Greater Cambridge Partnership

CAMBOURNE TO CAMBRIDGE

Technical Report 9 – Major Accidents and Disasters

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APPENDICES

1 INTRODUCTION AND SUMMARY

1.1.1. This Technical Report provides the outcome of the assessment of the potential vulnerability of the C2C Scheme to the risk of major accident(s) and/or disaster(s) as required by Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (HM Government, 2017) as amended by The Environmental Impact Assessment (Miscellaneous Amendments Relating to Harbours, Highways and Transport) Regulations 2017 (HM Government, 2017) (EIA Regulations).

1.1.2. The Major Accident and Disaster (MA&D) event types to which the Cambourne to Cambridge (C2C) Scheme is not considered to be vulnerable and justification for reaching that conclusion, are shown in the Long List of potential major accident(s) and/or disaster(s) events provided in **Appendix A – Major Accidents and Disasters Long List**. Those Major Event types which have been scoped out have not been included within this Technical Report or considered within this assessment. The scoped in Major Event types which have been considered within this assessment are:

- Animal diseases;
- Major accident hazard pipelines; and
- Unexploded ordnance (UXO).

1.1.3. It is considered highly unlikely that the C2C Scheme would be demolished after its design life as it is likely to have become an integral part of the infrastructure in the area. In the unlikely event of demolition, this would be part of the relevant statutory process at that time. Therefore, the demolition phase of the C2C Scheme has not been assessed in this Technical Report.

1.1.4. The C2C Scheme will include a 13.6km long mainly dedicated busway connecting Cambourne in the west with Cambridge in the east. A service road and maintenance track, to be used as an active travel path, will run alongside the segregated sections of busway. The C2C Scheme will use hybrid vehicles (and in due course, electric vehicles), providing a service of around 10 buses per hour each way. The Scotland Farm travel hub (a park and ride facility) will be situated along the route, just north of the A428, approximately 5km west of Cambridge. Further details about the Scheme proposal are set out in Chapter 3 of the ES[1].

1.1.5. This Technical Report describes the assessment methodology and the baseline conditions relevant to the assessment and a summary of the likely significant effects resulting from the vulnerability of the C2C Scheme to the risk of major accident(s) and/or disaster(s) as required by the EIA Regulations. Where appropriate, this Technical Report includes the further mitigation measures required to prevent, reduce or offset the assessed significant adverse effects, the preparedness for and proposed response to emergencies, and the expected residual effects after these measures have been employed.

[1] Environmental Statement (Document reference: C2C-10-00-Environmental Statement (Volume 1)).

2 BASELINE ENVIROMENT

2.1.1. The baseline relevant to this topic comprises:

- Features external to the C2C Scheme that contribute a potential source of hazard to it (see **Appendix A – Major Accidents and Disasters Long List**);
- Sensitive receptors at risk of significant effect (see **Section 3.2**); and
- Current (without the C2C Scheme) MA&D risks for the existing locality (see **Appendix A– Major Accidents and Disasters Long List**).

2.2 EXISTING BASELINE

2.2.1. Major accident(s) and/or disaster(s) risks relevant to the existing baseline include, inter alia, extreme weather events and associated flooding (as assessed in **Appendix A– Major Accidents and Disasters Long List**). Existing baseline conditions are described in detail in the following: **Technical Report 2: Air Quality, Technical Report 3: Climate Resilience, Technical Report 5: Ecology, Technical Report 11: Soil, Geology and Land Contamination, Technical Report 12: Traffic and Transport** and **Technical Report 13: Water**.

2.3 FUTURE BASELINE

2.3.1. In the future baseline and in the absence of the C2C Scheme, it is considered that the current land use within the development study area (as described in Section 3.1) would remain the same.

2.3.2. The climate resilience technical report (REF) considers the extent to which climate change may influence the future climate which could in turn have outcomes as worsened or lessened environmental effects.

2.3.3. The potential MA&D events that have been considered within this Technical Report have been assessed against likely climate hazards, as set out within Technical Report 3 – Climate Resilience, and the vulnerability of the C2C Scheme to the risk of MA&D events identified are not anticipated to change as a result of these hazards.

2.3.4. The MA&D assessment, in terms of its methodology, inherently considers the vulnerability of the C2C Scheme to in-combination climate effects. The Major Events which have been assessed in this Technical Report have taken into consideration the potential impacts of climate change.

2.3.5. The future baseline is not anticipated to differ significantly from the current baseline with regards to the vulnerability of the C2C Scheme to the risk of major accident(s) and/or disaster(s).

3 METHODOLOGY SUMMARY

3.1 STUDY AREA

3.1.1. Risk sources for major accident(s) and/or disaster(s) have been considered both within and outside the Order Limits along with potential internal and external influencing factors.

3.1.2. At the Scoping Stage, the following factors and associated distances were adopted for setting the Study Area:

- Manmade features:
  - Airports and airfields within 13 km;
  - Control of Major Accident Hazard facilities within 3 km;
  - Major accident hazard pipelines within 1 km;
  - Fuel retail sites (including Liquified Natural Gas, Liquified Petroleum Gas) within 1 km;
  - Rail infrastructure within 500 m; and
  - Transmission (gas, electrical, oil/fuels) crossing the Order Limits.
- Natural features with the potential to create risks within:
  - 3 km (chiefly hydrological and geological, for example dam failure and seismic activity respectively); and
  - 1 km (chiefly hydrological and geological, for example flood risk and unstable ground conditions respectively).

3.1.3. The internal and external influencing factors, which may have high adverse consequences on the C2C Scheme, were reviewed for the varying distances identified above. As presented at the Scoping Stage, it was identified that the key influencing external factors (notably UXO and major accident hazard pipelines) were within a 500 m corridor of the C2C Scheme. Therefore, the extent of the Study Area used for the MA&D assessment has been reduced to 500 m.

3.2 SENSITIVE RECEPTORS

3.2.1. The following receptors were considered as having the potential for impact from major accident(s) and/or disaster(s):

- Population and human health;
- Biodiversity;
- Land, soil, water, air and climate;
- Material assets, cultural heritage and the landscape; and
- The interaction between the factors above.

3.2.2. The specific potential receptors of effects resulting from major accident(s) and/or disaster(s) are reported in the relevant Technical Reports.

3.2.3. Receptors that have been excluded from the assessment, are set out in **Table TR-9-3-1** below for the reasons described.

Table TR-9-3-1 - Excluded Receptors

Receptor	Justification for Exclusion
Employees of the Applicant and/or its suppliers, whether during construction, operation, or maintenance of the C2C Scheme.	Employer's commitment and obligations to manage risks to employees are addressed in the Health and Safety at Work etc Act 1974 (HM Government, 1974).
Members of the public who are wilfully trespassing, for example, ignoring warning signs prohibiting access.	Outside the occupier's legal requirements under the Occupiers' Liability Act 1984 (HM Government, 1984).

3.3 ASSESSMENT METHODOLOGY

METHOD OF BASELINE DATA COLLECTION

3.3.1. A desk-based assessment was undertaken to collate baseline data within the 500 m Study Area. This information has been collated from the following sources which have also been used to support the identification of potential MA&D:

- The Cabinet Office National Risk Register (2020 Edition) (HM Government, 2020);
- The International Federation of Red Cross & Red Crescent Societies Early Warning, Early Action (The International Federation of Red Cross and Red Crescent Societies, 2021);
- The International Disaster Database (Centre for Research on the Epidemiology of Disasters, 2021);
- HSE COMAH 2015 Public Information (Health and Safety Executive, 2022); and
- **Technical Report 2: Air Quality, Technical Report 3: Climate Resilience, Technical Report 5: Ecology, Technical Report 11: Soil, Geology and Land Contamination, Technical Report 12: Traffic and Transport** and **Technical Report 13: Water**.

