

Appendix 6

Supporting Chapter 6 – Overview of Assessment Process

Appendix 6.1 – Screening of Major Accidents and Disasters

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6. Major Accidents and Disasters

6.1. Introduction

- 6.1.1 Regulation 20B (4) of Part 3 of the Roads (Scotland) Act 1984 (as amended) stipulates that “the effects to be identified, described and assessed... include the expected effects deriving from the vulnerability of the development to risks, so far as relevant to the development of major accidents and disasters” as part of an Environmental Impact Assessment (EIA).
- 6.1.2 Schedule 1A(9) of the Roads Act state the specific requirement for information to be included in the EIA: “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”.
- 6.1.3 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 Environmental Statement (ES). This is implied both in the directive itself and the regulations quoted above, 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 Hazard Regulations (2015) and Council Directive 09/71/Euratom, which deals with nuclear sites. Neither of these Directives is relevant to the Proposed Scheme.
- 6.1.4 The identification of likely significant effects associated with major accidents and disasters enables projects to be developed in a manner that provides protection of the environment, for example by making allowances in the design of developments to build resilience to the effects of a flood event arising from future climate change.

6.2. Approach and Methodology

Approach

- 6.2.1 In the absence of guidance for Scotland based development, this assessment will follow the Highways England issued Major Projects Instruction (MPI) 57 ‘Implementing the Requirements of 2011/92/EU as amended by 2014/52/EU (EIA Directive).
- 6.2.2 This supplementary guidance sets out the matters to be covered as part of the scope of a major events assessment (‘events’ being the collective term used by Highways England to describe both major accidents and disasters). It states that assessments need to consider the vulnerability of the project to risks of major accidents and/or disasters and any consequential changes in the predicted effects of that project on environmental topics.
- 6.2.3 In order to frame the scope of the assessment, a major event has been 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 Proposed scheme, and which has substantial consequences for people or the environment.
- 6.2.4 This definition does not distinguish between a major accident and a major disaster as substantial overlap exists, but does recognise that an accident is necessarily of human origin, whereas a disaster can be of human or natural origin. Therefore the Proposed Scheme can be a source of major events (for example if a bridge forming an integral component of the Proposed Scheme were to fail and collapse) and a receptor of major events (for example if a major flood event occurred which inundated the carriageway of the Proposed Scheme).

Methodology

6.2.5 The major events assessment methodology adopted includes the following four stages:

- a. **Stage 1 – Long List:** Generation of a long list of possible major events. This has been compiled from the following data sources:
 - The UK Government’s Risk Register of Civil Emergencies (2017);
 - East of Scotland Regional Resilience Partnership’s (EOSRRP) Lothian and the Border’s Local Resilience Partnership Community Risk Register (April 2016);
 - Professional judgement based on the form and nature of the Proposed Scheme and knowledge regarding the surrounding environment;
 - Review of the Proposed Scheme Risk Register and the Design Hazard and Risk Log.
- b. **Stage 2 – Screening:** Screening of the long list of major events to determine those events that are relevant to the Proposed Scheme, or where the Proposed Scheme may have a realistic sensitivity to a particular event. Any major events that could not realistically occur, due to the type of development and the characteristics of the Proposed Scheme geographic location were omitted from the assessment at this stage.
- c. **Stage 3 – Scoping:** A scoping exercise was then undertaken to review the remaining relevant major events to see whether they require further evaluation or design mitigation (scoped in) or whether they would be appropriately mitigated/ managed such that consequential environmental effects would be insignificant (scoped out). Justification for scoping each major event in or out is reported herein. Where this exercise is unable to adequately justify the scoping out of a particular major event, such an event has been included on the Scheme-Specific shortlist and taken through to Stage 4. Types of major events have also been divided into two categories:
 - Type 1: Events that could realistically occur, but for which the Proposed Scheme and its associated environmental resources and receptors are no more vulnerable than any other development; and,
 - Type 2: Events that could occur, and to which the Proposed Scheme is particularly vulnerable, or which the construction and operation of the Proposed Scheme has a particular capacity to exacerbate.
- d. **Stage 4 – Assessment:** where any major events cannot be scoped out at Stage 3, and where further design mitigation is unable to remove the potential for the major event to have potential significant environmental effects, the relevant ES chapters identify the potential consequences for receptors, and give a qualitative evaluation of the potential significance of effects as a result of the major event.

