



DOGGER BANK D WIND FARM

Preliminary Environmental Information Report

Volume 1
Chapter 28 Major Accidents and Disasters

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Appendix 28.1	Consultation Responses for Major Accidents and Disasters

Glossary

Term	Definition
Accident	An event which happens by chance or without expectation.
Additional Mitigation	<p>Measures identified through the EIA process that are required as further action to avoid, prevent, reduce or, if possible, offset likely significant adverse effects to acceptable levels (also known as secondary (foreseeable) mitigation).</p> <p>All additional mitigation measures adopted by the Project are provided in the Commitments Register.</p>
Birkhill Wood Substation	The onshore grid connection point for DBD identified through the Holistic Network Design process. Birkhill Wood Substation which is being developed by National Grid Electricity Transmission and does not form part of the Project.
Commitment	<p>Refers to any embedded mitigation and additional mitigation, enhancement or monitoring measures identified through the EIA process and those identified outside the EIA process such as through stakeholder engagement and design evolution.</p> <p>All commitments adopted by the Project are provided in the Commitments Register.</p>
Design	All of the decisions that shape a development throughout its design and pre-construction, construction / commissioning, operation and, where relevant, decommissioning phases.
Development Consent Order (DCO)	A consent required under Section 37 of the Planning Act 2008 to authorise the development of a Nationally Significant Infrastructure Project, which is granted by the relevant Secretary of State following an application to the Planning Inspectorate.
Disaster	A sudden accident or natural catastrophe that causes great damage or loss of life.
Effect	An effect is the consequence of an impact when considered in combination with the receptor’s sensitivity / value / importance, defined in terms of significance.
Embedded Mitigation	<p>Embedded mitigation includes:</p> <ul style="list-style-type: none">Measures that form an inherent part of the project design evolution such as modifications to the location or design of the development made during the pre-application phase (also known as primary (inherent) mitigation); andMeasures that will occur regardless of the EIA process as they are imposed by other existing legislative requirements or are considered as standard or best practice to manage commonly occurring environmental impacts (also known as tertiary (inexorable) mitigation). <p>All embedded mitigation measures adopted by the Project are provided in the Commitments Register.</p>

Term	Definition
Energy Storage and Balancing Infrastructure (ESBI)	A range of technologies such as battery banks to be co-located with the Onshore Converter Station, which provide valuable services to the electrical grid such as storing energy to meet periods of peak demand and improving overall reliability.
Enhancement	<p>Measures committed to by the Project to create or enhance positive benefits to the environment or communities, as a result of the Project.</p> <p>All enhancement measures adopted by the Project are provided in the Commitments Register.</p>
Environmental Impact Assessment (EIA)	A process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information and includes the publication of an Environmental Statement.
Environmental Statement (ES)	A document reporting the findings of the EIA which describes the measures proposed to mitigate any likely significant effects.
Event	An identified, unplanned event, which is considered relevant to the development and has the potential to result in a major accident and / or disaster, subject to assessment of its potential to result in a significant adverse effect on an environmental receptor.
Evidence Plan Process (EPP)	A voluntary consultation process with technical stakeholders which includes a Steering Group and Expert Topic Group (ETG) meetings to encourage upfront agreement on the nature, volume and range of supporting evidence required to inform the EIA and HRA process.
Expert Topic Group (ETG)	A forum for targeted technical engagement with relevant stakeholders through the EPP.
Grid Connection	The offshore and onshore electricity transmission network connection to Birkhill Wood Substation.
Harm	Damage to the receptor above the described or defined thresholds.
Haul Roads	Temporary tracks set aside to facilitate transport access during onshore construction works.
Hazard	Something with the potential to cause harm.
Impact	A change resulting from an activity associated with the Project, defined in terms of magnitude.
Landfall	The area on the coastline, south-east of Skipsea, at which the offshore export cables are brought ashore, connecting to the onshore export cables at the transition joint bay above Mean High Water Springs.