IMPACT ASSESSMENT METHODOLOGY

3.3.2. To date, there is no specific regulatory guidance on how to consider MA&D within the context of the EIA Regulations. However, the assessment takes account of the following emerging good practice:

- EIA Quality Mark Article: What is this MADness? (AMEC, 2017);
- EIA Quality Mark Article: Major Accidents and Disasters in EIA (Temple Group, 2018);
- Disasters in EIA (TUV SUD, 2018); and
- IEMA Major Accidents and Disasters in EIA Guide (Institute of Environmental Management & Assessment, 2020).

3.3.3. In addition, other relevant documentation, including the Cabinet Office's National Risk Register (HM Government, 2020) has been considered.

3.3.4. The assessment of major accident(s) and/or disaster(s) has been achieved through a review of available documentation and regulatory requirements. It should be noted that the assessment does not involve evaluation from 'first principles', given that existing health and safety legislation already identifies risks and control measures to protect human beings and the environment.

3.3.5. The assessment presents any identified risks and considers whether these are managed to be As Low As Reasonably Practicable (ALARP) or whether further mitigation actions (beyond those already integrated into the design) are required for the C2C Scheme.

3.3.6. The potential for identified relevant major accident(s) and/or disaster(s) to result in a significant adverse environmental effect have been evaluated using a risk-based approach. The approach considered the environmental consequences of a MA&D, the likelihood of these consequences occurring, taking into account planned design and embedded mitigation, and the acceptability of the subsequent risk to the relevant receptor (as presented in **Appendix B – Risk Record**). The following process has been applied to each of the included MA&D categories and are described further in **Appendix C – MA&D Impact Assessment Methodology**:

- Identifying risks;
- Screening these risks;
- Defining the impact;
- Assessing the risk; and
- Appraising risk management options.

SIGNIFICANCE CRITERIA

3.3.7. By definition, a major accident and/or disaster would have a major significant effect on people or the environment. Accordingly, any risks that could result in a MA&D without suitable mitigation, management or regulatory controls in place will be assessed as significant.

4 ASSUMPTIONS AND EMBEDDED MITIGATION

4.1 ASSUMPTIONS AND LIMITATIONS

4.1.1. The assumptions and limitations for this assessment are detailed below:

- The design of the C2C Scheme and its implementation is guided by both existing and emerging industry standards and codes, many of which are mandatory. These require infrastructure and systems to be designed so that risks to people and the environment are either eliminated or reduced to levels that are as low as reasonably practicable (ALARP);
- The construction phase(s) of the C2C Scheme will be managed through the implementation of the Construction Phase Plan (required under the CDM Regulations 2015 (HM Government, 2015)). A draft Code of Construction Practice (CoCP) accompanies this ES which contains the mitigation relied on in the ES to manage the environmental impacts of the C2C Scheme. A LEMP will be prepared by the Principal Contractor post-consent;
- Environmental effects associated with unplanned events that do not meet the definition of a major accident and/or disaster e.g., minor leaks and spills that may be contained within the construction sites are addressed in the CoCP;
- It is recognised that the management framework for the C2C Scheme is not fully defined at this stage; however, a presumption of standard practice and regulatory compliance within the adopted management framework has been assumed and will be developed following the appointment of the Principal contractor;
- The design, installation, commissioning, operation and maintenance of plant, drainage systems, equipment, and machinery, including associated systems, will consider Good Engineering Practice (i.e., proven and accepted engineering methods, procedures, and practices that provide appropriate, cost-effective, and well-documented solutions to meet user-requirements and compliance with applicable regulations);
- In accordance with good environmental and safety management principles, it has been assumed that all risks that have the potential to be major accidents or disasters, and could impact a local environmental receptor, will be managed using the ALARP principle; and
- The assessment is based on information available at the time of writing.

4.2 EMBEDDED MITIGATION

4.2.1. The Applicant is identifying opportunities for embedded mitigation as part of the design process to reduce the vulnerability of the C2C Scheme to the risk of MA&D. Confirmed embedded mitigation measures include a programme of hazard studies (such as road safety audits) to produce an inherently safe design and to ensure residual risks are managed to be ALARP.

4.2.2. The Applicant has also committed to constructing and managing the C2C Scheme in accordance with the following non-exclusive list of standards and systems:

- Environmental, Health & Safety Management systems;
- Manage all construction risks in accordance with the CDM Construction Phase Plan (HM Government, 2015);
- Supplier management environmental, health & safety standards (for example, Construction Skills Certification Scheme);
- Risk management systems; and
- Construction and Environmental Management systems (including the LEMP).

5 ASSESSMENT OF VULNERABILITY TO THE RISK OF MAJOR ACCIDENTS AND DISASTERS

5.1.1. This section details the output of the assessment of the vulnerability of the C2C Scheme to the risk of Major Events, taking account of the mitigation measures detailed in **Sections 4.2** and **5.4**.

Major Events to which the C2C Scheme may be vulnerable during the temporary construction phase and the operation phase are summarised below.

5.2 TEMPORARY CONSTRUCTION PHASE

5.2.1. Four Major Events have been identified to which the C2C Scheme may be vulnerable during the temporary construction phase as detailed in **Table TR9- 5-1** below. All events that have been considered are set out in **Appendix B – Risk Record**.

Table TR9- 5-1 - Potential Major Accident and/or Disaster Events during Temporary Construction Phase Grouped by High Level Risk Event

Risk Record Entry Number	Risk Description	Risk Event (High Level)	Reasonable Worst Consequence if Event Did Occur
1	There is a risk of crossing unidentified contaminated land (e.g. Animal burial pits) which have not been identified in design process, with resultant impact on health of construction workers.	Harm to people.	Ill-heath amongst construction workers / contractors.
2	Striking of underground pipeline during ground investigation or construction.	Fire and / or explosion or release of harmful gas.	Fire and/or explosion affects neighbouring property and/or those people in the immediate area.
3	Striking of underground pipeline during ground investigation or construction.	Physical damage or contamination of aquifer or borehole.	Reversible on Site soil contamination.
4	During ground investigation or construction discovering UXO.	Fire and / or explosion or release of harmful gas.	Fire and/or explosion affects neighbouring property and/or those people in the immediate area.

5.2.2. Based on the assumptions and mitigation measures (presented in **Appendix B – Risk Record**) put forward in other relevant Technical Reports, it is considered that the identified potential Major Events above would all be managed to be ALARP.

5.3 OPERATIONAL PHASE

No Major Events have been identified to which the C2C Scheme may be vulnerable during the operational phase.

5.4 ADDITIONAL MITIGATION

5.4.1. The measures outlined above and the specific mitigation measures which are detailed in **Appendix B – Risk Record** have been assumed in the assessment and will be in place for the construction of the C2C Scheme to ensure that any potential Major Events are managed to be ALARP. **Appendix B – Risk Record** provides details of mitigation measures for each potential MA&D event identified. The identified mitigation measures will be secured through the implementation of the CoCP.

5.4.2. No further design or mitigation measures have been identified as being required to mitigate any significant effects arising from the vulnerability of the C2C Scheme to the risk of Major Events.

5.5 CUMULATIVE EFFECTS

5.5.1. The MA&D assessment has, by its very nature, implicitly considered interactions with external factors such as other proposed developments which may impact on the study area. The assessment approach for MA&D, which considers the vulnerability of the C2C Scheme to Major Events, does not assess potential cumulative effects on sensitive receptors as a Major Event, is a rare, isolated event, which does not have on-going impacts.

6 SUMMARY OF LIKELY SIGNIFICANT EFFECTS

6.1.1. Based on the assumptions and mitigation measures put forward in other relevant Technical Reports, it is considered that the identified potential Major Events identified during the construction phase will all be managed to be ALARP.

