Great Yarmouth Third River Crossing

Application for Development Consent Order

Document 6.2: Environmental Statement Volume II: Technical Appendix 13C: Climate Change Risk Assessment

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) ("APFP")

APFP regulation Number: 5(2)(a)

Planning Inspectorate Reference Number: TR010043

Author: Norfolk County Council

Document Reference: 6.2 – Technical Appendix 13C

Version Number: 0 – Revision for Submission

Date: 30 April 2019

CONTENTS

PAGE No.

Tables

1 Climate Change Risk Assessment

1.1.1 In line with published guidance (primarily IEMA (2015), Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (Ref 1.14) and European Commission (2016), Climate Change and Major Projects (Ref 1.15), the assessment of climate vulnerability and risk in the EIA process consists of five steps:

- **Step 1**: Identify receptors and analyse policy context;
- **Step 2**: Climate vulnerability assessment;
- **Step 3**: Risk assessment;
- **Step 4**: Adaptation measures and
- **Step 5:** Determination of significance.

1.1.2 This Appendix presents the detailed assessment and findings of Step 3.

Step 3: Risk Assessment

1.1.3 The full methodology for the risk assessment is presented in Chapter 13, paragraphs 13.6.11 to 13.6.14.

1.1.4 The risk assessment identifies hazardous related to the 'medium' and 'high' vulnerabilities identified in Step 2. The climate and weather-related risks affecting the Scheme receptors over the construction and operational phases associated with the medium and high vulnerabilities are presented in Table 1.1 of this Appendix.

1.1.5 Unless stated, the impacts identified in the table below are expected to impact the whole Scheme. The terms 'road', 'bridge' and 'cycle and footway' are used throughout this Appendix, Chapter 13: Climate Change (document reference 6.1) and Appendix 13B:

- The 'road' including the new dual carriageway road, five-arm roundabout signalised junction junctions and reinforced earth embankments;
- 'Bridges' including the new double-leaf bascule bridge and associated substructure and 'knuckle' walls and associated control tower, plant room control equipment, and single span bridge over Southtown Road; and
- The 'cycle and footway' comprising the cycle and pedestrian provision.

1.1.6 The risk assessment is then undertaken by considering the likelihood of climate hazards occurring and the consequences to Scheme elements through a quantitative assessment based on professional judgement. The consequence and likelihood ratings are combined to develop a climate risk rating for each element of the Scheme relative to a specific climate hazard as presented in Table 1.2.

Table 1.1: Climate Variables and Associated Hazards / Opportunities for the Scheme

Climate Variable	Associated Hazards / Opportunities	Impact (construction and operational phase)					
		Structural Stability	Structural Robustness	Ancillary Equipment	Material Durability	Site Contents and Business Continuity	Health and safety (H&S of Users (operators and customers)
Sea	Sea level rise (applicable to road, bridges, cycle and footway)	Damage to road, bridge, cycle and footway structures due to flooding Soil softening and erosion leading to collapse and settlement of structures Increased slope instability Soil saturation	Deformation of rigid structures (road, bridge, cycle and footway etc). Undercutting, particularly in relation to the bridge over the River Yare	Softening of subsurface materials Blockage of drains and associated assets	Greater mobilisation of pollutants in the soil/ground causing premature deterioration of materials Increase in soil salinity leading to deterioration of materials	Road, bridge, cycle and footway closure due to flooding Scour of embankments leading to increased maintenance	Health and safety risks to road, bridge, cycle and footway users from sea level rise (such as flooding, damage to structures).
	Storm surge	Damage to road, bridge,	Undercutting, particularly in	Blockage of drains and	Greater mobilisation	Road, bridge, cycle and	Health and safety risks