Term	Definition
Major Accident	An occurrence leading to a loss of life or serious danger to human health and / or the environment, whether immediately or over time, on-site or off-site.
Mitigation	<p>Any action or process designed to avoid, prevent, reduce or, if possible, offset potentially significant adverse effects of a development.</p> <p>All mitigation measures adopted by the Project are provided in the Commitments Register.</p>
Mitigation Hierarchy	A systematic approach to guide decision-making and prioritise mitigation design. The hierarchy comprises four stages in order of preference and effectiveness: avoid, prevent, reduce and offset.
Monitoring	<p>Measures to ensure the systematic and ongoing collection, analysis and evaluation of data related to the implementation and performance of a development. Monitoring can be undertaken to monitor conditions in the future to verify any environmental effects identified by the EIA, the effectiveness of mitigation or enhancement measures or ensure remedial action are taken should adverse effects above a set threshold occur.</p> <p>All monitoring measures adopted by the Project are provided in the Commitments Register.</p>
Onshore Converter Station (OCS) Zone	The area within which the Onshore Converter Station and Energy Storage and Balancing Infrastructure will be located in vicinity of Birkhill Wood Substation.
Onshore Converter Station (OCS)	A compound containing electrical equipment required to stabilise and convert electricity generated by the wind turbines and transmitted by the export cables into a more suitable voltage for grid connection into Birkhill Wood Substation.
Onshore Development Area	The area in which all onshore infrastructure associated with the Project will be located, including any temporary works area required during construction and permanent land required for mitigation and enhancement areas, which extends landward of Mean Low Water Springs. There is an overlap with the Offshore Development Area in the intertidal zone.
Onshore Export Cable Corridor (ECC)	The area within which the onshore export cables will be located, extending from the landfall to the Onshore Converter Station zone and onwards to Birkhill Wood Substation.
Onshore Export Cables	Cables which bring electricity from the transition joint bay at landfall to the Onshore Converter Station zone (HVDC cables) and from the Onshore Converter Station zone onwards to Birkhill Wood Substation (HVAC cables).
Project Design Envelope	<p>A range of design parameters defined where appropriate to enable the identification and assessment of likely significant effects arising from a project's worst-case scenario.</p> <p>The Project Design Envelope incorporates flexibility and addresses uncertainty in the DCO application and will be further refined during the EIA process.</p>

Term	Definition
Scoping Opinion	<p>A written opinion issued by the Planning Inspectorate on behalf of the Secretary of State regarding the scope and level of detail of the information to be provided in the Applicant's Environmental Statement.</p> <p>The Scoping Opinion for the Project was adopted by the Secretary of State on 02 August 2024.</p>
Scoping Report	<p>A request by the Applicant made to the Planning Inspectorate for a Scoping Opinion on behalf of the Secretary of State.</p> <p>The Scoping Report for the Project was submitted to the Secretary of State on 24 June 2024.</p>
Study Areas	A geographical area and / or temporal limit defined for each EIA topic to identify sensitive receptors and assess the relevant likely significant effects.
The Applicant	SSE Renewables and Equinor acting through 'Doggerbank Offshore wind Farm Project 4 Projco Limited.
The Project	Dogger Bank D Offshore Wind Farm Project, also referred to as DBD in this PEIR.