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Appendix A

MAJOR ACCIDENTS AND DISASTERS LONG LIST

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
Natural Hazards	Geophysical	Earthquakes	Chapter 14: Soils, Geology and Land Contamination	N	N/A	N/A	Do not occur in Britain of a sufficient intensity owing to the motion of the Earth's tectonic plates causing regional compression. In addition, uplift from the melting of the ice sheets that covered many parts of Britain thousands of years ago can also cause movement. The BGS acknowledges that on average, a magnitude 4 earthquake happens in Britain roughly every two years and a magnitude 5 earthquake occurs around every 10 to 20 years. As such the Cabinet Office National Risk Register of Civil Emergencies states that "Earthquakes in the UK are moderately frequent but rarely result in large amounts of damage. An earthquake of sufficient intensity (determined on the basis of the earthquake's local effect on people and the environment) to inflict severe damage is unlikely". The C2C Scheme is not in or close to an active area.	N
Natural Hazards	Geophysical	Volcanic Activity	Chapter 14: Soils, Geology and Land Contamination	N	N/A	N/A	The C2C Scheme is not in an active area and it is highly unlikely that an ash cloud could significantly impact on any aspect of the C2C Scheme.	N
Natural Hazards	Geophysical	Landslides	Chapter 14: Soils, Geology and Land Contamination	Y	C, O	Workers Road Users	The soil in the area of the C2C Scheme is described to have a clayey surface texture, and slightly impeded drainage. However, the effects of potential landslides are unlikely since the topography of area is generally flat.	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
						Public and local community	In addition, the scheme does not involve the formation of deep cuts/high embankments.	
Natural Hazards	Geophysical	Sinkholes	Chapter 14: Soils, Geology and Land Contamination	N	N/A	N/A	The bedrock geology varies across the scheme from west to east. The West Melbury Marly Chalk Formation (typically up to 12m in thickness) overlies the Gault Formation from Madingley Mulch to the Coton Orchard. This formation is potentially vulnerable to the formation of sink holes. The geotechnical team will obtain a natural cavities and mining database search and occurrence risk assessment, which, together with an assessment of groundwater conditions, will be used to provide a risk rating for the Site. If required, mitigation would range from a site inspection at construction stage (after topsoil stripping) through to the inclusion of strengthened geogrids to reduce the risk associated with collapse settlement. It is notable that the existing A428 and the St Neots Road cross similar geological conditions, as does the High Street in Coton, and there are no known occurrences of solution features in the chalk.	N
Natural Hazards	Geophysical	Tsunamis	Chapter 14: Soils, Geology and Land Contamination	N	N/A	N/A	The C2C Scheme is located inland, outside a tsunami risk zone.	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
Natural Hazards	Hydrology	Coastal Flooding	Chapter 15: Water Resources and Flood Risk	N	N/A	N/A	The C2C Scheme is located inland, outside a coastal area.	N
Natural Hazards	Hydrology	Fluvial Flooding	Chapter 15: Water Resources and Flood Risk	Y	C, O	Aquatic environment and ecological receptors Properties Road Users Public and local community	Review of the Environment Agency Flood Map for Planning (Rivers and Sea) indicates that the majority of the C2C Scheme is located within the low-risk Flood Zone 1 where the risk of flooding from fluvial sources is less than 1 in 1000 (0.1%) in any year. However, there is a small area located within Flood Zone 3 located to the eastern end of the C2C Scheme where the risk of flooding from fluvial sources is greater than 1 in 100 (1%) in any year. The identified fluvial flood risk is located along the Bin Brook and is associated with the floodplain of the River Cam located to the east. As the C2C Scheme will increase the area of hardstanding along the route and the route crosses Flood Zone 3 along the Bin Brook, a robust Flood Risk Assessment (FRA) will be undertaken, as part of the ES, to demonstrate the surface water drainage design of the C2C Scheme meets the requirements of the Lead Local Flood Authorities (LLFA). The FRA will assess the potential implications of the C2C Scheme on flood risk to people and property, as well as assess the potential risk of flooding to the C2C Scheme. The FRA will be based on the surface water drainage strategy for the C2C Scheme. The surface water drainage	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							design and strategy will include a section that assesses potential pollution hazard risks to receiving surface waters. On the basis that a detailed FRA is being undertaken for the C2C Scheme, it is proposed to scope fluvial flooding out of the MA&D assessment.	
Natural Hazards	Hydrology	Pluvial Flooding	Chapter 15: Water Resources and Flood Risk	Y	C, O	Aquatic environment and ecological receptors Properties Road Users Public and local community	Review of the Environment Agency's Flood Risk from Surface Water Map indicates that sections of the C2C Scheme are at high, medium and low risk of flooding from surface water sources. Flooding from surface water is typically associated with natural overland flow paths and local depressions in topography where surface water runoff can accumulate during or following heavy rainfall events. As pluvial flood risk will be assessed as part of the FRA and appropriately mitigated as required, it is proposed to scope pluvial flooding out of the MA&D assessment.	N
Natural Hazards	Hydrology	Groundwater Flooding	Chapter 15: Water Resources and Flood Risk	Y	C, O	Aquatic environment and ecological receptors Properties Road Users	From Madingley Mulch to the Coton Orchard the area has the West Melbury Marl Chalk Formation present. The chalk formation is an isolated outcrop on the north-western limit of outcropping chalk in East Anglia. It is draped over the underlying Gault Formation and is likely to be relatively thin in the study area. There are no springs visible in the area around the edge of the chalk formation which	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
						Public and local community	indicates the chalk is likely to have limited water within it. It is worthy of note that the Environment Agency has not included this outcrop within any designated groundwater body (under the Water Framework Directive). This reinforces the interpretation that the outcrop is a small, isolated outcrop that is not likely to hold any significant groundwater. Review of the Environment Agency's groundwater data indicates that there is a Zone 3 Source Protection Zone (SPZ) located approximately 650m to the south of the western end of the C2C Scheme. Zone 3 is defined as the area around a supply source within which all the groundwater ends up at the abstraction point. As groundwater flood risk will be assessed as part of the FRA and appropriately mitigated as required, it is proposed to scope groundwater flooding out of the MA&D assessment.	
Natural Hazards	Hydrology	Avalanches	Chapter 14: Soils, Geology and Land Contamination	N	N/A	N/A	Not considered relevant given the geographical location of the C2C Scheme. The C2C Scheme's topography is relatively flat and therefore an avalanche will not occur.	N
Natural Hazards	Climatological and Meteorological	Cyclones, hurricanes, typhoons, storms and gales	Chapter 8: Climate Resilience	Y	C, O	Property Workers Road Users	Cyclones, hurricanes and typhoons do not occur in the UK. The winter of 2015/2016 was the second wettest winter on record and a series of storms (including 'Desmond' and 'Eva') resulted in heavy and sustained rainfall.	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							17,600 UK properties were flooded and several bridges collapsed, disrupting access to and from local communities. Storms and gales could result in damage to highway infrastructure and could affect journeys made by road users; however, the risk is no different to similar roads or road users in the locality.	
Natural Hazards	Climatological and Meteorological	Thunderstorms	Chapter 8: Climate Resilience	Y	C, O	Workers	This type of event could result in lightning strikes to temporary elevated structures during construction (e.g. tower cranes) and new elevated structures (such as bridges) introduced as part of the C2C Scheme; however, the risk is no different to similar roads or road users in the locality. Specific measures are therefore not considered to be required as part of the C2C Scheme.	N
Natural Hazards	Climatological and Meteorological	Wave surges	Chapter 8: Climate Resilience	N	N/A	N/A	The C2C Scheme is located sufficiently inland, and therefore is not subject to wave surges.	N
Natural Hazards	Climatological and Meteorological	Extreme temperatures: Heatwaves Low (sub-zero) temperatures and heavy snow	Chapter 8: Climate Resilience	Y	C, O	N/A	This type of event could give rise to changes in climatic conditions, with road infrastructure exposed to greater heat intensity and exposure to sunlight. Heavy snow could cause workers and road users to be trapped on the highway. In August 1990, the UK experienced heatwave conditions with temperatures reaching what was then a record 37.1°C in Cheltenham, England. In August 2003 a UK heatwave lasted 10 days and resulted in over 2,000	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							deaths. Temperatures reached what was then a record 38.5°C in Faversham, England and 33°C in Anglesey, Wales. High temperature records are now being broken with increasing frequency. The most widespread and prolonged low temperatures and heavy snow in recent years occurred from December 2009 to January 2010. Daytime temperatures were mostly sub-zero across the UK. At night, temperatures in England regularly fell to -5°C to -10°C. Snowfall across the UK lasted for some time, allowing 20cm to 30cm of snow to build up, closing schools and making it very difficult to travel. Between 1981 and 2010, there have been 40 occurrences where summer mean temperatures exceeded 19.4°C on five or more consecutive days. Between 1981 and 2010, there have been 1,263 days with a maximum minimum temperature below zero degrees Celsius. Between 1981 and 2010, there were 224 days with snow lying at 0900 however, there are no records from the Met Office of the depth of snow. Extremely hot weather may affect the road surface itself and could affect the comfort and health of users of the C2C Scheme, and has the potential to pose a risk to scheme assets such as deformation and deterioration of	