Climate Variable	Associated Hazards / Opportunities	Impact (construction and operational phase)					
		Structural Stability	Structural Robustness	Ancillary Equipment	Material Durability	Site Contents and Business Continuity	Health and safety (H&S of Users (operators and customers)
	(applicable to road, bridges, cycle and footway)	cycle and footway structures due to flooding Subsidence impacting road, bridge, cycle and footway structures	relation to the bridge over the River Yare	associated assets	of pollutants in the soil/ground causing premature deterioration of materials	footway closure due to flooding Traffic disruption and congestion	to road, bridge, cycle and footway users from storm surge (such as flooding, damage to structures).
Precipitation	Changes in annual average – drier summers (applicable to road)	Failure of earthworks due to desiccation Shrinking and cracking of soils leading to subsidence	Shrinking and cracking of soils leading to cracking of road surface	Damage and disruption from fires Die-back of vegetation	Enhanced reactions when cement stabilising and drying of concrete	Increased dust and windborne materials affecting site construction, operation and maintenance, including silting and sedimentation	Fewer construction days lost to heavy rainfall More dust

Climate Variable	Associated Hazards / Opportunities	Impact (construction and operational phase)					
		Structural Stability	Structural Robustness	Ancillary Equipment	Material Durability	Site Contents and Business Continuity	Health and safety (H&S of Users (operators and customers)
	Changes in annual average – wetter winters (applicable to road)	Flooding and damage due to increased run-off Soil softening and erosion leading to collapse and settlement of soil structures Increased slope instability Soil saturation	Deformation of rigid structures Damage to unpaved shoulders	Blockage / overwhelming of drains and associated assets Water accumulation in low spots and/or on impermeable surfaces Excessive vegetation growth Softening of subsurface materials	Greater mobilisation of pollutants in the soil/ground More rapid erosion of materials	Increasingly difficult working conditions, including time available to undertake works Reduced opportunities for maintenance	Movement of debris causing slip, trip and fall hazards Increased risk of aquaplaning Construction days lost to heavy rainfall

Climate Variable	Associated Hazards / Opportunities	Impact (construction and operational phase)					
		Structural Stability	Structural Robustness	Ancillary Equipment	Material Durability	Site Contents and Business Continuity	Health and safety (H&S of Users (operators and customers)
	Drought (applicable to road, cycle and footway)	Failure of earthworks due to desiccation, particularly impacting the road structure Shrinking and cracking of soils leading to subsidence	Drying out of construction materials and cracking Deformation of rigid structures, particularly road, cycle and footway	Damage and disruption from fires Die-back of vegetation	Enhanced reactions when cement stabilising and drying of concrete Increased rate of deterioration of materials, potentially leading to need for early replacement Shrinking and cracking	No applicable impact	More dust Evaporation of construction water
	Extreme rainfall events (applicable to road, bridges,	Damage to road, bridge, cycle and footway	Deformation of rigid structures	Drains and culverts becoming overwhelmed	Accelerated deterioration of materials	Water accumulation causing disruption to	Difficult working conditions

Climate Variable	Associated Hazards / Opportunities	Impact (construction and operational phase)					
		Structural Stability	Structural Robustness	Ancillary Equipment	Material Durability	Site Contents and Business Continuity	Health and safety (H&S of Users (operators and customers)
	cycle and footway)	structures due to flooding and increased run-off Soil saturation and water damage Undercutting particularly in relation to the bridge over the River Yare Increased slope instability Erosion, silting and sedimentation	Damage to unpaved shoulders	Blockages of drainage assets	Greater mobilisation of pollutants in soil/ground causing premature deterioration of materials	construction and operation Stopping of services due to asset failure Scour of embankments leading to increased maintenance Traffic disruption and congestion	Movement of debris causing slip, trip and fall hazards Health and safety risks to road users from extreme rainfall (such as flooding and standing water).

Climate Variable	Associated Hazards / Opportunities	Impact (construction and operational phase)					
		Structural Stability	Structural Robustness	Ancillary Equipment	Material Durability	Site Contents and Business Continuity	Health and safety (H&S of Users (operators and customers)
		Softening of subsurface materials					
Temperature	Extreme temperature events (applicable to road, bridges, cycle and footway)	Cracking and expansion, particularly impacting road, bridge, cycle and footway structures Increased risk of erosion	Damage and disruption from e.g. fires Deformation of structures and materials	Overheating of equipment, including during construction and operation (e.g. electronic signage) Failure of temperature controls	Enhanced reactions when cement is stabilising and drying of concrete UV degradation of exposed equipment e.g. cabling	Reduced working periods and delays Risks to stored equipment, including waste Reduced opportunities for maintenance Operational disruption	Difficult working conditions Increased fire risk Hot surfaces which may cause injury Health and safety risks to road users from extreme temperature events such as exposure, damaged road, bridges,