28 Major Accidents and Disasters

28.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) presents the preliminary results of the Environmental Impact Assessment (EIA) on major accidents and disasters related to the Energy Storage and Balancing Infrastructure (ESBI) aspects of the Dogger Bank D Offshore Wind Farm Project (hereafter ‘the Project’ or ‘DBD’).
2. **Chapter 4 Project Description** provides a description of the key infrastructure components which form part of the Project and the associated construction, operation, and maintenance (O&M) and decommissioning activities.
3. The primary purpose of the PEIR is to support the statutory consultation activities required for a Development Consent Order (DCO) application under the Planning Act 2008. The information presented in this PEIR chapter is based on the baseline characterisation and assessment work undertaken to date. The feedback from the statutory consultation will be used to inform the design where appropriate and presented in an Environmental Statement (ES), which will be submitted with the DCO application.
4. Additionally, and as explained in the EIA Scoping Report (Royal HaskoningDHV, 2024), major accidents and disasters for both the offshore and onshore export cable corridors (ECC) and Onshore Converter Station (OCS) are detailed in the accompanying technical chapters of this PEIR, where relevant.
5. This PEIR chapter:
 - Describes the baseline environment relating to the major accidents and disasters for the ESBI;
 - Presents an assessment of the likely significant effects on the major accidents and disasters during the construction, O&M and decommissioning phases of the ESBI aspects of the Project;
 - Identifies any assumptions and limitations encountered in compiling the environmental information; and
 - Sets out proposed mitigation measures to avoid, prevent reduce or, if possible, offset potential significant adverse environmental effects identified during the EIA process and, where relevant, monitoring measures or enhancement measures to create or enhance positive effects.
6. Following guidance published by the Institute of Environmental Management and Assessment (IEMA) on major accidents and disasters in Environmental Impact Assessment (EIA) (IEMA, 2020), consideration of major accidents and disasters within the EIA process is conducted within individual technical chapters, where relevant. Further details can be found in:
 - Coastal erosion and flood risk, considered within **Chapter 8 Marine Physical Processes, Chapter 21 Water Resources and Flood Risk** and **Chapter 31 Climate Change**;
 - Accidental pollution, covered within **Chapter 9 Marine Water and Sediment Quality, Chapter 21 Water Resources and Flood Risk** and **Chapter 22 Soils and Land Use**;
 - Vessel collision and allision, considered within **Chapter 15 Shipping and Navigation**;
 - Exposed export cables leading to vessel snagging, considered within **Chapter 14 Commercial Fisheries** and **Chapter 15 Shipping and Navigation**; and
 - Aviation safety, considered within **Chapter 16 Aviation, Radar and Military**.
7. An exception to compliance with the IEMA guidance (IEMA, 2020) outlined above has been made for the ESBI in response to the Scoping Opinion from the Planning Inspectorate. Further information on this is presented in **Section 28.3** and **Volume 2, Appendix 28.1 Consultation Responses for Major Accidents and Disasters**.
8. Major accidents and disasters should be included in an assessment where a project has the potential to cause the loss of life, permanent injury and / or temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration.
9. Events that have both a high likelihood of occurring and a high consequence would be considered a high risk and therefore would be unacceptable, i.e. they cannot proceed. The risks and consequences of projects of this nature should have been designed-out prior to commencement.
10. Conversely, low-impact events, regardless the likelihood, e.g. minor spills, are low risk and are unlikely to be considered a major accident and disasters risk. Such events would not threaten or cause serious environmental effects to human health and / or the environment such that they required the use of resources, beyond those of the Applicant, to manage. Such events are therefore outside the scope of this assessment.

28.2 Policy and Legislation

28.2.1 National Policy Statements

11. Planning policy on energy Nationally Significant Infrastructure Projects (NSIP) is set out in the National Policy Statements (NPS). The following NPS is relevant to the major accidents and disasters assessment:
- Overarching NPS for Energy (EN-1) (DESNZ, 2023a).
12. The major accidents and disasters assessment has been prepared with reference to specific requirements in the above NPS and are summarised in **Table 28-1**, along with how and where they have been considered in this PEIR chapter.

Table 28-1 Summary of Relevant National Policy Statement Requirements for Major Accidents and Disasters

NPS Reference and Requirement	How and Where Considered in the PEIR
NPS for Energy (EN-1)	
Paragraph 4.7.10: “In the light of the above and given the importance which the Planning Act 2008 places on good design and sustainability, the Secretary of State needs to be satisfied that energy infrastructure developments are sustainable and, having regard to regulatory and other constraints, are as attractive, durable, and adaptable (including taking account of natural hazards such as flooding) as they can be.”	Relevant legislation is presented in Section 28.2.2 , and natural hazards are identified in Section 28.6.1 and Table 28-14 .
Paragraph 4.13.1: “In addition to its role in the planning system, the HSE is the independent regulator for workplace health and safety and is responsible for enforcing a range of health and safety legislation, some of which is relevant to the construction, operation and decommissioning of energy infrastructure.”	Relevant legislation is presented in Section 28.2.2 and impacts from operation and decommissioning are presented in Sections 28.7.1 and 28.7.2 respectively.

28.2.2 Other Policy and Legislation

13. Other policy and legislation relevant to the major accidents and disasters assessment is summarised in the following sections.

28.2.2.1 National

14. The following sections outline national legislation relevant to the major accidents and disasters assessment for the ESBI aspects of the Project.

