

A14
Cambridge to Huntingdon
improvement scheme
Development Consent Order Application
Response to the First Written Questions

HE/A14/EX/38

TR010018

HE/A14/EX/38
Development Consent Order Application Response to the First Written Questions
Report 11: Planning Policy Context

June 2015

The Infrastructure Planning (Examination Procedure) Rules 2010

A14 Cambridge to Huntingdon improvement scheme

Development Consent Order Application
Response to the First Written Questions
(Report 11: Planning Policy Context)

Contents

11	Planning Policy Context	3
	Question 1.11.1.....	3
	Response.....	3
	Question 1.11.2.....	7
	Response.....	7
	Question 1.11.3.....	10
	Response.....	10

Figures

Figures

Figure 11-1: Recommended national precautionary sensitivity ranges for peak rainfall intensity, peak river flow, offshore wind speed and wave height	7
--	---

11 Planning Policy Context

Question 1.11.1

How have the impacts of climate change been taken into account in the location, design, build and future operation of the proposed scheme? Where in the ES are the projected impacts of climate change discussed and taken account of? (Para 4.40 NN NPS)

Response

1. In schemes of this nature the climate change issue primarily relates to potential effects of changes in weather patterns. Current guidance focuses on the potential for greater extremes of weather, including heat and cold extremes, rainfall intensity and extended periods of drought.

Location

2. The overall location of the scheme is dictated by the need to retain the A14 as a key east-west link and to link with other major roads in the area. This requirement has limited the ability to cater for climate change considerations related to existing surface water courses by avoiding them completely. In terms of physical configuration, the scheme has been designed to remain functional in extreme rainfall events – for example by elevating the proposed vertical alignment above the 1 in 100 year flood level, and by not siting key infrastructure (communications, lighting power supplies) where it would be prone to flooding.

Design

Drainage design parameters

3. Currently specific guidance for climate change is focussed on the requirements for drainage design, to cater for predicted increases in rainfall intensity.
4. The design incorporates an allowance for climate change for culverts and floodplain compensation areas of an additional 20% in peak river flow for the 1% (1 in 100) Annual Exceedance probability (AEP) event. Similarly, the highway drainage design incorporates an additional 20% in rainfall intensity.

5. The design of balancing ponds and similar storage facilities has been based on providing sufficient storage for the critical duration 1% (1 in 100) AEP storm event +20% climate change allowance. It has been agreed with the Environment Agency and Cambridgeshire County Council as lead local flood authority that any adjustment required to reflect increased climate change predictions will be undertaken during major maintenance cycles prior to 2085 and so either the detailed design of balancing ponds will provide, as far as is reasonable, for increase in the size of the ponds or alternative measures at reasonable cost will be taken in the future to achieve this.

Earthworks design

6. The earthworks side slopes in the proposed design have been designed to Eurocode 7 (BS EN 1997-1) and BS 6031 (the British Code of Practice for Earthworks). These slopes are likely to be predominantly constructed in high plasticity clay soils – either insitu in cuttings or out of fill derived from such soils in embankments.
7. These soils are susceptible to cyclical seasonal shrink-swell effects and strain softening in the “vadose” zone which runs approximately parallel and up to 1.5m below the surface of the slopes. Due to the effects of the weather, these soils become drier in summer (and thus shrink) and wetter in winter (and so swell). Climate change is likely to lead to longer periods of both drier and wetter weather, increasing these cyclical shrink-swell effects. Accordingly, the vadose zone has been conservatively modelled with fully softened soil parameters and the worst credible groundwater scenario, resulting in fairly slack slopes. As a result, the slope designs are robust in terms of climate change and will enable a futureproof, maintenance-free design.

Build

8. Section 5.10 of The Code of Construction Practice (*ES Appendix 20.2 Doc ref 6.3*) identifies the need for main contractors on the scheme to ‘pay due consideration to the impacts of extreme weather events and related conditions during construction.’ The details of such measures are to be set out in the Construction Environmental Management Plans (CEMPs) to be prepared by each contractor prior to the start of works. The potential impacts of climate change on highway surfacing would influence the choice of surfacing composition specified in the detailed design.