Climate Variable	Associated Hazards / Opportunities	Impact (construction and operational phase)					
		Structural Stability	Structural Robustness	Ancillary Equipment	Material Durability	Site Contents and Business Continuity	Health and safety (H&S of Users (operators and customers)
							cycle and footpath surfaces).
	Solar radiation (applicable to road)	No applicable impact	No applicable impact	Increased solar gain (i.e. glare and warming of exposed surfaces)	Deformation of materials UV degradation of exposed equipment e.g. cabling	Reduced opportunities for maintenance	Health and safety risks to road users and operatives from exposure to solar radiation.
Wind	Gales and high winds (applicable to road, bridges)	Risk of damage to road and bridge structures Erosion of banks and	Damage from high winds and rain-infiltration into surfaces and materials	Damage from high winds and rain-infiltration into surfaces and materials	Increased rate of deterioration of materials	Reduced opportunities for maintenance Operational disruption	Difficult working conditions Health and safety risks to road users, particularly

Climate Variable	Associated Hazards / Opportunities	Impact (construction and operational phase)					
		Structural Stability	Structural Robustness	Ancillary Equipment	Material Durability	Site Contents and Business Continuity	Health and safety (H&S of Users (operators and customers)
		exposed surfaces		Damage to signage and site structures			high sided vehicles from gales and high winds, debris.
	Storms (applicable to bridges)	Destabilisation due to lighting strike, particularly to the bridge and associated control tower	No applicable impact	Destabilisation due to lighting strike, particularly to the bridge and associated control tower	No applicable impact	Risk to power sources Risk to operation of the bridge and control tower through loss of power Fire risk	Difficult working conditions Health and safety risks to road users from storms, such as exposure, debris, strong winds or rain.
Soils	Soil moisture (applicable to road, cycle and footway)	Shrinking and cracking of soils leading to subsidence	Cracking of structures	Shrinking and cracking of soils leading to subsidence	Greater mobilisation of pollutants	Increased maintenance costs and	Difficult working conditions

Climate Variable	Associated Hazards / Opportunities	Impact (construction and operational phase)					
		Structural Stability	Structural Robustness	Ancillary Equipment	Material Durability	Site Contents and Business Continuity	Health and safety (H&S of Users (operators and customers)
		Soil softening and erosion leading to collapse and settlement of structures Increased slope instability Soil saturation			in the soil/ground	risks to operation	Risk from slope instability
	Soil Salinity (applicable to bridges)	No applicable impact	No applicable impact	No applicable impact	Increased rate of deterioration of materials, potentially leading to need for early replacement	No applicable impact	No applicable impact

Climate Variable	Associated Hazards / Opportunities	Impact (construction and operational phase)					
		Structural Stability	Structural Robustness	Ancillary Equipment	Material Durability	Site Contents and Business Continuity	Health and safety (H&S of Users (operators and customers)
	Runoff (applicable to road, cycle and footway)	Flooding and damage due to increased run-off Soil saturation	Damage to unpaved shoulders	Blockage / overwhelming of drains and associated assets Drains and culverts becoming overwhelmed Water accumulation in low spots and/or on impermeable surfaces	More rapid erosion of materials	Increasingly difficult working conditions, including time available to undertake works	Movement of debris causing slip, trip and fall hazards Increased risk of aquaplaning
	Soil stability (applicable to road, bridges, cycle and footway)	Subsidence impacting road, bridge, cycle and footway structures Failure of earthworks	No applicable impact	Increased rate of deterioration, potentially leading to need for early replacement	Increased rate of deterioration of materials	Increased maintenance costs and risks to operation	Movement of debris causing slip, trip and fall hazards

Climate Variable	Associated Hazards / Opportunities	Impact (construction and operational phase)					
		Structural Stability	Structural Robustness	Ancillary Equipment	Material Durability	Site Contents and Business Continuity	Health and safety (H&S of Users (operators and customers)
		due to desiccation Shrinking and cracking of soils Greater rates of soil erosion					

1.1.7 The severity of risk of the impacts described above depends on the likelihood of them occurring and the consequence if they do occur. Table 1.2 presents risk ratings for each of the identified climate risks, across both the construction and operational phases, to the Scheme based on a qualitative assessment of likelihood and consequence.

