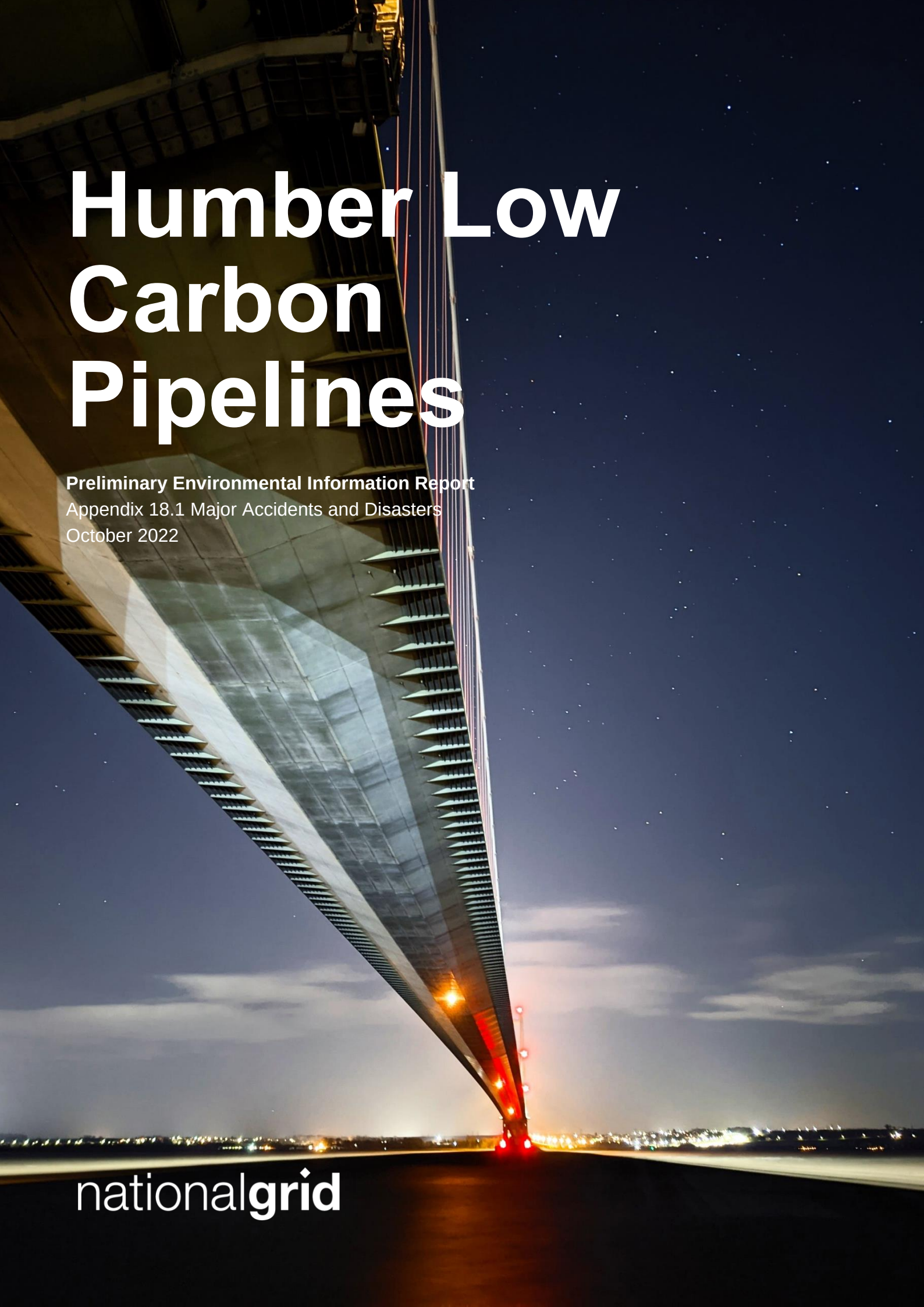

Humber Low Carbon Pipelines

Preliminary Environmental Information Report
Appendix 18.1 Major Accidents and Disasters
October 2022

nationalgrid

Contents

Appendix 18.1: Major Accidents and Disasters Long List

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
Internal Major Accidents				
Accidents during commissioning	Construction	Chapter 2: Project Description (Volume II)	**Likelihood:** Low **Consequence:** High Following the construction of the pipelines, there would be a period of initial testing called pre-commissioning. This period is used to confirm that the pipelines have been correctly installed and have not been damaged during the construction phase prior to flammable or toxic fluids being introduced. There is the potential for a major accident to occur during commissioning such as a pipe failure which could harm members of the Project workforce.	✓
Construction phase accidents including dropped objects, heavy plant, temporary works, rock falls from tunnel boring and problems with machinery	Construction	Chapter 2: Project Description (Volume II)	**Likelihood:** Low **Consequence:** Low The potential for accidents to occur during the construction process would be identified and dealt with through appropriate risk assessment and mitigation (applying the hierarchy of controls) as required to comply with UK health and safety legislation and environmental legislation. The Construction Environment Management Plan would require risk assessment of construction activities (including any necessary earthworks or demolition activities) and this assessment would identify and	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			mitigate, where necessary, the potential impact of all major accidents or disasters, including those affecting non-human receptors. These risk assessments shall count for adverse weather and prevailing environmental conditions. There may be potential for accidents during trenchless techniques during construction (for example, encountering unexpected ground conditions leading to instability etc.). This would be mitigated via geological investigations prior to the construction phase.	
Construction phase activities impact on UXO	Construction	n/a	**Likelihood:** Low **Consequence:** Low Encountering Unexploded Ordnance (UXO) during intrusive construction works is scoped out. Based on The UXO Risk Map (Ref. 1), the hazard across the preliminary 1 km Study Area is low. There are well developed construction industry practices which allow safe construction of thousands of Projects each year in low hazard areas.	X