Operation

9. During operation, the scheme has been designed to remain functional in extreme rainfall events – for example by elevating the proposed vertical alignment above the 1 in 100 year flood level, and by not siting key infrastructure (communications, lighting power supplies) where it would be prone to flooding.

10. Regular resurfacing would take account of the most obvious potential effects arising from increased severity of heat related climate change events beyond those currently predicted.

National Networks National Policy Statement (NN NPS) Compliance

11. Highways England has submitted document HE-A14-EX-21 to demonstrate compliance with NN NPS policies on climate change. These NN NPS policies include paragraphs 2.7, 4.36 to 4.47 and 5.93. For example, against paragraph 4.40, Highways England's response is:

12. *The Flood Risk Assessment in the Environmental Statement (ES) Appendix 17.1 (document reference 6.3) and ES (document reference 6.1) Chapter 17 on Road Drainage and the Water Environment sets out how the proposal takes account of predicted impacts of climate change.*

Environmental Statement

13. The *ES (document reference 6.1)* deals with climate change at both a strategic level and under relevant specific topic headings. Climate change is considered within specific topic chapters where relevant to the understanding of the baseline environment and potential impact interactions.
14. Section 3.3 and 3.9 of chapter 3 of the *ES* describes the approach to climate change in the design process, and discusses policy and the guidance parameters used in the scheme design.
15. Greenhouse gases associated with climate change are considered in *ES* chapter 8 Air Quality (para 8.5.56 and 8.5.57) and also chapter 13 Materials (para 13.6.16 *et seq*) of the *ES*.
16. Para 10.4.13 of chapter 10 Landscape of the *ES* notes the need to consider climate change in species selection during the detailed design stage.
17. Para 11.3.115 of chapter 11 Nature Conservation of the *ES* discusses the potential impacts of climate change and refers to current guidance in relation to potential effects on biodiversity. The environmental design of the scheme includes measures to retain habitat corridor linkages across the scheme, and the east-west Huntingdon Southern Bypass element would provide a significant east-west habitat corridor in an area where such features are extremely limited.

18. Chapter 17 of the *ES*, Road Drainage and the Water Environment, highlights the importance of climate change predictions in the drainage design of the scheme. Paragraph 17.2.14 makes reference to the allowance made in the preliminary design of the scheme, and paragraph 17.3.5 refers to the allowances made in the flood risk assessment for the scheme. Paragraphs 17.5.10 *et seq* discuss flood risk and drainage aspects of the scheme, and make clear the allowances for climate change included in the design and assessment process.

Question 1.11.2

Please identify the adaptation measures in place in response to the potential impacts of climate change. How can the ExA be assured that there are no critical features of the design of the proposed scheme which may be seriously affected by more radical changes to the climate beyond current predictions? (Para 4.37 NN NPS)

Response

19. The scheme's compliance with the National Networks National Policy Statement (NN NPS) is set out in HE/A14/EX-21, in particular section 4.36 *et seq.*
20. Current guidance requires designs to take account of the predicted impact of climate change with the associated potential for greater extremes of weather, including heat and cold extremes, rainfall intensity and extended periods of drought.
21. The impact of climate change on the scheme has been assessed in accordance with Environment Agency guidance note 'Climate change allowances for planners' (September 2013) produced to support the National Planning Policy Framework (NPPF) (2012) reproduced in the published table shown in Figure 11-1.

Figure 11-1: Recommended national precautionary sensitivity ranges for peak rainfall intensity, peak river flow, offshore wind speed and wave height

Table 2: Recommended national precautionary sensitivity ranges for peak rainfall intensity, peak river flow, offshore wind speed and wave height

Parameter	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
Peak rainfall intensity	+5%	+10%	+20%	+30%
Peak river flow	+10%	+20%		
Offshore wind speed	+5%		+10%	
Extreme wave height	+5%		+10%	