6.3. Hazards Impact Assessment

Stage 1: Long List	Stage 2: Screening	Stage 3: Scoping			Stage 4: Assessment Required?	Relevant Topic Chapter in Environmental Statement
		Type 1 or Type 2	Relevant Receptors	Mitigation		
Geological and Ground Related Disasters						
Avalanches	No	N/A	N/A	Not relevant in the context of the Proposed Scheme.	No	N/A
Landslides	No	N/A	N/A	Not relevant given the topography of the area.	No	N/A
Earthquakes	No	N/A	N/A	The Sheriffhall Fault runs through the centre of the roundabout and seismic activity has occurred in/near the site along the fault in the past. However, there has been no recent seismic activity since the cessation of deep mining and no naturally occurring historical seismic activity has led to major accidents or disasters. Seismic activity (and earthquakes) are therefore not considered a current risk.	No	Chapter 16: Geology and Soils
Sinkholes	No	N/A	N/A	The nature of the geology in the study area is such that sinkholes are not applicable to this geographic location and no evidence of any feature, or geology that may lead to such feature, was encountered during the ground investigations.	No	N/A
Ground Stability	Yes	2	Water resources; Ecological receptors; Nearby properties; and, People (incl. drivers, NMUs and workers).	The proposed scheme is underlain by shallow mine workings. There are also mine entries directly beneath, and within close proximity to, the scheme. Both pose a risk to ground stability in terms of localised subsidence and crown holes. Mitigation incorporated in the design of the Proposed Scheme will include infill grouting of shallow mine workings and either infill grouting and/or capping (with a reinforced concrete cap at bedrock) of mine entries. The design of the Proposed Scheme to applicable standards means that receptors would not be at greater risk because of the Proposed Scheme.	No	Chapter 16: Geology and Soils
Volcanic Eruptions	No	N/A	N/A	Not relevant in the context of the Proposed Scheme.	No	N/A
Landfill Accidents (gas migration, leachate leakage, asbestos)	No	N/A	N/A	The Scheme is not interfering with any landfills.	No	Chapter 16: Geology and Soils
Hydrological Disasters						
Groundwater Contamination Events	Yes	2	Water resources; Ecological receptors; and, People (incl.	The Proposed Scheme's deep engineering works, specifically deep piling and the grouting of mine workings and mine entries, have the potential to impact the quality and flow of groundwater in the bedrock aquifer. Impacts on groundwater flow are expected to be localised. Contamination of bedrock groundwater from surface activities is also possible via pathways from mine workings. Controlling grout run-off on the ground surface and prevent grout reaching agricultural soils,	No	Chapter 11 - Road Drainage and the Water Environment Chapter 16 - Geology

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			drivers, NMUs and workers).	<p>watercourses or causing contamination of groundwater.</p> <p>Care should also be taken to prevent the grout extending past the target zone. This may be controlled by measures such as the use of gravel to form curtain walls to the grout. If practicable, large voids should also be filled with permeable granular materials, such as gravel, to allow some groundwater flow to remain and minimise hydraulic obstruction. This will include identifying any potential mine water discharges via a water features survey prior to construction and a visual monitoring assessment to observe for areas of seepage of migrated contaminated groundwater from grouting activities.</p> <p>All piles should be installed in accordance with SEPA methodology. This is of particular importance where the proposed piles terminate below the groundwater level in the bedrock. Where the piles terminate above the groundwater level in the bedrock, there will be no impacts on bedrock groundwater flow or negligible impacts on bedrock groundwater quality.</p>		and Soils.
Limnic Eruptions	No	N/A	N/A	Not relevant given that there are no deep-water lakes near the scheme.	No	N/A
Floods	Yes	2	Water resources; Ecological receptors; Nearby properties; and, People (incl. drivers, NMUs and workers).	The scheme results in a loss of floodplain storage. In order to mitigate against the loss of floodplain storage, flood storage compensation areas have been included in the design.	No	Chapter 11 – Road Drainage and the Water Environment
Tsunami/ Storm Surge	No	N/A	N/A	Not relevant given that the Proposed Scheme is not in a coastal location.	No	N/A
Meteorological Disasters						
Blizzards	Yes	1	People (incl. drivers, NMUs and workers).	Could cause road users to be trapped on the road and NMU routes. Risk is no different than any other road/ road user in the UK and specific measures are not considered to be required for the Proposed Scheme.	No	N/A
Cyclonic Storms	Yes	1	People (incl. drivers, NMUs and workers).	Major storms are a risk for any location in the UK. Risk is no different from any other road/ road users in the UK and specific measures not considered to be required for the scheme.	No	N/A
Droughts	Yes	1	People (incl. drivers, NMUs and workers).	The Proposed Scheme is not considered to be vulnerable to drought. Risk is no different from any other road/ road users in the UK and specific measures not considered to be required for the scheme.	No	N/A
Thunderstorms	Yes	1	People (incl. drivers, NMUs and workers).	New bridges and structures would be elevated and as such at risk from lightning strikes. However, the risks are no different from any other road/ road users in the UK.	No	N/A