Table 1.2: Risk Assessment

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
Structural stability	Sea level rise (applicable to road, bridges, cycle and footway)	Damage to road, bridge, cycle and footway structures due to flooding	Moderate adverse	Low	Medium
		Soil softening and erosion leading to collapse and settlement of soil structures	Minor adverse	Low	Low
		Increased slope instability	Moderate adverse	Low	Medium
		Soil saturation	Minor adverse	Medium	Low
	Storm surge (applicable to road, bridges, cycle and footway)	Damage to road, bridge, cycle and footway structures due to flooding	Moderate adverse	Low	Medium
		Subsidence impacting road, bridge, cycle and footway structures leading to subsidence	Moderate adverse	Low	Medium
	Changes in annual average – drier summers (applicable to road)	Failure of earthworks due to desiccation	Large adverse	Low	Medium
		Shrinking and cracking of soils leading to subsidence	Minor adverse	Medium	Low
	Changes in annual average – wetter winters	Flooding and damage due to increased run-off	Minor adverse	Medium	Low

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
	(applicable to road)	Soil softening and erosion leading to collapse and settlement of soil structures	Moderate adverse	Low	Medium
		Increased slope instability	Large adverse	Low	Medium
		Soil saturation	Minor adverse	Low	Low
	Drought (applicable to road, cycle and footway)	Failure of earthworks due to desiccation, particularly impacting the road structure	Large adverse	Low	Medium
		Shrinking and cracking of soils leading to subsidence	Moderate adverse	Medium	Medium
	Extreme rainfall events (applicable to road, bridges, cycle and footway)	Damage to road, bridge, cycle and footway structures due to flooding and increased run-off	Minor adverse	Medium	Low
		Soil saturation and water damage	Moderate adverse	Low	Medium
		Undercutting particularly in relation to the bridge over the River Yare	Large adverse	Low	Medium
		Increased slope instability	Moderate adverse	Low	Medium
		Erosion, silting and sedimentation	Minor adverse	Medium	Low
		Softening of subsurface materials	Moderate adverse	Low	Medium

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
	Extreme temperature events (applicable to road, bridges, cycle and footway)	Cracking and expansion, particularly impacting road, bridge, cycle and footway structures	Moderate adverse	Medium	Medium
		Increased risk of erosion	Minor adverse	Medium	Low
	Gales and high winds (applicable to road, bridges)	Risk of damage to road and bridge structures and foundations	Moderate adverse	Low	Medium
		Erosion of banks and exposed surfaces	Minor adverse	Medium	Low
	Storms (applicable to bridges)	Destabilisation due to lighting strike, particularly to the bridge and associated control tower	Large adverse	Very low	Medium
	Soil moisture (applicable to road, cycle and footway)	Shrinking and cracking of soils leading to subsidence	Moderate adverse	Medium	Medium
		Soil softening and erosion leading to collapse and settlement of structures	Moderate adverse	Low	Medium
		Increased slope instability	Moderate adverse	Low	Medium
		Soil saturation	Minor adverse	Low	Low
	Runoff (applicable to road, cycle and footway)	Flooding and damage due to increased run-off	Minor adverse	Medium	Low