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							asphalt surfacing. However, since this effect is no different to similar roads or road users in the locality the effect is considered not to be significant. Therefore, specific measures are not required as part of the C2C Scheme	
Natural Hazards	Climatological and Meteorological	Droughts	Chapter 14: Soils, Geology and Land Contamination	Y	C, O	Aquatic environment and ecological receptors People Properties Workers Road users	The C2C Scheme should not be vulnerable to drought as water is not an essential service during the construction, use or maintenance phases. Prolonged periods of drought can impact road infrastructure as drying out and cracking of soils may affect structural stability and prolonged dry periods can lead to cracking of surfaces and more rapid deterioration of materials. Decreased rainfall combined with an increase in the average temperature can also increase subsidence, affecting the stability of the road infrastructure, including pavements and hard surfaces. The design of the C2C Scheme will follow good engineering practice taking into consideration future climatic changes (including drought) and will be resilient to ground shrinkage and this event type should remain in the design risk register until designed out.	N
Natural Hazards	Climatological and Meteorological	Severe Space Weather: Solar Flares	Chapter 2: Scheme Description	N	N/A	N/A	Solar flare events are known to interrupt radio and other electronic communications. Records from solar storms in 1921 and 1960 describe widespread radio disruption and impacts on railway signalling and switching systems. There is no increased reliance on roadside technology therefore the C2C	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							Scheme is no more vulnerable than the existing route.	
Natural Hazards	Climatological and Meteorological	Severe Space Weather: Solar Energetic Particles	N/A	N	N/A	N/A	Solar energetic particles which cause solar radiation storms, but only in outer space, so this major event type can be scoped out.	N
Natural Hazards	Climatological and Meteorological	Severe Space Weather: Coronal Mass Ejections	N/A	N	N/A	N/A	Coronal mass ejections (CME) cause geomagnetic storms. The geomagnetic storm in 2003 caused the UK aviation sector to lose some Global Positioning System (GPS) functions for a day, however no known significant impact on road users or infrastructure.	N
Natural Hazards	Climatological and Meteorological	Fog	Chapter 2: Scheme Description	N	N/A	N/A	Fog is one of the most common weather conditions in the UK, particularly throughout autumn and winter. Severe disruption to transport occurs when the visibility falls below 50m over a wide area. However, the risk is no different to similar roads or road users in the locality. Specific measures are therefore not considered to be required as part of the C2C Scheme.	N
Natural Hazards	Climatological and Meteorological	Wildfires: Forest fire, Bush/brush, pasture	Chapter 2: Scheme Description	Y	C, O	Aquatic environment and ecological receptors Properties	The C2C Scheme is surrounded by agricultural land which has a low risk of wildfire events during hot, dry periods and/or fires initiated by construction related activities as opposed to areas of woodland. During construction, standard control measures would be implemented by the appointed contractor to	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
						Workers Road users	manage the risk of fire. During operation however, the risk is no different to similar roads or road users in the locality. Specific measures are therefore not considered to be required as part of the C2C Scheme.	
Natural Hazards	Climatological and Meteorological	Poor Air Quality	Chapter 5: Air Quality Chapter 17: Traffic and Transport	Y	C	Ecological receptors People Workers Road users	The proposed duration of the construction works for the C2C Scheme would be approximately two years. **Construction:** Construction effects would be temporary for the duration of the construction phase. Increased dust emissions from construction activities and combustion related emissions from on-site plant and vehicles could affect local air quality at nearby sensitive receptors (residential receptors). Traffic management measures during construction may also lead to changes in vehicles emissions which may, in turn, result in impacts on local air quality. Providing mitigation measures are in place during the construction phase, the changes in local air quality are not expected to be significant. **Operation:** Potential effects on air quality during the operational phase will include: (1) Changes in emissions associated with changes in traffic flows (including composition and speed) on the local road network; and (2) Changes in road layout which may bring road traffic emission sources closer to, or farther away from, sensitive receptors. The C2C Scheme aims to improve quality of life by relieving congestion and improving air quality,	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							and as such it is unlikely that the C2C Scheme will result in a MA&D so this major event type can be scoped out.	
Natural Hazards	Biological	Disease epidemics: - Viral - Bacterial - Parasitic - Fungal - Prion	Chapter 9: Community and Human Health	Y	C	Aquatic and ecological receptors People Workers Road Users	The CRC Scheme is located in a developed country where the population is in general good health. The most rRecent disease epidemic in England was COVID-19, the first cases of which were identified in February 2020. Although no longer considered a global health emergency by The World Health Organisation, the vulnerability of the Project to a major event caused by COVID-19 during construction and operation should be mitigated by the occupational health and safety processes that are implemented by both the contractor and government guidelines on the control of spread of COVID-19. The Project itself is not going to give rise to any disease epidemics. Furthermore, the use of the C2C Scheme (highway) is not going to give rise to any disease epidemics. The UK Health Security Agency, the executive agency of the Department of Health is responsible for protecting the nation from public health hazards, preparing for and responding to public health emergencies. One of the UK Health Security Agency's functions is to protect the public from infectious disease outbreaks and the Agency has produced a document providing operational guidance for the management of outbreaks of communicable disease, 'Communicable	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							Disease Outbreak management: Operational Guidance'.	
Natural Hazards	Biological	Animal Diseases: - zoonotic: • avian influenza • West Nile virus • Rabies - non-zoonotic: • foot and mouth • swine fever	N/A	Y	C	Aquatic and ecological receptors People Workers Road Users	Low and highly pathogenic avian influenza has been recorded in poultry in the UK several times in the last 10 years, most recently in 2022, although with no human cases reported. There was a devastating foot and mouth outbreak in 2001. It is likely the major event will be scoped out as the use of the C2C Scheme (highway) is not going to be the source of any disease epidemics and spread would be controlled through containment of infected animals including prohibition of transportation. However, more information is required to understand if there are any Foot and mouth burial pits within the C2C Scheme area to confirm this.	Y
Natural Hazards	Biological	Plants	Chapter 6: Biodiversity	N	C	Aquatic and ecological receptors People Workers	Initial baseline data does not identify any invasive/dangerous/regulated plants. Standard control measures would be implemented by the appointed contractor during construction to handle and dispose of any diseased plants and/or injurious weeds and prevent their spread.	N
Technological or Manmade Hazards	Societal	Extensive public demonstrations which could lead to violence and loss of life.	N/A	Y	C	Road users Public and local communities	The C2C Scheme is in a developed country that has steady, yet small population growth. England is politically stable with no direct border with countries experiencing conflicts.	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
Technological or Manmade Hazards	Societal	Widespread damage to societies and economies.	N/A	N	N/A	N/A	The C2C Scheme is in a developed country that has steady, yet small population growth. England is politically stable with no direct border with countries experiencing conflicts.	N
Technological or Manmade Hazards	Societal	The need for large-scale multi-faceted humanitarian assistance.	N/A	N	N/A	N/A	The C2C Scheme is in a developed country that has steady, yet small population growth. England is politically stable with no direct border with countries experiencing conflicts.	N
Technological or Manmade Hazards	Societal	The hindrance or prevention of humanitarian assistance by political and military constraints.	N/A	N	N/A	N/A	The C2C Scheme is in a developed country that has steady, yet small population growth. England is politically stable with no direct border with countries experiencing conflicts.	N
Technological or Manmade Hazards	Societal	Significant security risks for humanitarian relief workers in some areas.	N/A	N	N/A	N/A	The C2C Scheme is in a developed country that has steady, yet small population growth. England is politically stable with no direct border with countries experiencing conflicts.	N
Technological or Manmade Hazards	Societal	Famine	N/A	N	N/A	N/A	The C2C Scheme is located in a developed country that produces its own crops and imports food. It is politically stable and not subject to hyperinflation and therefore food is available, whether produced within the UK or imported. Famine is also not relevant to the use of the C2C Scheme (highway).	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
Technological or Manmade Hazards	Societal	Displaced population	N/A	N	N/A	Public and local communities	There will be no significant displacement of populations as part of the C2C Scheme.	N
Technological or Manmade Hazards	Industrial and Urban Accidents	Major Accident Hazard Chemical sites	N/A	N	N/A	N/A	There are no industrial areas along the route that are likely to present a major hazard to the environment or human health. There are small commercial operations along St Neots Road in Hardwick but based on an Envirocheck report, no COMAH site of Planning Hazardous Substances Consents / Enforcements are recorded within 5 km from the route. Cambridge University are proposing West Cambridge development, a research and development site associated with the University of Cambridge. Planning permission has been granted and detailed designs are being prepared. However, since this effect of the proposed project is no different to similar roads or road users in the locality the effect is considered to not be significant. Therefore, specific measures are not required as part of the C2C Scheme. Any specific measures relating to the environment and nearby stakeholders will be considered in the EIA for the West Cambridge development.	N
Technological or Manmade Hazards	Industrial and Urban Accidents	Major Accident Hazard Pipelines	N/A	Y	C	Road users Public and local communities	One local high pressure National Grid gas pipeline under sections of the C2C Scheme and through the scheme's boundary. In the unlikely event of the high pressure gas pipeline needing to be diverted (new sections of pipeline to be constructed) to meet current	Y