Drainage design parameters

22. With regards to drainage design, the proposed design of balancing ponds and similar storage facilities has been based on providing sufficient storage for the critical duration 1 in 100 year storm event plus a further 20% climate change allowance in rainfall intensity. This is based on the design life expectancy for drainage assets to be 60 years, as stipulated by Highways England guidelines, making them life expired around 2080. This would be consistent with the above guidance. In the event that the anticipated design life expectancy of the drainage assets exceed year 2085 or future proofing of drainage assets is required, then further consultations with EA and CCC would be carried out at detailed design stage. The design of balancing ponds would provide, as far as is reasonable, for increase in the size of the ponds (or provision of alternative measures at reasonable cost) at a future date to provide for a forecast minimum 30% climate change allowance in rainfall intensity beyond year 2085 up to year 2115.
23. This approach has been agreed with the Environment Agency and Cambridgeshire County Council.
24. Drainage culverts would be designed in accordance with the design life expectancy for structures which is 100 years. Therefore, the design would allow for a 1 in 100 year peak storm flows + 20% climate change allowance in peak river flow as recommended in the above table for assets with a life span up to year 2115.

Flood risk assessment

25. Floodplain compensation has been provided on a level for level basis up to the 1 in 100 year + 20% climate change water level (based on peak river flows) that would provide an allowance for climate change up to year 2115. Again, this is in accordance with the published guidance in the above table and has been agreed with the EA.

Earthworks design

26. The earthworks side slopes in the proposed design have been designed to Eurocode 7 (BS EN 1997-1) and BS 6031 (the British Code of Practice for Earthworks). These slopes are likely to be predominantly constructed in high plasticity clay soils – either insitu in cuttings or out of fill derived from such soils in embankments.

27. These soils are susceptible to cyclical seasonal shrink-swell effects and strain softening in the “vadose” zone which runs approximately parallel and up to 1.5m below the surface of the slopes. Due to the effects of the weather, these soils become drier in summer (and thus shrink) and wetter in winter (and so swell). Climate change is likely to lead to longer periods of both drier and wetter weather, increasing these cyclical shrink-swell effects. Accordingly, the vadose zone has been conservatively modelled with fully softened soil parameters and the worst credible groundwater scenario, resulting in fairly slack slopes. As a result, the slope designs are considered to be robust in terms of climate change and will provide a future proof, low maintenance design.

Scheme Location and Operational Considerations

28. In terms of scheme location and operation, the scheme has been designed to remain functional in extreme rainfall events – for example by elevating the proposed vertical alignment above the 1 in 100 year flood level, by sizing culverts and bridges allowing for climate change and by not siting key infrastructure (such as communications, lighting power supplies) where it would be prone to flooding.

29. The potential impacts of climate change on highway surfacing would influence the choice of surfacing composition in the detailed design but this is not critical in terms of the overall scheme design as periodic resurfacing would take place throughout the life of the scheme, allowing adaptations to be made if necessary.

Radical Climate Changes beyond Current Predictions

30. Scheme designs have been based on published current guidance with respect to climate change allowances. No further allowance has been made beyond current expectations (which include an allowance for climate change) as this is not required by paragraph 4.37 of the NN NPS.

Question 1.11.3

What are the arrangements for undertaking road safety audits and how are these secured in the draft DCO? (Para 4.62 NN NPS)

Response

31. The Road Safety Audit process is mandatory for Highways England and the project is being undertaken in accordance with HD 19 of the *Design Manual for Roads and Bridges*.
32. A Stage 1 Road Safety Audit was undertaken by Highways England in August/September 2014, when the audit was also discussed with Cambridgeshire County Council. A Stage 2 Road Safety Audit will be undertaken after the detailed design and prior to the commencement of construction. During construction, the appointed Highways England main contractors will consult with the traffic management working group for traffic management measures proposed and will undertake Road Safety Audits for complex or major traffic management schemes in accordance with *Design Manual for Roads and Bridges* and with reference to the 6.3 *Environmental Statement (ES) Appendix 20.2 - Code of Construction Practice*, the latter of which is secured under Schedule 2 to the DCO.
33. There will also be a Stage 3 and 4 Road Safety Audit, following the construction of the scheme.
34. Highways England does not consider it is necessary to secure a specific requirement for undertaking road safety audits within the Development Consent Order (DCO), as HD 19 of the *Design Manual for Roads and Bridges* is a standard, mandatory procedure for Highways England to undertake.