Construction traffic accidents	Construction	Chapter 15: Traffic and Transport (Volume II)	**Likelihood:** Low **Consequence:** Low The Project would require road transport movements for the construction workforce and construction materials. However, the numbers of vehicle movements would not be significant compared to the background rate across the widespread area covered by the Project. A full assessment of the impact on traffic will be in Chapter 15: Traffic and Transport of the Environmental	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			Statement (ES). It is therefore not considered further in the assessment of Major Accidents and Disasters.	
Damage to existing utilities	Construction	Chapter 2: Project Description (Volume II)	**Likelihood:** Low **Consequence:** High There is potential for utilities and services to be present along the Proposed Order Limits. There is potential to damage these utilities which could harm the Project workforce or lead to contamination of the ground/groundwater.	✓
Fires	Construction and Operation	Chapter 2: Project Description (Volume II)	**Likelihood:** Low **Consequence:** High There would be construction compounds including temporary welfare facilities and vehicle fuelling facilities established in order to facilitate construction. There is the potential for a fire in the construction compounds which could cause serious harm to the Project workforce. Suitable risk assessments would be conducted and appropriate mitigation measures included. There would be electrical equipment and other consumables in the AGIs once operational, with a low potential risk of fire.	✓
Impacts on aviation	Construction and Operation	n/a	**Likelihood:** Low **Consequence:** High There is one airport (Humberside Airport) which lies within 10 km of the Proposed Order Limits which at its closest point is approximately 250 m northwest of the Proposed Order Limits.	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			The Airport Operators Association have published five Advice Notes (AN) on safety in the proximity to airports. Advice Note 4 (Ref. 2) states that good practice in line with BS 7121 Code of practice for the safe use of cranes (Ref. 3) requires the Project to consult with the aerodrome/airfield manager for any crane exceeding 10 m in height within 6 km of the aerodrome. As outlined earlier, a section of the Proposed Order Limits lies within 6 km of the airport. It is not yet known whether any cranes would be required in these locations but, if they are, it is unlikely they would exceed 10 m in height. If a crane was to exceed 10 m, the aerodrome/airfield manager would be consulted.	