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							engineering and safety standards, there will be an increased risk of a major accident and disaster during the construction phase due to the nature of the work required on the pipeline. However, any work within the consultation zone of the pipeline must be undertaken with the agreement of the pipeline operator, which will include risk assessment and method statements covering the works to be carried out before they can commence, under existing legal requirements, namely The Pipelines Safety Regulations 1996. Risks during maintenance and operation of the scheme should not be significantly different than the baseline situation. On this basis, the local high pressure National Grid gas pipeline has been scoped out of the MA&D assessment. The previous scoping report notes the presence of a pipeline between Coton to Bourn which lies to the north of the adjacent A428, opposite Bourn Airfield, and further east, from Scotland Farm to the A1303/ A428 slip road, south of Park Farm before continuing south of the A428 to Coton. Based on its location and information in the public domain it is likely this pipeline was used to transport aviation fuel to Bourn Airfield. However, it is unknown whether this pipeline is currently operational. This will be further assessed in the Environmental Statement.	

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
Technological or Manmade Hazards	Industrial and Urban Accidents	Nuclear	N/A	N	N/A	N/A	Nuclear sites are designed, built and operated so that the chance of accidental releases of radiological material in the UK is extremely low. Last historical major accident in the UK was Windscale in 1957. No nuclear sites are within a 5 km corridor along the C2C Scheme.	N/A
Technological or Manmade Hazards	Industrial and Urban Accidents	Fuel storage	N/A	Y	O	Workers Road Users	The nature of construction for the C2C Scheme is of routine civil engineering works involving earthmoving and construction of road infrastructure. Some hazardous substances will be used in the construction works (e.g. fuel, asphalt, cement and associated additives) but the storage and handling of these will be governed by standard health and safety procedures. Whilst the materials are hazardous and present a potential hazard to the environment and personnel if released in an uncontrolled manner, it is considered unlikely the volume and nature of the materials would be sufficient to risk the occurrence of a major accident.	N
Technological or Manmade Hazards	Industrial and Urban Accidents	Dam breaches	Chapter 15: Water Resources and Flood Risk	N	N/A	N/A	Dam breaches in the UK are rare; the last major breach was at the Cwm Eigiau dam in 1925, which caused 17 fatalities and widespread flooding. No dam has been identified within 5 km of the scheme area. Grafham water reservoir is located approximately 34 km from scheme area, it is the eighth largest reservoir in England by volume and created by building an earth and concrete dam in 1965.	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
Technological or Manmade Hazards	Industrial and Urban Accidents	Mines and storage caverns	Chapter 14: Soils, Geology and Land Contamination	N	C, O	Road users Workers	Coal Authority records state that there are no coal workings within the scheme footprint.	N
Technological or Manmade Hazards	Industrial and Urban Accidents	Fires	N/A	N	C, O	Cultural heritage sites People Road users	Fires could be initiated by construction related activities which impact areas adjacent to the construction activities. During construction, standard control measures would be implemented by the appointed contractor to manage the risk of fire. The risk of fires affecting the C2C Scheme during operation is no greater than risks for existing highways through/developments in an urban environment.	N
Technological or Manmade Hazards	Transport Accidents	Road	N/A	Y	C, O	Aquatic environment and ecological receptors Properties Workers Road users	Significant transport accidents occur across the UK on a daily basis, mainly on roads, and involving private and/or commercial vehicles. During construction there will be an increase in heavy construction plant and equipment on local road network which may increase the risk of accidents. The C2C Scheme has been designed to achieve a reduction in existing accident rates on the road network, and to take account of any accidental spillages through modern drainage and treatment systems. The environmental risks posed by spillages of hazardous loads as a result of road accidents will be considered within the Environmental Impact Assessment.	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
Technological or Manmade Hazards	Transport Accidents	Rail	Chapter 2: Scheme Description	Y	C, O	Aquatic environment and ecological receptors Properties Workers Road users	The existing rail network nearby does not serve movements along the A428/A1303 route and the proposed east west rail scheme is not within the vicinity of the C2C Scheme area.	N
Technological or Manmade Hazards	Transport Accidents	Waterways	Chapter 15: Water Resources and Flood Risk	N	N/A	N/A	There are no waterways located in the study area used for significant transport by water that could impact the road network during construction and operational phases.	N
Technological or Manmade Hazards	Transport Accidents	Aviation	N/A	N	N/A	N/A	There have been no major air accidents in the UK since the Kegworth incident in 1989. Bourn airfield is an airfield east of Cambourne located south of the C2C Scheme within the study area. However, it is understood that this airfield is no longer operational and therefore no further assessment is required.	N
Technological or Manmade Hazards	Pollution Accidents	Air	Chapter 5: Air Quality	Y	C, O	People Road users	Construction activities may cause dust emissions which may contribute to poor air quality albeit on a temporary basis. The use of fossil fuelled mobile plant and equipment during the construction phase may contribute to events associated with poor air quality. Guidance from the Institute of Air	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							Quality Management (IAQM) notes that effects from onsite exhaust emission are unlikely to be significant. Also given the local and temporary nature of the Site, plant emissions are considered to have a negligible impact on local air quality, relative to the surrounding road traffic contribution on the local road networks. Emissions associated with vehicles travelling on new and improved sections of the C2C Scheme may contribute to events associated with poor air quality. The EIA will assess air quality effects of pollutants (NOx, PM10, PM2.5) generated during the operational phase and changes in road layout which may bring road traffic emission sources closer to, or farther away from, sensitive receptors.	
Technological or Manmade Hazards	Pollution Accidents	Land	Chapter 14: Soils, Geology and Land Contamination	Y	C	Ecological receptors Local heritage Public and local community	Construction may increase the risk of leaks and spillages of hazardous materials associated with the construction activities (e.g. fuel, asphalt, cement and associated additives) but the storage and handling of these will generally be governed by standard health and safety procedures implemented by the appointed contractor to manage the risk of spillages and leaks. While the materials are hazardous and present a potential hazard to the environment if released in an uncontrolled manner, it is considered unlikely the volume and nature of the materials would be sufficient to risk the occurrence of a major accident.	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							There is also a small risk that hotspots of contamination from Bourn Airfield's operational history could be encountered, but if these are encountered the risk they posed to receptors would be assessed as to whether they should be isolated and removed for appropriate disposal or can be left in-situ. The environmental risks posed by spillages of hazardous loads will be considered within the Environmental Impact Assessment.	