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			and workers).			
Hailstorms	Yes	1	People (incl. drivers, NMUs and workers).	Scheme is not considered vulnerable to hailstorms. Risk is no different no different from any other road/ road users in the UK.	No	N/A
Heat Waves	Yes	1	People (incl. drivers, NMUs and workers).	Scheme is no more vulnerable to heat wave conditions than any other road in the UK.	No	N/A
Tornadoes	Yes	1	People (incl. drivers, NMUs and workers).	The Proposed Scheme is not considered vulnerable to tornadoes. Risk is no different from any other road/ road user in the UK and specific measures are not considered to be required for the scheme.	No	N/A
Wildfires	Yes	1	People (incl. drivers, NMUs and workers).	The Proposed Scheme is not surrounded by significant areas of scrub, grassland or heather. Risk is no different from any other road/ road user in the UK and specific measures are not considered to be required for the scheme.	No	N/A
Air Quality Events	Yes	1	People (incl. drivers, NMUs and workers).	It is not considered necessary to undertake any more assessment than is already included in the assessment provided in Chapter 13 – Air Quality.	No	Chapter 13 – Air Quality
Space Disasters						
Impact events and Airburst	Yes	1	Water resources; Ecological receptors; Nearby properties; and, People (incl. drivers, NMUs and workers).	The Proposed Scheme is not considered to be any more vulnerable than any existing road.	No	N/A
Solar Flare	Yes	1	Road Users	Solar flares can interrupt radio and other electronic communications. Significant communication and electronic systems are not proposed as part of the scheme. Therefore, the Proposed Scheme is at no more risk than the existing road.	No	N/A
Transport Accidents/ Disasters						
Road Accidents	Yes	2	Water resources; Ecological	The Proposed Scheme's drainage systems take account of potential road accidents. The environmental risks posed by spillages of hazardous loads as a result of road accidents are considered in Chapter 11 – Road Drainage and the Water Environment.	No	Chapter 11 – Road Drainage and the Water Environment

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			receptors; and, People (incl. drivers, NMUs and workers).	The Proposed Scheme has been designed to current safety standards and is subject to staged Road Safety Audits.		
Rail Accidents	Yes	2	Water resources; Ecological receptors; and, People (incl. drivers, NMUs and workers)	The Borders Railway line runs beneath the existing and proposed A720 to the east of the roundabout. This underbridge will be extended as part of the Proposed Scheme. The presence of the railway has been taken into account during the design of the Proposed Scheme. Rail accident risk associated with the Proposed Scheme is no greater than that of the existing road layout.	No	N/A
Aircraft Disasters	No	N/A	N/A	There are no RAF bases or airports in the vicinity if the Proposed scheme. Risk is no different from any other road/ road users in the UK and specific measures are not considered to be required for the Proposed Scheme.	No	N/A
Maritime Disasters	No	N/A	N/A	The scheme is not located in a coastal area.	No	N/A
Engineering Accidents/ Failures						
Bridge Failure	Yes	2	Water resources; Ecological receptors; and, People (incl. drivers, NMUs and workers)	New bridges are required as part of the Proposed Scheme. Appropriate bridge design to current design standards is a fundamental component of the scheme design. No further mitigation requirements are considered to be needed.	No	N/A
Property or bridge demolition accidents	No	N/A	Water resources; Ecological receptors; and, People (incl. drivers, NMUs and workers)	No property demolition is required as part of the Proposed Scheme. Partial demolition of existing railway wingwalls will be undertaken as part of the railway extension structure work. Further consultations with Network Rail will be undertaken to determine working arrangements.	No	N/A
Tunnel failure/ fire	Yes	2	Water resources; Ecological receptors; and, People (incl.	New subways and railway underbridge extensions are required as part of the Proposed Scheme. Appropriate bridge design to current design standards is a fundamental component of the scheme design. No further mitigation requirements are considered to be needed.	No	N/A