Impacts on mines and storage caverns	Construction and Operation	Chapter 9: Geology and Hydrogeology (Volume II)	**Likelihood:** Low **Consequence:** High Available Coal Authority records show two sections of the Study Area fall within Coal Mining Reporting Areas (Ref. 4), this includes the initial stretch of the Proposed Order Limits prior to Scunthorpe and then a stretch of the Proposed Order Limits crossing the Humber. A full assessment of the impact on mines and storage caverns will be in Chapter 9: Geology and Hydrogeology of the ES. It is therefore not considered further in the assessment of Major Accidents and Disasters	X
Impacts on transport networks and network impacts on the pipelines	Construction and Operation	Chapter 2: Project Description (Volume II)	**Likelihood:** Low **Consequence:** Low The pipelines would be required to cross transport networks including major road infrastructure. It is anticipated that these would likely be crossed using trenchless techniques to minimise	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			the potential impact on these networks. At a crossing point, the pipelines would be designed in accordance with the appropriate approved codes and standards with regards sufficient depth, wall thickness and, if necessary, impact protection. These guidelines are well established and understood by the pipeline industry such that the pipelines would be protected from any road accidents. It is noted that there are a very large number of natural gas pipelines which are buried in public highways and experience gained over many decades ensures that the risk of damage by traffic collisions on the road surface is negligible. Road crossings are well understood by the pipeline industry and would be addressed through the design of the pipelines. Industry good practice design would be adopted for the whole pipeline infrastructure. In addition, pipeline crossings of railways and major roads are subject to approval by the relevant network authority.	
Impacts on watercourse	Construction and Operation	Chapter 2: Project Description (Volume II)	**Likelihood:** Low **Consequence:** Low The pipelines would need to cross various watercourses including the River Humber, River Aire, River Trent and the Sheffield and South Yorkshire Canal. It is anticipated that major rivers and canals would likely be crossed using trenchless techniques to minimise the potential impact on these networks, i.e., closing waterbodies to facilitate construction. Smaller watercourse crossings including ditches and streams would generally be crossed using an open cut technique. The pipelines would be buried beneath the watercourse and therefore not located within the surface water body. The design	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			of the pipelines in such locations would be in accordance with the appropriate approved codes and standards to ensure that they are protected from foreseeable forces including but not limited to sedimentation, scour or dredging. These are well understood by the pipeline industry and would be addressed through the design of the pipelines. Industry good practice design would be adopted for the whole pipeline system.	
Impact on intertidal areas	Construction and Operation	Chapter 7: Ecology and Biodiversity (Volume II) and Chapter 17: Hydrology and Land Drainage (Volume II)	**Likelihood:** Low **Consequence:** Low The pipelines would need to cross two intertidal areas: the River Humber and the Holderness Coast. There is not expected to be an impact on the River Humber during construction as it would be crossed utilising trenchless techniques. Furthermore, during operation the pipelines would be buried beneath the River Humber and therefore not located within the surface water body. The design of the pipelines in such locations would be in accordance with the appropriate approved codes and standards to ensure that it is protected from foreseeable forces including sedimentation, scour or dredging. These are well understood by the pipeline industry and would be addressed through the design of the pipelines. Industry good practice design would be adopted for the whole pipeline infrastructure.. On this basis, it is proposed to scope out the impact on the River Humber. Chapter 7: Ecology and Biodiversity and Chapter 17: Hydrology and Land Drainage of the ES will assess the potential for	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			impacts to the Holderness Coast during the construction and operation phases; it is therefore not considered further in the assessment of Major Accidents and Disasters.	