Technological or Manmade Hazards	Pollution Accidents	Water	Chapter 14: Soils, Geology and Land Contamination	Y	C	Public and local community Water environment	During construction there are likely to be no significant below ground works except in the vicinity of the main structural elements at the M11 bridge crossing and the section closest to the A428 near the Waterworks site. At the M11 crossing the foundations would be based in the Gault clay formation. Along the A428 the route is largely on Gault clay – but closest to the Waterworks site the route encroaches onto the western extremity of chalk outcrop. In these areas some form of below ground piling for foundations maybe required. Piling creates an opportunity for pollutants to move more rapidly from the surface to any groundwater encountered by the piling but as the geology is of low permeability clays, or a dry area of chalk any piling is not likely to cause any significant effects on groundwater. It is also possible that in the circumstances of extreme rainfall the erosion of topsoil and other materials could cause environmental harm if released into, the local water courses.	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							During such an event it is likely that the runoff from land would include significant suspended sediment from the surrounding land and pollute surface water. The EIA will detail how drainage along the route will minimise risks to water through the construction of a drainage network. The EIA will detail how a robust Code of Construction Practice (CoCP) and LEMP is to be in place during construction to ensure all earthworks included mean to control runoff to minimise risks arising from natural events.	
Technological or Manmade Hazards	Utilities Failure	Electricity	N/A	Y	C	Public and local community Workers	Instances of electricity failure (also referred to as power loss or blackout) can be caused by a number of things, such as severe weather (e.g. very strong winds, lightning and flooding) which damage the distribution network. These tend of be mainly specific place, local (e.g. metropolitan area) and less frequently regional (e.g. North East) as a result of severe winter storms and consequent damage to the distribution overhead line network. Underground and/or above-ground electrical transmission lines are present across the C2C Scheme, the responsibilities of which lie with the relevant local operator or company should this infrastructure fail. Information regarding any diversions will be considered as part of the design risk register and in the ES.	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							The potential risk of construction-related incidents when undertaking diversion works as part of the C2C Scheme would be covered by existing legislation. Therefore, further consideration in the ES is not considered necessary.	
Technological or Manmade Hazards	Utilities Failure	Gas	N/A	Y	C	Public and local community Workers	Underground gas transmission pipelines are present across the C2C scheme's boundary, the responsibilities of which lie with the relevant local operator or company should this infrastructure fail. The diversion works will be considered as part of the ES. The potential risk of construction-related incidents when undertaking diversion works as part of the scheme would be covered by existing Health and Safety legislation. No gas use is associated with the C2C Scheme.	N
Technological or Manmade Hazards	Utilities Failure	Water supply	N/A	N	N/A	N/A	No water use associated with the C2C Scheme during its operation and relatively low use during construction which could be addressed by tankering in supplies if required.	N
Technological or Manmade Hazards	Utilities Failure	Sewage system	N/A	N	N/A	N/A	No use of the sewage system associated with the C2C Scheme. During construction phase temporary portable systems will be in place covered by H&S welfare requirements.	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
Technological or Manmade Hazards	Malicious Attacks	Unexploded ordnance	N/A	Y	C	Property Public and local community Workers	Historically an RAF airfield was located at Borne airfield, as a result the potential for UXO risk cannot be discounted. It should be noted that this topic will be covered by the Geology and Soils Chapter of the scoping report. Measures would be undertaken during construction to brief operatives to raise awareness of this issue, and to define appropriate response strategies such this be discovered during the works. There would be a limited risk of unexploded ordnance affecting the C2C Scheme, once operational but no greater than similar schemes.	Y
Technological or Manmade Hazards	Malicious Attacks	Attacks Chemical Biological Radiological Nuclear	N/A	N	N/A	N/A	Extremists remain interested in Chemical, Biological, Radiological and Nuclear (CBRN) materials, however alternative methods of attack such as employing firearms or conventional explosive devices remain far more likely. Historical use has been in closed densely occupied structures (underground, buildings) or targeted at specific individuals. The C2C Scheme is unlikely to be a target for this type of event due to the low number of exposed targets.	N
Technological or Manmade Hazards	Malicious Attacks	Transport systems	N/A	N	N/A	N/A	Potential systems would include (but are not limited to) railways, buses, passenger ferries, cargo vessels and aircraft. The C2C Scheme is unlikely to be a target for this type of event due to the low number of exposed targets.	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
Technological or Manmade Hazards	Malicious Attacks	Crowded places	N/A	N	N/A	N/A	The C2C Scheme does not fall within the definition of a crowed place, i.e. pedestrian routes and other thoroughfares as well as sports arenas, retail outlets and entertainment spaces. The C2C Scheme is unlikely to be a target for this type of event due to the low number of exposed targets.	N
Technological or Manmade Hazards	Malicious Attacks	Cyber	N/A	Y	O	Workers People Road users	Cyber-attacks occur almost constantly on key national and commercial electronic information, control systems and digital industries. The increasing reliance on roadside technology could render the C2C Scheme more vulnerable to a cyber-attack. As technology is not proposed to be installed as part of the C2C Scheme along the route (gantries and overhead signage). Notwithstanding this, it is not considered to be more vulnerable to attack than similar infrastructure installed and running elsewhere on the strategic road network. Highways England is accountable to the Secretary of State for Transport for ensuring the resilience of their strategic road network to national security risks, including from terrorism, cyber-attack, natural hazards and other risks outlines in the National Risk Assessment.	N
Technological or Manmade Hazards	Malicious Attacks	Infrastructure	N/A	N	N/A	N/A	Terrorists in the UK have previously attacked, or planned to attack, national infrastructure. Attempts were made to attack electricity substations in the 1990s. Bishopsgate, in the City of London, was attacked in 1993 and	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
							South Quay in London's Docklands in 1996. These attacks resulted in significant damage and disruption but relatively few casualties. The C2C Scheme would have minimal impact on local infrastructure or be considered a high profile attack.	
Technological or Manmade Hazards	Engineering accidents and failures	Bridge failure	N/A	Y	C, O	Aquatic environment and ecological receptors People Road Users Workers	Bridge works are not proposed as part of the C2C Scheme. These structures have been designed to meet modern safety standards, which reduces their likelihood of future failure. The risk associated with the C2C Scheme of this event is considered no greater than other similar roads that include new structures designed to comparable standards.	N
Technological or Manmade Hazards	Engineering accidents and failures	Flood defence failure	Chapter 15: Water Resources and Flood Risk	Y	C, O	People Property Road users Workers	The study area associated with the C2C Scheme does not benefit from flood defences or flood storage areas. The design of the C2C Scheme has been developed to include allowances for future climate change predictions that could result in flooding. The potential risk of breech events is considered in the Environmental Impact Assessment.	N
Technological or Manmade Hazards	Engineering accidents and failures	Mast and tower collapse	N/A	N	N/A	N/A	There are no towers or masts in close proximity to the C2C Scheme or being built as part of the C2C Scheme.	N

Major Event Group	Major Event Category	Major Event Type	Technical Chapter(s) with Relevant Information	Relevant to Scheme Area	Phases which Exacerbate Vulnerability	Potential Receptors	Basis of Decision to Scope In / Out	Scope In?
Technological or Manmade Hazards	Engineering accidents and failures	Property or bridge demolition accidents	Chapter 9: Community and Human Health	Y	C	People Road users Workers	The C2C Scheme does not involve demolition works.	N
Technological or Manmade Hazards	Engineering accidents and failures	Tunnel failure/fire	N/A	N	N/A	N/A	There are no tunnel structures proposed as part of the C2C Scheme or within the study area.	N

Appendix B

RISK RECORD

The Long List in **Appendix A– Major Accidents and Disasters Long List**, presents all of the Major Event categories and types which have been considered as part of the assessment. Those Major Event types which could not be scoped out have been further assessed, the output of which is presented below. This Appendix is a record of all potential Major Events considered as part of the ES assessment process.