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			drivers, NMUs and workers)			
Dam failure	No	N/A	People (incl. drivers, NMUs and workers)	There are no dams within close proximity of the Proposed Scheme.	No	N/A
Flood defence failure	Yes	2	People (incl. drivers, NMUs and workers)	The Scheme is not a risk from flood defence failures, although this risk is considered within the FRA which is referred to in Chapter 11 – Road drainage and the Water Environment.	No	Chapter 11 – Road Drainage and the Water Environment
Mast and tower collapse	No	N/A	People (incl. drivers, NMUs and workers)	There is telecommunications mast to the northwest of the existing roundabout. Consultations will be undertaken with the Utility company to determine relocation of tower prior to construction.	No	N/A
Building failure or fire	No	N/A	People (incl. drivers, NMUs and workers)	Buildings in proximity of the scheme are scattered, low-rise, and predominantly residential.	No	N/A
Utilities failure	Yes	2	People (incl. drivers, NMUs and workers)	Numerous utilities are located in the vicinity of the scheme which is the responsibility of relevant utility companies. The potential for construction related incidents is covered by safe working practices.	No	N/A
Industrial Accidents						
Defence industry and unexploded ordnance (UXO) risk	Yes	N/A	Water resources; Ecological receptors; Nearby properties; and, People (incl. drivers, NMUs and workers).	There are no defence/ defence manufacturing facilities in the vicinity of the Proposed Scheme.	No	N/A
Energy industry (fossil fuel)	No	N/A	Water resources; Ecological receptors; Nearby properties; and, People (incl. drivers, NMUs	There are no petrol stations or other fossil fuel storage facilities in the vicinity of the Proposed Scheme.	No	N/A

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			and workers).			
Nuclear power	No	N/A	Water resources; Ecological receptors; Nearby properties; and, People (incl. drivers, NMUs and workers).	There are no nuclear facilities in the vicinity of the Proposed Scheme therefore the scheme is at no more risk than any other road/ road users in the UK.	No	N/A
Oil and gas refinery/ storage	No	N/A	Water resources; Ecological receptors; Nearby properties; and, People (incl. drivers, NMUs and workers).	There are no oil or gas refinery/ storage facilities in the vicinity of the Proposed Scheme.	No	N/A
Food industry	No	N/A	Water resources; Ecological receptors; Nearby properties; and, People (incl. drivers, NMUs and workers).	There are no food industry facilities in the vicinity of the Proposed Scheme.	No	N/A
Chemical industry	No	N/A	Water resources; Ecological receptors; Nearby properties; and, People (incl. drivers, NMUs and workers).	There are no chemical industry facilities in the vicinity of the Proposed Scheme.	No	N/A

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Manufacturing industry	No	N/A	Water resources; Ecological receptors; Nearby properties; and, People (incl. drivers, NMUs and workers).	There are no manufacturing industry facilities in the vicinity of the Proposed Scheme.	No	N/A
Mining industry	No	N/A	Water resources; Ecological receptors; Nearby properties; and, People (incl. drivers, NMUs and workers).	There are no operation mining facilities in the vicinity of the Proposed Scheme. The risk posed by historic mine workings and mine entries is considered under Ground Stability.	No	N/A
Crime/ War/ Civil Unrest						
Bomb/ vehicle attack on people	Yes	2	People (incl. drivers, NMUs and workers).	The scheme is unlikely to be a target of a bomb/ vehicle attack on people due to its location outside of the urban area and the low number of exposed targets. No further mitigation requirements are considered to be needed.	No	N/A
Bomb/ vehicle attack on infrastructure	Yes	2	People (incl. drivers, NMUs and workers).	The scheme is unlikely to be a target of a bomb/ vehicle attack on infrastructure due to its location outside of the urban area and the low number of exposed targets. No further mitigation requirements are considered to be needed.	No	N/A
Mass Shooting	No	N/A	N/A	The scheme is unlikely to be a target of a mass shooting due to its location outside of the urban area and the low number of exposed targets. No further mitigation requirements are considered to be needed.	No	N/A
Chemical/ gas attack	No	N/A	N/A	The scheme is unlikely to be more of a target than the existing road to this type of incident. No further mitigation requirements are considered to be needed.	No	N/A
Rioting	No	N/A	N/A	The scheme is unlikely to be more of a target than the existing road to this type of incident. No further mitigation requirements are considered to be needed.	No	N/A
Cyber attack	Yes	2	People (incl. drivers, NMUs)	No significant roadside technology is proposed and as such the Proposed Scheme would be no more vulnerable than the existing road.	No	N/A

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