Leaks and spills – pollution to water or ground	Construction and Operation	Chapter 9: Geology and Hydrogeology (Volume II) and Chapter 17: Hydrology and Land Drainage (Volume II)	**Likelihood:** Low **Consequence:** Low There would be small amounts of chemicals and fuels used and stored within the construction compounds. These would be stored in line with industry good practice and the quantities would be minimised. Chapter 9: Geology and Hydrogeology of the ES would assess the potential for ground/groundwater contamination during the construction and operation phases; it is therefore not considered further in the assessment of Major Accidents and Disasters. Chapter 17: Hydrology and Land Drainage of the ES will assess the potential for water contamination during the construction and operation phases; it is therefore not considered further in the assessment of Major Accidents and Disasters.	X
Accidents during maintenance	Operation	Chapter 2: Project Description (Volume II)	**Likelihood:** Low **Consequence:** Low The AGIs and pipelines are normally unoccupied but personnel would visit for inspection and maintenance activities and to carry out any repairs which may be required. Maintenance accidents are work related accidents that could affect only one or two workers carrying out the task, the effects of which do not extend to receptors within the wider environment. Under UK Health and Safety legislation, employers are required to manage the risk to their employees and others who could be affected by their	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			activities and ensure that the risk is reduced to As Low As Reasonable Possible (ALARP). The ALARP principle requires compliance with good practice as a minimum. The AGIs would be designed with consideration of the potential occupational health and safety hazards such as electrocution, falls from height and trip hazards. These would be mitigated through the application of the hierarchy of controls: i.e., hazards would be designed out or minimised where practicable, and appropriate measures to prevent and mitigate residual risks implemented. All staff who undertake maintenance on the system would be suitably qualified and experienced professionals	
Unplanned release of hydrogen from pipeline or AGI during operation	Operation	n/a	**Likelihood:** Low **Consequence:** High There is potential for a release of hydrogen from a pipeline or AGI during operation, for example as a result of external interference with the pipeline either accidentally or deliberately and from operational errors. The release of flammable gases has the potential to lead to fire or explosion hazards which could lead to serious harm to receptors in the vicinity.	✓
Unplanned release of carbon dioxide from pipeline or AGI during operation	Operation	n/a	**Likelihood:** Low **Consequence:** High There is potential for a release of carbon dioxide from a pipeline or AGI during operation, for example as a result of external	✓

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			interference with the pipeline either accidentally or deliberately and from operational errors. The release of carbon dioxide has the potential to cause asphyxiation and/or have toxic contamination effects, both of which could lead to serious harm to receptors in the vicinity.	
Structural collapse of assets	Operation	Chapter 2: Project Description (Volume II)	**Likelihood:** Low **Consequence:** Low The design of the AGIs would be undertaken by suitably qualified and experienced personnel including civil and structural engineers. The design would account for the expected ground conditions and design loads, e.g., due to wind, accounting for the effects of climate change, and would be ensured through compliance with appropriate codes and standards, and the application of good practice in structural design. This would ensure appropriate design of the Project and a reduction of the risk of structural hazards during operation such as building collapse to low levels, which are considered to be ALARP.	X
External Major Accidents				
Aircraft	Construction and Operation	Chapter 2: Project Description	**Likelihood:** Low **Consequence:** High The risk of an aircraft crash impacting the Project is considered to be extremely low. The Project represents a small construction workforce population which at its closest point would be located 250 m east from the closest airport.	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			The Project would include predominantly buried infrastructure, which is unlikely to have any material impact on aviation. Given the narrow, buried and linear nature of the Pipelines as well as there not being AGI locations within 10 km of Humberside Airport, the risk of a plane crash impacting the Project is low As the Project would not materially alter the risk of an aircraft crash, it would not have a potential impact and is not considered further.	
Rail	Construction and Operation	Chapter 2: Project Description	**Likelihood:** Low **Consequence:** Low The proposed pipeline route alignments would require crossing of the rail network in England. Trenchless crossing techniques would be employed during the construction phase so as not to impact on the ongoing use of the railway. There would be close liaison and agreement with the railway operator before works commence near and under the railway. The pipelines are a sealed, below-ground feature and therefore where they pass underneath embankments there is potential impacts on rail lines from subsidence over time and potentially vibration from trains passing over at high speed on the pipelines which would need to be considered in the design. It is considered that there would not be a significant risk to underground pipeline integrity from an impact resulting from a rail accident as the pipelines would be buried and constructed to good engineering practice. The AGIs are located within a fenced	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			compound a significant distance away from the railway line and are unlikely to be impacted during a rail accident.	