28.2.2.1.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

15. Regulation 5 of the EIA Regulations states that: “*The significant effects to be identified, described and assessed include, where relevant, the expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development.*”
16. Schedule 4, Paragraph 8 requires an ES to provide: “*A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and / or disasters which are relevant to the project concerned.*”

28.2.2.1.2 Environmental Permitting (England and Wales) Regulations 2016

17. The Environmental Permitting Regulations do not currently include ESBI as a regulated activity. However, associated activities, such as water discharge, combustion processes, e.g. generators used during the construction phase or as emergency back-up generators during O&M, are regulated activities and therefore may require an Environmental Permit.

28.2.2.1.3 Environmental Protection Act 1990

18. The Environmental Protection Act provides the basis for overarching environmental protections including contaminated land, nuisance, waste, and the control of emissions into the environment.

28.2.2.1.4 Environmental Liability and Damage Regulations (Prevention and Remediation) (England) Regulations 2015

19. The Environmental Liability and Damage Regulations define the meaning of environmental damage to a protected species, natural habitat, or Site of Special Scientific Interest (SSSI), surface or groundwater, marine waters and land. The Regulations apply to receptors where the damage, caused by the operator, was intentional or negligent. The Regulations do not apply to environmental damage caused by events including an act of terrorism and exceptional natural phenomenon.

28.2.2.1.5 Health and Safety at Work Act 1974

20. The Health and Safety at Work Act is the principal piece of legislation covering health and safety in the workplace, and places general duties on employers to protect the health and safety of its employees as far as reasonably practicable including on construction sites.

28.2.2.1.6 Construction (Design and Management) Regulations 2015

21. The Construction (Design and Management) (CDM) Regulations improve health and safety within the construction sector by requiring companies and individuals to plan any work, ensuring that individuals undertaking tasks are suitably competent, experienced and trained. In addition, it requires that the correct information regarding a development to be communicated and that individuals are made aware of the risks associated with a development.

28.2.2.1.7 Management of Health and Safety at Work Regulations 1999

22. The Management of Health and Safety at Work Regulations requires employers to protect employees from harm including the assessment and elimination of risks.

28.2.2.1.8 The Control of Major Accident Hazards (COMAH) Regulations 2015

23. The Control of Major Accident Hazards (COMAH) Regulations aim to prevent and mitigate the effects of major accidents involving hazardous substances which could impact upon people and the environment causing serious damage. However, the Project is not expected to be a COMAH Establishment as no hazardous substances above the relevant threshold values are planned to be stored onsite.

28.2.2.2 Local

24. The East Riding Local Plan Update 2025 – 2039 (adopted 2025) (East Riding of Yorkshire Council, 2025) includes reference to environmental hazards (Section 7) and a specific policy ENV6: Managing Environmental Hazards, which states:

“Environmental hazards, such as flood risk, coastal change, nutrient deposition, aerial pollution, groundwater pollution and other forms of pollution, will be managed to ensure that development does not result in unacceptable consequences to its users, the wider community, and the environment.

...

Policy ENV6 applies to all types of environmental hazard, which incorporates both existing hazards and/or any hazard that may be caused or exacerbated as a result of new development. This includes flood risk, coastal change, contaminated land, unstable land, hazardous installations, nutrient deposition, aerial pollution, water pollution, and pollution generated by light, noise, dust, smell, vibration, fumes, smoke, soot, ash or grit.

Many hazards are controlled through relevant statutory controls and procedures, and consultation with relevant bodies, such as the Health and Safety Executive (HSE) or the Environment Agency. Where a proposal is likely to generate or be affected by an environmental hazard, for example it is located close to a waste water treatment works where odour could occur, early discussions should take place with the relevant bodies/departments as early as possible in the development process, preferably at pre-application stage. It is recommended that early consultation on environmental permitting is conducted in parallel with pre-planning applications.”

25. The Local Plan acknowledges that the majority of hazards are controlled by statutory processes and through consultation with the relevant regulatory authorities such as the Environment Agency and the HSE and that where a proposal is likely to generate an environmental hazard, pre-application discussions should be commenced as early as possible.