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
		Soil saturation	Minor adverse	Low	Low
	Soil stability (applicable to road, bridges, cycle and footway)	Subsidence impacting road, bridge, cycle and footway structures	Moderate adverse	Medium	Medium
		Failure of earthworks due to desiccation	Moderate adverse	Low	Medium
		Shrinking and cracking of soils	Moderate adverse	Medium	Medium
		Greater rates of soil erosion	Minor adverse	Medium	Low
Structural robustness	Sea level rise (applicable to road, bridges, cycle and footway)	Deformation of rigid structures (road, bridge, cycle and footway etc).	Moderate adverse	Low	Medium
		Undercutting, particularly in relation to the bridge over the River Yare	Moderate adverse	Low	Medium
	Storm surge (applicable to road, bridges, cycle and footway)	Undercutting, particularly in relation to the bridge over the River Yare	Moderate adverse	Low	Medium
	Changes in annual average – drier summers (applicable to road)	Shrinking and cracking of soils leading to cracking of road surface	Moderate adverse	Medium	Medium
	Changes in annual average – wetter winters (applicable to road)	Deformation of rigid structures	Moderate adverse	Low	Medium
		Damage to unpaved shoulders	Minor adverse	Medium	Low

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
	Drought (applicable to road, cycle and footway)	Drying out of construction materials and cracking	Minor adverse	Medium	Low
		Deformation of rigid structures, particularly road, cycle and footway	Moderate adverse	Low	Medium
	Extreme rainfall events (applicable to road, bridges, cycle and footway)	Deformation of rigid structures	Moderate adverse	Low	Medium
		Damage to unpaved shoulders	Minor adverse	Medium	Low
	Extreme temperature events (applicable to road, bridges, cycle and footway)	Damage and disruption from fires	Minor adverse	Low	Low
		Deformation of structures and materials	Moderate adverse	Medium	Medium
	Gales and high winds (applicable to road, bridges)	Damage from high winds and rain-infiltration into surfaces and materials	Minor adverse	Medium	Low
	Soil moisture (applicable to road, cycle and footway)	Cracking of structures	Moderate adverse	Medium	Medium
	Runoff (applicable to road, cycle and footway)	Damage to unpaved shoulders	Minor adverse	Medium	Low

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
Ancillary equipment	Sea level rise (applicable to road, bridges, cycle and footway)	Softening of subsurface materials	Moderate adverse	Low	Medium
		Blockage of drains and associated assets	Minor adverse	High	Medium
	Storm surge (applicable to road, bridges, cycle and footway)	Blockage of drains and associated assets	Minor adverse	High	Medium
	Changes in annual average – drier summers (applicable to road)	Damage and disruption from fires	Minor adverse	Low	Low
		Die-back of vegetation	Minor adverse	Medium	Low
	Changes in annual average – wetter winters (applicable to road)	Blockage / overwhelming of drains and associated assets	Minor adverse	High	Medium
		Water accumulation in low spots and/or on impermeable surfaces	Minor adverse	Medium	Low
		Excessive vegetation growth	Minor adverse	Medium	Low
		Softening of subsurface materials	Moderate adverse	Medium	Medium
	Drought (applicable to road, cycle and footway)	Damage and disruption from fires	Minor adverse	Low	Low
		Die-back of vegetation	Minor adverse	Medium	Low
	Extreme rainfall events	Drains and culverts becoming overwhelmed	Minor adverse	Medium	Low

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
	(applicable to road, bridges, cycle and footway)	Blockages of drainage assets	Minor adverse	High	Medium
	Extreme temperature events (applicable to road, bridges, cycle and footway)	Overheating of equipment, including during construction and operation (e.g. electronic signage)	Minor adverse	Low	Low
		Failure of temperature controls	Moderate adverse	Low	Medium
	Solar radiation (applicable to road)	Increased solar gain (i.e. glare and warming of exposed surfaces)	Minor adverse	Medium	Low
	Gales and high winds (applicable to road, bridges)	Damage from high winds and rain-infiltration into surfaces and materials	Minor adverse	Medium	Low
		Damage to signage and site structures	Minor adverse	Medium	Low
	Storms (applicable to bridges)	Destabilisation due to lighting strike, particularly to the bridge and associated control tower	Large adverse	Very low	Medium
	Soil moisture (applicable to road, cycle and footway)	Shrinking and cracking of soils leading to subsidence	Moderate adverse	Medium	Medium
	Runoff (applicable to road, cycle and footway)	Blockage / overwhelming of drains and associated assets	Minor adverse	High	Medium