External chemical major accidents	Construction and Operation	n/a	**Likelihood:** Low **Consequence:** High There are a large number of Control of Major Accident Hazard (COMAH) Establishments and potentially further sites holding Hazardous Substance Consents within the preliminary 10 km Study Area (Ref. 5), including some sites which are associated with the Project as users or suppliers of hydrogen and/or carbon dioxide. A major accident at one of these sites could impact the construction workforce or could potentially initiate a major release through damage to the pipelines.	✓
External nuclear major accidents	Construction and Operation	n/a	**Likelihood:** Low **Consequence:** High Nuclear sites are designed, built and operated so that the chance of accidental releases of radiological material in the UK is extremely low. The last historical major accident in the UK was Windscale in 1957. There are no nuclear sites within a 10 km corridor along the Proposed Order Limits.	X
Loss of utilities	Construction and Operation	Chapter 2: Project Description (Volume II)	**Likelihood:** Low **Consequence:** Low During the construction and operation of the Project, there would be a reliance on utility systems to provide services to the Project. For example, electricity would be required for lighting, and powering control systems for operation of the AGIs, it may also	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			be used to provide heating and welfare facilities during construction. However, the loss of utility systems including water, power or telecommunications would only lead to construction phase/operational inconvenience, but it would not lead to Major Accident level consequences, as all items would be designed to 'fail-safe' in the event of loss of utilities.	
External Major Accidents – Malicious Attacks				
Terrorism	Construction and Operation	n/a	**Likelihood:** Low **Consequence:** Low Terrorism is the act of inflicting violence as a means of inflicting terror for political reasons. At the time of writing (July 2022), MI5 rates the current UK-wide threat level as SUBSTANTIAL, which means an attack in the UK is considered 'likely' (Ref. 6). The National Risk Register (Ref. 7) for the UK lists various types of terrorist attack as potential major accidents including attacks on publicly accessible locations, transport systems, infrastructure, as well as Chemical, Biological, Radiological or Nuclear (CBRN) or Cyber-attacks. The Project is not a publicly accessible location or transport system, it is also does not represent a potential target or vector for a CBRN attack. Cyber-attacks are considered separately below. The Centre for the Protection of National Infrastructure (CPNI) sets the definition of Critical National Infrastructure (CNI) (Ref. 8). Security provisions have already been allowed for within the design of the Project and consideration would be given to the	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			appropriate additional measures if the Project is designated as CNI. Additionally, it is worth noting that the Project is infrastructure which is dispersed over significant distances and would be buried. This would make it extremely difficult to 'damage' in the conventional sense as it is protected by its disparate nature, unlike a power station or water treatment facility, which presents a more consolidated target. The potential effects on the Project of terrorism are not considered significant.	
Widespread public disorder	Construction and operation	n/a	**Likelihood:** Low **Consequence:** Low The National Risk Register (Ref. 7) states that public disorder 'may be caused by a combination of long-standing grievances and a spontaneous response to a single incident.' The UK is a developed economy with a stable democratic political regime, such that prolonged civil unrest is considered extremely unlikely. Periodically, political protests may turn violent but these are rarely widespread and are usually in response to a 'precipitating event'. As the Project represents a significant step forward in the UKs drive to a Net Zero Carbon economy, it is not considered that the Project is likely to be either a target or a precipitating event for widespread public disorder.	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
Cyber Attack	Construction and Operation	Chapter 18: Major Accidents and Disasters (Volume II)	**Likelihood:** Low **Consequence:** High The National Risk Register (Ref. 7) includes cyber attacks as one of the types of terrorism which may affect the UK. In recent years, other countries have seen successful cyber attacks against power stations or grid infrastructure and the UK NHS has also been a victim of a ransomware attack. The Project has associated cyber infrastructure which could be attacked. If this were to happen, impacts could be as follows: • An unplanned shut down leading to a major event; • Overpressure of the pipelines; and • A carbon dioxide and/or hydrogen shut down that could affect the Connected Projects' ability to generate power. Any one of these impacts has the potential to lead to a High magnitude of change to human and non-human receptors. The project would be conducting appropriate risk assessments and the systems supporting the Project would include suitable protective measures.	✓
Disasters				
Biological threats, e.g., disease epidemics, animal diseases etc.	Construction and Operation	n/a	**Likelihood:** Low **Consequence:** Low The Project would not materially alter the health of those who may be exposed to biological threats, nor would it increase or decrease their likelihood, as the construction population would	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			be small. The Project would not therefore materially alter the background risk of biological threats. Any impacts that these threats may have on the Project such as temporary cessation of construction or requirements for social distancing measures as were required for the Coronavirus pandemic are not considered to be Major Accidents. Therefore, the assessment of biological threats was scoped out of MA&D.	