28.3 Consultation

- 26. No topic-specific consultation has been undertaken to date in relation to the major accidents and disasters assessment with respect to the Evidence Plan Process (EPP), however where required, technical consultation will be undertaken with relevant stakeholders prior to DCO application submission in line with the process set out in **Chapter 7 Consultation**.
- 27. A Scoping Opinion from the Planning Inspectorate was received on 2nd August 2024, which has informed the scope of the assessment presented within this chapter (as outlined in **Section 28.4.2**).
- 28. **Volume 2, Appendix 28.1 Consultation Responses for Major Accidents and Disasters** summarises how consultation responses received to date (as part of the Scoping Opinion) are addressed in this chapter.
- 29. The Applicant has consulted with both National Gas and Ineos regarding infrastructure (pipelines) located in proximity to the ESBI. Both organisations have provided guidance regarding the construction of the Project where it crosses any existing pipeline, which will be used and taken into consideration when micro-siting and designing infrastructure within the onshore ECC and OCS zone, including the ESBI layout.
- 30. This chapter will be updated based on refinements made to the Project Design Envelope and to consider where appropriate stakeholder feedback on the PEIR. The updated chapter will form part of the ES to be submitted with the DCO application.

28.4 Basis of the Assessment

- 31. The following section establishes the basis of the assessment of likely significant effects, which is defined by the Study Area(s), assessment scope, realistic worst-case scenarios and development scenarios.
- 32. This section should be read in conjunction with **Volume 2, Appendix 1.2 Guide to PEIR**, **Volume 2, Appendix 6.2 Impacts Register** and **Volume 2, Appendix 6.3 Commitments Register**.
- 33. All major accidents and disasters could result in damage and / or harm. The assessment considers the likelihood, or risk, of the event occurring. A key focus is on the prevention of any incidents happening in the first place.
- 34. The methodology used for the major accidents and disasters assessment differs from the EIA assessment presented in **Chapter 6 Environmental Impact Assessment Methodology**. In order to assess major accidents and disasters, a list of potential accidents and risks are identified along with potential receptors, and then the likelihood of an occurrence is considered to evaluate the significance of potential effects.

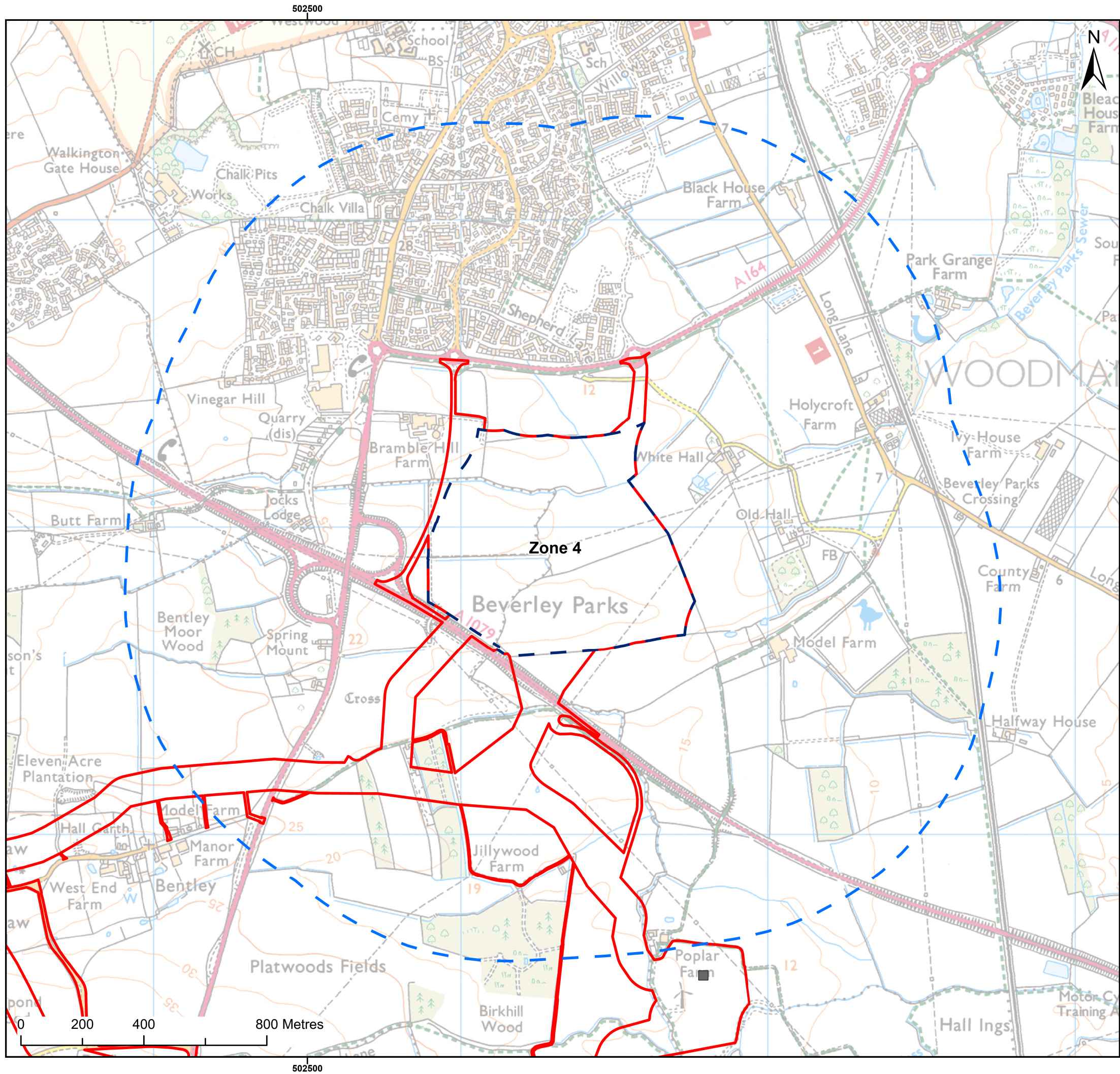
- 35. Additionally, the effect of onsite, offsite and natural hazards on receptors during the O&M and decommissioning phases is considered to have the same impact, as such the impact assessments (**Section 28.7**) have been combined.