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
		Drains and culverts becoming overwhelmed	Minor adverse	Medium	Low
		Water accumulation in low spots and/or on impermeable surfaces	Minor adverse	Medium	Low
	Soil stability (applicable to road, bridges, cycle and footway)	Increased rate of deterioration, potentially leading to need for early replacement	Minor adverse	Medium	Low
Material durability	Sea level rise (applicable to road, bridges, cycle and footway)	Greater mobilisation of pollutants in the soil/ground causing premature deterioration of materials	Minor adverse	Low	Low
		Increase in soil salinity leading to deterioration of materials	Minor adverse	Low	Low
	Storm surge (applicable to road, bridges, cycle and footway)	Greater mobilisation of pollutants in the soil/ground causing premature deterioration of materials	Minor adverse	Low	Low
	Changes in annual average – drier summers (applicable to road)	Enhanced reactions when cement stabilising and drying of concrete	Minor beneficial	Medium	Not applicable, beneficial effect
	Changes in annual average – wetter winters (applicable to road)	Greater mobilisation of pollutants in the soil/ground	Minor adverse	Low	Low
		More rapid erosion of materials	Minor adverse	Medium	Low

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
	Drought (applicable to road, cycle and footway)	Enhanced reactions when cement stabilising and drying of concrete	Minor beneficial	Medium	Not applicable, beneficial effect
		Increased rate of deterioration of materials, potentially leading to need for early replacement	Minor adverse	Medium	Low
		Shrinking and cracking	Minor adverse	Medium	Low
	Extreme rainfall events (applicable to road, bridges, cycle and footway)	Accelerated deterioration of materials	Minor adverse	Medium	Low
		Greater mobilisation of pollutants in soil/ground causing premature deterioration of materials	Minor adverse	Low	Low
	Extreme temperature events (applicable to road, bridges, cycle and footway)	Enhanced reactions when cement is stabilising and drying of concrete	Minor beneficial	Medium	Not applicable, beneficial effect
		UV degradation of exposed equipment e.g. cabling	Minor adverse	Low	Low
	Solar radiation (applicable to road)	Deformation of materials	Moderate adverse	Low	Medium
		UV degradation of exposed equipment e.g. cabling	Minor adverse	Low	Low

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
	Gales and high winds (applicable to road, bridges)	Increased rate of deterioration of materials	Minor adverse	Medium	Low
	Soil moisture (applicable to road, cycle and footway)	Greater mobilisation of pollutants in the soil/ground	Minor adverse	Low	Low
	Soil Salinity (applicable to bridges)	Increased rate of deterioration of materials, potentially leading to need for early replacement	Minor adverse	Low	Low
	Runoff (applicable to road, cycle and footway)	More rapid erosion of materials	Minor adverse	Medium	Low
	Soil stability (applicable to road, bridges, cycle and footway)	Increased rate of deterioration of materials	Minor adverse	Low	Low
Site contents and business continuity	Sea level rise (applicable to road, bridges, cycle and footway)	Road, bridge, cycle and footway closure due to flooding	Moderate adverse	Low	Medium
		Scour of embankments leading to increased maintenance	Moderate adverse	Low	Medium
	Storm surge (applicable to road, bridges, cycle and footway	Road, bridge, cycle and footway closure due to flooding	Moderate adverse	Low	Medium
		Traffic disruption and congestion	Moderate adverse	Low	Medium

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
	Changes in annual average – drier summers (applicable to road)	Increased dust and windborne materials affecting site construction, operation and maintenance, including silting and sedimentation	Minor adverse	Medium	Low
	Changes in annual average – wetter winters (applicable to road)	Increasingly difficult working conditions, including time available to undertake works	Minor adverse	High	Medium
		Reduced opportunities for maintenance	Minor adverse	High	Medium
	Extreme rainfall events (applicable to road, bridges, cycle and footway)	Water accumulation causing disruption to construction and operation	Minor adverse	High	Medium
		Stopping of services due to asset failure	Moderate adverse	Low	Medium
		Scour of embankments leading to increased maintenance	Moderate adverse	Medium	Medium
		Traffic disruption and congestion	Moderate adverse	Medium	Medium
	Extreme temperature events	Reduced working periods and delays	Minor adverse	High	Medium
		Risks to stored equipment, including waste	Minor adverse	Medium	Low