Dam/Reservoir breaches	Construction and Operation	Chapter 17: Hydrology and Land Drainage (Volume II)	**Likelihood:** Low **Consequence:** High A Flood Risk Assessment would be undertaken as part of the Chapter 17: Hydrology and Land Drainage assessment within the ES. To avoid duplication, flood risk is not considered further within MA&D.	X
Extreme weather conditions (temperature, wind, precipitation, drought)	Construction and Operation	Chapter 8: Climate Resilience (Volume II)	**Likelihood:** Low **Consequence:** Low The design of the Project, including any temporary structures, would be undertaken by suitably qualified and experienced personnel including civil and structural engineers. The design would account for the expected ground conditions and design loads over the appropriate return period, e.g., due to wind and would be ensured through compliance with good practice in structural/process design, including compliance with the Eurocodes and any relevant British Standards Institution (BSI) published documents.	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			The design of the Project would include allowances for the anticipated changes in climate over the lifecycle of the Project and would incorporate measures to allow adaption where required. This is described and assessed within Chapter 8: Climate of the ES. To avoid duplication, extreme weather conditions was scoped out of MA&D.	
Flood risk including pluvial, fluvial and coastal flooding	Construction and Operation	Climate 17: Hydrology and Land Drainage (Volume II)	**Likelihood:** Low **Consequence:** High A Flood Risk Assessment would be undertaken as part of the Hydrology and Land Drainage assessment. To avoid duplication, flood risk was scoped out of the Major Accidents and Disasters assessment.	X
Lightning	Construction and Operation	n/a	**Likelihood:** Low **Consequence:** Low The majority of the pipeline infrastructure would be buried and therefore at negligible risk of a lightning strike. The potential consequences of a lightning strike on any AGI are likely to be restricted to damage to the AGI building and potential injury to any workers who may be present. The Project would be provided with adequate lightning protection compliant with BS EN 62305-3 Protection Against Lighting (Ref. 9) to ensure the risk from lightning is reduced further and is considered to be reduced to ALARP. Adequate lightning protection for temporary	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			structures or plant during construction would be required by the CEMP.	
Seismic	Construction and operation	Chapter 9: Geology and Hydrogeology (Volume II)	**Likelihood:** Low **Consequence:** Low Seismic activity does not occur in Britain in a sufficient intensity to inflict severe damage. The British Geological Survey (BGS) (Ref. 10) acknowledges that on average, a Richter 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 (Ref. 7) 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 Project is not located within or close to a geologically active area. Furthermore, the design of the Project would account for any foreseeable loads, e.g., due to seismic activity in line with British Standards. It is therefore considered there are no potential impacts arising from seismic hazards.	X
Space Weather	Construction and Operation	n/a	**Likelihood:** Low **Consequence:** Low Severe space weather is divided into three categories in the National Risk Register (Ref. 7): Solar flares, solar energetic	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			particles and coronal mass ejections. These have the capacity to cause a loss of power or interference with satellite or radio based communication technologies. While these events affecting the UK are extremely rare, they are known to have occurred in 1921, 1960, 1989, 1991 and 2003. The only foreseeable impact to the Project is a temporary loss of power (which could also affect pipeline Cathodic Protection (CP) systems for a short period) or telemetry systems. Good engineering design practices would ensure that in the event of loss of services (power or communications), the Project would be maintained in a safe condition. It is noted that the Project is no more vulnerable than other similar infrastructure such as the natural gas systems across the UK, and much less vulnerable than other industries which have a more onerous reliance on satellites such as aviation. As space weather does not have the capacity to cause a major accident which may impact the Project it is therefore not considered further.	