Risk Record Entry Number	Major Event Category	Risk Event Type	Section of C2C Scheme	Hazard Description	Applicable Phases (Construction, Operational, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water Environment	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Justification
1	Natural Hazards: Biological	Harm to people	Route Wide	Unknown contaminated land - e.g. Animal burial pits.	C	There is a risk of crossing unidentified contaminated land (e.g. Animal burial pits) which have not been identified in design process, with resultant impact on health of construction workers.	Contaminants and organisms harmful to human health.	CDM register. Ground conditions report.	Ill-heath amongst construction workers / contractors.			X			X					X	A Phase 2 Contaminated Land Ground Investigation to be undertaken prior to construction works commencing to allow characterisation and quantification of potential contamination risks. Liaison with farmers, Local Authorities and DEFRA, at pre-construction phase.	N	The reasonable worst consequence of this event does not meet the criteria of a major accident. The only potential receptors of harm are construction workers / contractors.	N/A	Not identified as a potential major accident / disaster event.
2	Technological or Manmade Hazards: Industrial and Urban	Fire and / or explosion or release of harmful gas	Between Bourn and Coton	Presence of pipeline with unknown contents.	C	Presence of pipeline with unknown contents.	Release of contents of pipeline.	CDM register.	Fire and/or explosion affects neighbouring property and/or those people in the immediate area.			X			X					X	1) CAT scan and GPR surveys. 2) Trial Pits.	Y	Could cause loss of life or permanent injury to multiple members of the public; or significant structural property damage.	Y	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

Risk Record Entry Number	Major Event Category	Risk Event Type	Section of C2C Scheme	Hazard Description	Applicable Phases (Construction, Operational, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water Environment	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Justification
3	Technological or Manmade Hazards: Industrial and Urban Accidents	Physical damage or contamination of aquifer or borehole	Between Bourn and Coton	Presence of pipeline with unknown contents.	C	Presence of pipeline with unknown contents.	Release of contents of pipeline.	CDM register.	Reversible on site soil contamination.						X					X	1) CAT scan and GPR surveys. 2) Trial Pits. A LEMP will be produced including measures to mitigate geology and soils risks associated with the construction phase.	Y	Could cause permanent or long-lasting damage to environmental receptor(s) that cannot be restored through minor clean-up and restoration efforts.	Y	Considered to be ALARP if all mitigation measures outlined are correctly implemented.
4	Technological or Manmade Hazards: Malicious Attacks	Fire and / or explosion or release of harmful gas	Western quarter of the site, notably around Bourn Airfield	Unexploded ordnance.	C	During ground investigation or construction discovering UXO.	Presence of unexploded ordnance.	Ground Conditions Report. CDM Register. UXO Risk Assessment. Desk Study for Potential Unexploded Ordnance Contamination	Fire and/or explosion affects neighbouring property and/or those people in the immediate area.			X									A preliminary UXO Threat Assessment has been undertaken. As the potential for unexploded WWI and WWII ordnance to exist has been identified at the western quarter	Y	Could cause loss of life or permanent injury to multiple members of the public.	Y	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

Risk Record Entry Number	Major Event Category	Risk Event Type	Section of C2C Scheme	Hazard Description	Applicable Phases (Construction, Operational, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water Environment	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Justification
																					of the Site a detailed UXO assessment prior to any intrusive works to identify and mitigate any UXO risk will be undertaken. A Desk Study for Potential Unexploded Ordnance Contamination was undertaken by RPS in 2017 which recommended the implementation of the following mitigation measures: explosives safety and awareness briefing and an explosives safety consultancy on call in support of works taking place across the area. For all areas of intrusive works, mitigation measures include an intrusive magnetometer survey ahead				

Risk Record Entry Number	Major Event Category	Risk Event Type	Section of C2C Scheme	Hazard Description	Applicable Phases (Construction, Operational, Maintenance)*	Risk Description	Hazard Sources and/or Pathways	Documentation in which the event is/will be addressed	Reasonable worst consequence if event did occur and receptor(s)	Air Quality	Climate	People and Communities	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Transport	Material Resources	Road Drainage and the Water Environment	Mitigation	Could this constitute a major accident or disaster?	Justification	Is this ALARP with existing mitigation?	Justification
																					of piling / boreholes (where practical), explosives site safety support for excavations, and safety awareness briefings / site safety guidance. Provide possible procedures, protocols and training required during the construction phase.				

*Applicable Phases (C=Construction, O=Operational, M=Maintenance)

Appendix C

MA&D IMPACT ASSESSMENT METHODOLOGY

1 MA&D IMPACT ASSESSMENT METHODOLOGY

1.1 IDENTIFY RISKS

1.1.1. The major accident(s) and/or disaster(s) considered in the assessment are rare events.

1.1.2. All low consequence events, whatever their likelihood, do not meet the definition of MA&D as defined in IEMA's Primer (Institute of Environmental Management & Assessment, 2020). For example, minor spills which may occur during construction, but would be limited in area and volume and temporary in nature, do not meet the definition of a major accident. Such minor events would be dealt with under the construction contractor's Environmental Management System (EMS) and do not fall within the scope of this assessment. Similar events during operation and decommissioning would adopt the same approach.

1.1.3. This assessment focuses on low likelihood, but potentially high consequence events as illustrated in **Plate TR9-0-1-1** which is based on Figure 2 in IEMA's Primer (Institute of Environmental Management & Assessment, 2020).

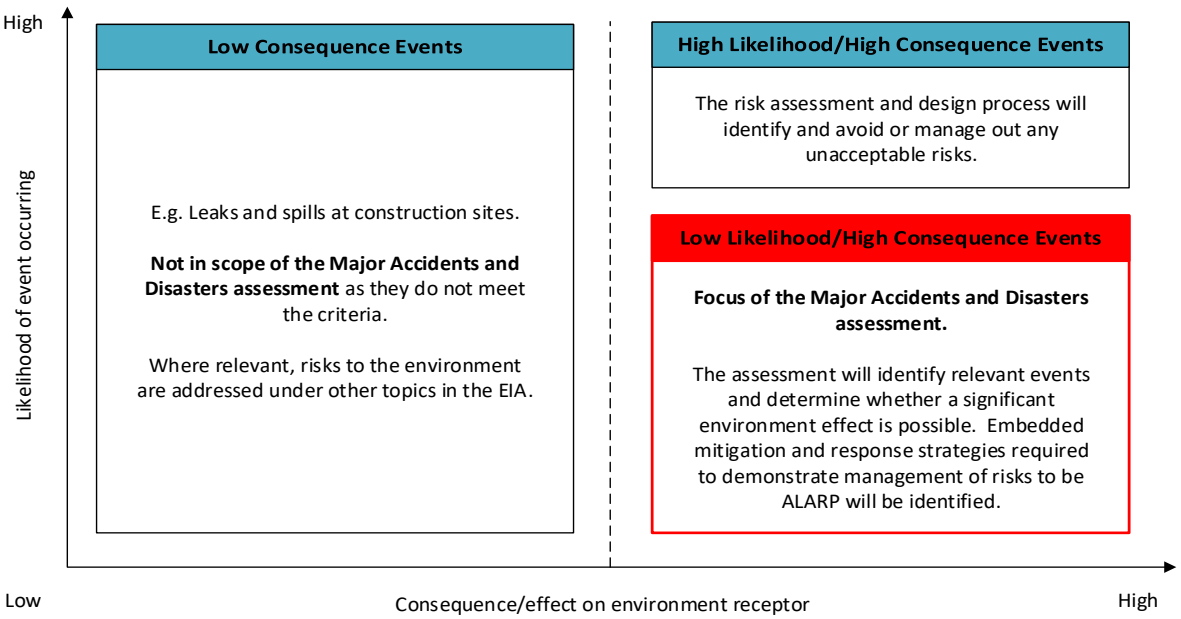

Plate TR9-0-1-1 - Graphical Representation of Major Accidents and Disasters Consequence Significance

1.1.4. Low likelihood is defined for the purposes of this assessment, as: May occur during the lifetime of the C2C Scheme, so no more than once in 10 years for the construction phase, and no more than once in 100 years for the operational phase.