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
	(applicable to road, bridges, cycle and footway)	Reduced opportunities for maintenance	Minor adverse	High	Medium
		Operational disruption	Minor adverse	Medium	Low
	Solar radiation (applicable to road)	Reduced opportunities for maintenance	Minor adverse	Medium	Low
	Gales and high winds (applicable to road, bridges)	Reduced opportunities for maintenance	Minor adverse	Medium	Low
		Operational disruption	Moderate adverse	Medium	Medium
	Storms (applicable to bridges)	Risk to power sources	Moderate adverse	Low	Medium
		Risk to operation of the bridge and control tower through loss of power	Moderate adverse	Low	Medium
		Fire risk	Moderate adverse	Low	Medium
	Soil moisture (applicable to road, cycle and footway)	Increased maintenance costs and risks to operation	Minor adverse	Low	Low
	Runoff (applicable to road, cycle and footway)	Increasingly difficult working conditions, including time available to undertake works	Minor adverse	High	Medium
	Soil stability	Increased maintenance costs and risks to operation	Minor adverse	Low	Low

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
	(applicable to road, bridges, cycle and footway)				
H&S of users (operators and customers)	Sea level rise (applicable to road, bridges, cycle and footway)	Health and safety risks to road, bridge, cycle and footway users	Minor adverse	Low	Low
	Storm surge (applicable to road, bridges, cycle and footway)	Health and safety risks to road, bridge, cycle and footway users	Minor adverse	Low	Low
	Changes in annual average – drier summers (applicable to road	Fewer construction days lost to heavy rainfall	Minor beneficial	Medium	Not applicable, beneficial effect
		More dust	Minor adverse	Medium	Low
	Changes in annual average – wetter winters (applicable to road)	Movement of debris causing slip, trip and fall hazards	Minor adverse	Medium	Low
		Increased risk of aquaplaning	Minor adverse	Medium	Low
		Construction days lost to heavy rainfall	Minor adverse	Medium	Low

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
	Drought (applicable to road, cycle and footway)	More dust	Minor adverse	Medium	Low
		Evaporation of construction water	Minor adverse	Medium	Low
	Extreme rainfall events (applicable to road, bridges, cycle and footway)	Difficult working conditions	Minor adverse	Medium	Low
		Movement of debris causing slip, trip and fall hazards	Minor adverse	Medium	Low
		Health and safety risks to road users	Minor adverse	Medium	Low
	Extreme temperature events (applicable to road, bridges, cycle and footway)	Difficult working conditions	Minor adverse	Medium	Low
		Increased fire risk	Minor adverse	Low	Low
		Hot surfaces which may cause injury	Minor adverse	Low	Low
		Health and safety risks to road users	Minor adverse	Medium	Low
	Solar radiation (applicable to road)	Health and safety risks to road users and operatives	Minor adverse	Medium	Low
	Gales and high winds (applicable to road, bridges)	Difficult working conditions	Minor adverse	High	Medium
		Health and safety risks to road users, particularly high sided vehicles	Moderate adverse	High	Medium
	Storms (applicable to bridges)	Difficult working conditions	Minor adverse	Medium	Low
		Health and safety risks to road users	Minor adverse	Medium	Low

Component	Description of Risk Hazard	Risk	Consequence	Likelihood	Risk Rating
	Soil moisture (applicable to road, cycle and footway)	Difficult working conditions	Minor adverse	Low	Low
		Risk from slope instability	Moderate adverse	Low	Medium
	Runoff (applicable to road, cycle and footway)	Movement of debris causing slip, trip and fall hazards	Minor adverse	Medium	Low
		Increased risk of aquaplaning	Minor adverse	Medium	Low
	Soil stability (applicable to road, bridges, cycle and footway)	Movement of debris causing slip, trip and fall hazards	Minor adverse	Medium	Low