Coastal erosion and landslides	Construction and operation	Chapter 17: Hydrology and Land Drainage (Volume II)	**Likelihood:** Low **Consequence:** High The landfall site is located on the Holderness coast in vicinity of Easington. There are existing coastal defences at this location that would be maintained up to 2045. However, the long-term future of these defences is uncertain. This part of the coastline is rapidly eroding and there is evidence of landslides in the area.	X

Major Accident/Disaster	Phase	Topic Chapter(s) with Relevant Information	Justification for Inclusion/Exclusion within the Short List	Short List?
			Coastal erosion has the potential to expose the carbon dioxide pipeline in the intertidal zone leading to potential damage to the pipeline. Additionally, the Pump Facility could be impacted by the erosion of the cliff although the site options being considered are set back from the current cliff line in order to minimise this risk. Assessment of coastal processes in the intertidal zone will be undertaken as part of the Hydrology and Land Drainage assessment. To avoid duplication, coastal processes was scoped out of MA&D.	

References

- Ref. 1 Zetica (2021). *UXO Risk Maps*. Available at: https://zeticauxo.com/downloadsand-resources/risk-maps/ (Accessed: 5 June 2022).
- Ref. 2 Airport Operators Association (2016) *Safeguarding of Aerodromes - Advice Note 4: Cranes and Other Construction Issues*. [online] Available at: <https://www.aoa.org.uk/wp-content/uploads/2016/09/Advice-Note-4-Cranes-2016.pdf> (Accessed: 5 June 2022).
- Ref 3 British Standards (2016). *Code of practice for safe use of cranes*. Available at: https://landingpage.bsigroup.com/LandingPage/Series?UPI=BS%207121 (Accessed: 7 June 2022)
- Ref 4 Interactive Map Viewer *(*2022*) Coal Authority*. Available at: <https://mapapps2.bgs.ac.uk/coalauthority/home.html> (Accessed: 7 June 2022).
- Ref 5 Health and Safety Executive (2021) *COMAH 2015 Public Information Search.* [online]. Available at: https://notifications.hse.gov.uk/COMAH2015/Search.aspx (Accessed: 7 June 2022).
- Ref 6 GOV.UK (2022) *Terrorism and national emergencies*. Available at: <https://www.gov.uk/terrorism-national-emergency> (Accessed: 7 June 2022).
- Ref 7 HM Government (2020) *National Risk Register*. Available at: https://www.gov.uk/government/publications/national-risk-register-2020 (Accessed: 8 June 2022).
- Ref 8 CPNI (2021) *Critical National Infrastructure*. Available at: <https://www.cpni.gov.uk/critical-national-infrastructure-0#:~:text=National%20Infrastructure%20are%20those%20facilities,upon%20which%20daily%20life%20depends.> (Accessed 8 June 2022).
- Ref 9 British Standard (2011) *BS EN 62305-3 - Protection Against Lightning*. Available at: http://www-public.tnb.com/eel/docs/furse/BS_EN_IEC_62305_standard_series.pdf. (Accessed: 8 June 2022).
- Ref 10 British Geological Society (2022) *Where do earthquakes occur?* Available at: https://www.bgs.ac.uk/discovering-geology/earth-hazards/earthquakes/where-do-earthquakes-occur/#:~:text=A%20magnitude%204%20earthquake%20happens,UK%20is%20around%20magnitude%206.5. (Accessed: 8 June 2022).

National Grid plc,
1-3 Strand,
London.
WC2N 5EH United Kingdom

Registered in England and Wales
No. 4031152
nationalgrid.com