1.1.5. This is an upper boundary for low likelihood. Very low likelihood events will also be included in the assessment, which may only occur at most once in every 1,000 years. Mitigation measures will reflect what is reasonable for such rare events, considering their potential consequence, within the guiding principle of risks being ALARP.

1.1.6. High consequence events are considered to lead to a significant adverse effect.

1.1.7. The risk identification process has used existing sources of information wherever possible, such as risk assessments undertaken for the C2C Scheme as part of other processes (many of which are required by law) or Risk Events identified within the UK's current National Risk Register. No additional risk assessments have been undertaken and the risk identification activity has focused on collating and reviewing the existing sources.

1.1.8. In order to identify whether a Risk Event has the potential to be a Major Event, which also has the potential to have a significant adverse effect on an environmental receptor, three components need to be present: a source, a pathway (between source and receptor) and a receptor. As such, and as recommended by Defra (Department for Environment, Food & Rural Affairs, 2011), the assessment uses the following conceptual model:

- The source is the original cause of the hazard, which has the potential to cause harm;
- The pathway is the route by which the source can reach the receptor; and
- The receptor, which is the specific component of the environment that could be adversely affected, if the source reaches it.

1.1.9. Risk Events which do not have all three components have been screened out from the assessment.

1.2 SCREEN RISKS

1.2.1. The following major accident(s) and/or disaster(s) screening process has been used to identify those Risk Events which would require further consideration within the assessment as illustrated in **Plate TR9-0-1-2** below:

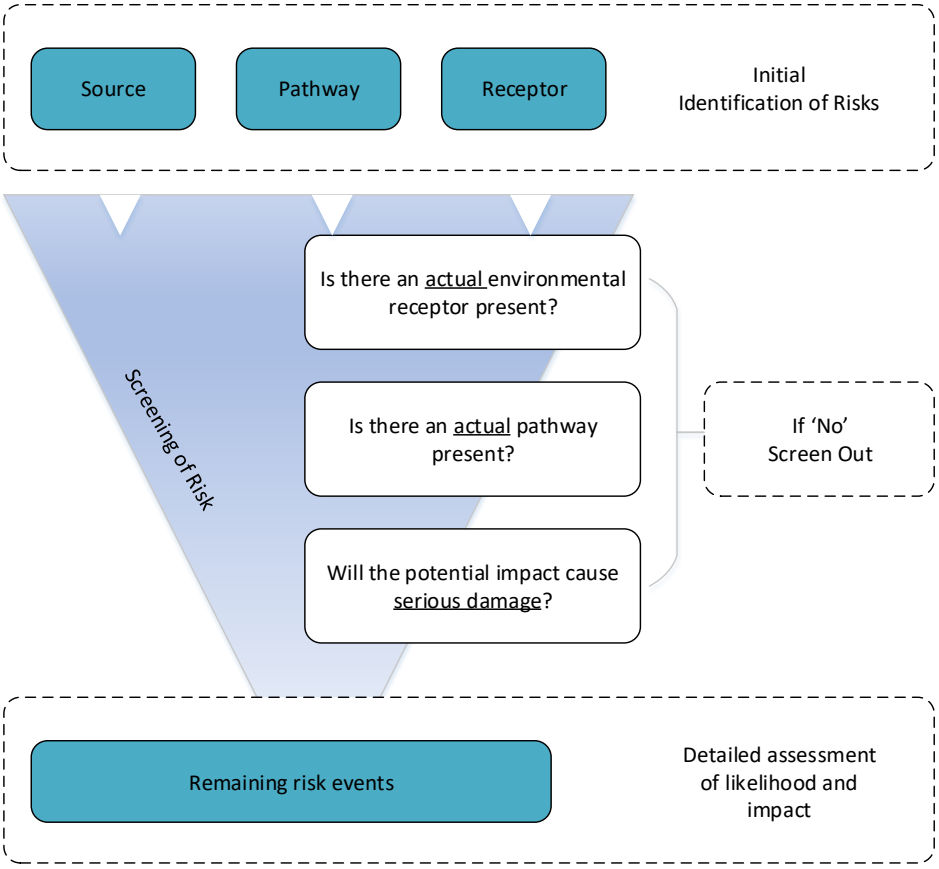

Plate TR9-0-1-2 - Screening Process Flow Diagram

1.2.2. For those Risk Events which are not screened out during the three-step process, the following assessment methodology has been used. The assessment forms the basis for recommending additional mitigation measures, as appropriate.

1.3 DEFINE IMPACT

1.3.1. Several mechanisms are in place to reduce the vulnerability of the C2C Scheme to major accident(s) and/or disaster(s) or mitigate significant effects on the environment should they occur. All measures to manage and reduce the risk of significant adverse effects occurring as a result of the vulnerability of the C2C Scheme to major accident(s) and/or disaster(s) are considered to be primary mitigation measures for the purposes of the assessment.

1.3.2. It has been assumed that:

- The design, installation, commissioning, operation and maintenance of plant, drainage systems, equipment and machinery, including associated systems, will take into account Good Engineering Practice to ensure compliance with applicable regulatory regimes; and
- The construction stage(s) of the C2C Scheme will be managed through the implementation of the Construction Phase Plan (required under the CDM Regulations 2015 (HM Government, 2015)) and mitigation measures relating to MA&D would be set out by the Construction Contractor for approval prior to construction as part of the LEMP.

1.3.3. A reasonable worst-case environmental impact(s) has been identified for each scoped-in Risk Event. Impacts have been identified in consultation with relevant disciplines for each environmental factor assessed within this ES. The environmental impacts are identified through a qualitative process which seeks to answer the question ‘could this event constitute a major accident or disaster in terms of the definitions provided’. Where relevant, specific sensitive receptors around the C2C Scheme are considered. The Risk Record (**Appendix TR9-B**) records the outcome of this process.

1.4 ASSESS RISK

1.4.1. The likelihood of the reasonable worst-case environmental effect(s) occurring has been evaluated taking into account the following:

- The likelihood of the Risk Event occurring considering the measures already embedded into the design and execution of the C2C Scheme; and
- The likelihood that an environmental receptor is affected by the Risk Event.

1.4.2. Likelihood assessments evaluate whether the effect (for example, loss of life) is a possible outcome of the Risk Event.

1.4.3. This evaluation refers to existing risk assessments as well as consultation with relevant discipline specialists.

1.4.4. The assessment of the risk has been carried out in line with the IEMA Primer on Major Accidents and Disasters in EIA (Institute of Environmental Management & Assessment, 2020). Where likely significant adverse effects are identified, mitigation measures must be in place, commensurate with the likelihood of the event occurring. The assessment considers, in consultation with relevant environmental topics, whether the risk to the environmental receptor is managed to be ALARP with the existing measures. If gaps are identified, where the existing measures do not represent management of risks to an environmental receptor to be ALARP, then additional measures would be

required. The Risk Record presented in **Appendix B – Risk Record** records the outcome of the assessment.

1.5 APPRAISE RISK MANAGEMENT OPTIONS

1.5.1. Risk management options fall into the following categories:

- Eliminate (or 'avoid') the risk, by adopting alternative processes in order to eliminate the source of the hazard, or remove the receptor;
- Reduce the risk by adapting proposed processes such that either the likelihood or the impact of the Risk Event can be reduced;
- Isolate the risk, by using physical measures to ensure that should the Risk Event occur, it can be effectively isolated such that there is no pathway;
- Control the risk, by ensuring that appropriate control measures are in place (for example emergency response) so that should a Risk Event occur, it can be controlled and managed appropriately. The mitigation hierarchy of repair and compensate any significant damage to environmental receptors may then apply following a control measure; and
- Exploit the risk if it presents potential benefits or new opportunities.

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