28.4.1 Study Area

- 36. The Major Accidents and Disasters Study Area (hereafter referred to as ‘the Study Area’) includes the ESBI element of the Project, which will be co-located within the OCS zone with the OCS, and a buffer of up to 1km from the OCS zone boundary (**Figure 28-1**), including potential infrastructure and human and environmental receptors.
- 37. The Study Area is located within the East Riding of Yorkshire. The following location data has been used to undertake the assessment (**Table 28-2**).

Table 28-2 Location Search Criteria for Major Accidents and Disasters Assessment

Parameter	OCS Zone 4	OCS Zone 8
National Grid Reference	TA 03211 37105	TA 00836 36107
Easting / Northing	503211, 437105	500836, 436107
Postcode	HU17 8EW	HU17 8RS



- Legend:
- Onshore Development Area
 - Onshore Converter Station Zone 4
 - Onshore Converter Station Zone 4 1km Buffer
 - Indicative Birkhill Wood Substation Location

Source: © Haskoning DHV UK Ltd, 2024; © Environment Agency, 2024; © Atkins, Utility Solutions 2024; © Crown copyright and database rights 2025 Ordnance Survey 0100031673.

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK
WIND FARM

Title:

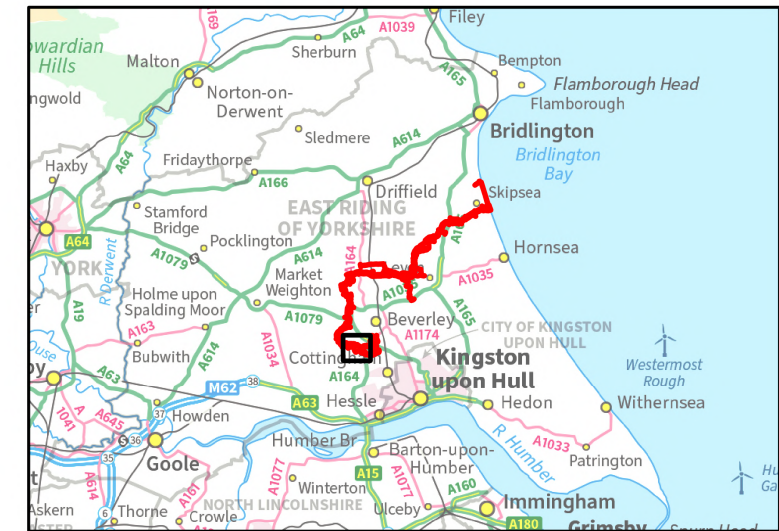
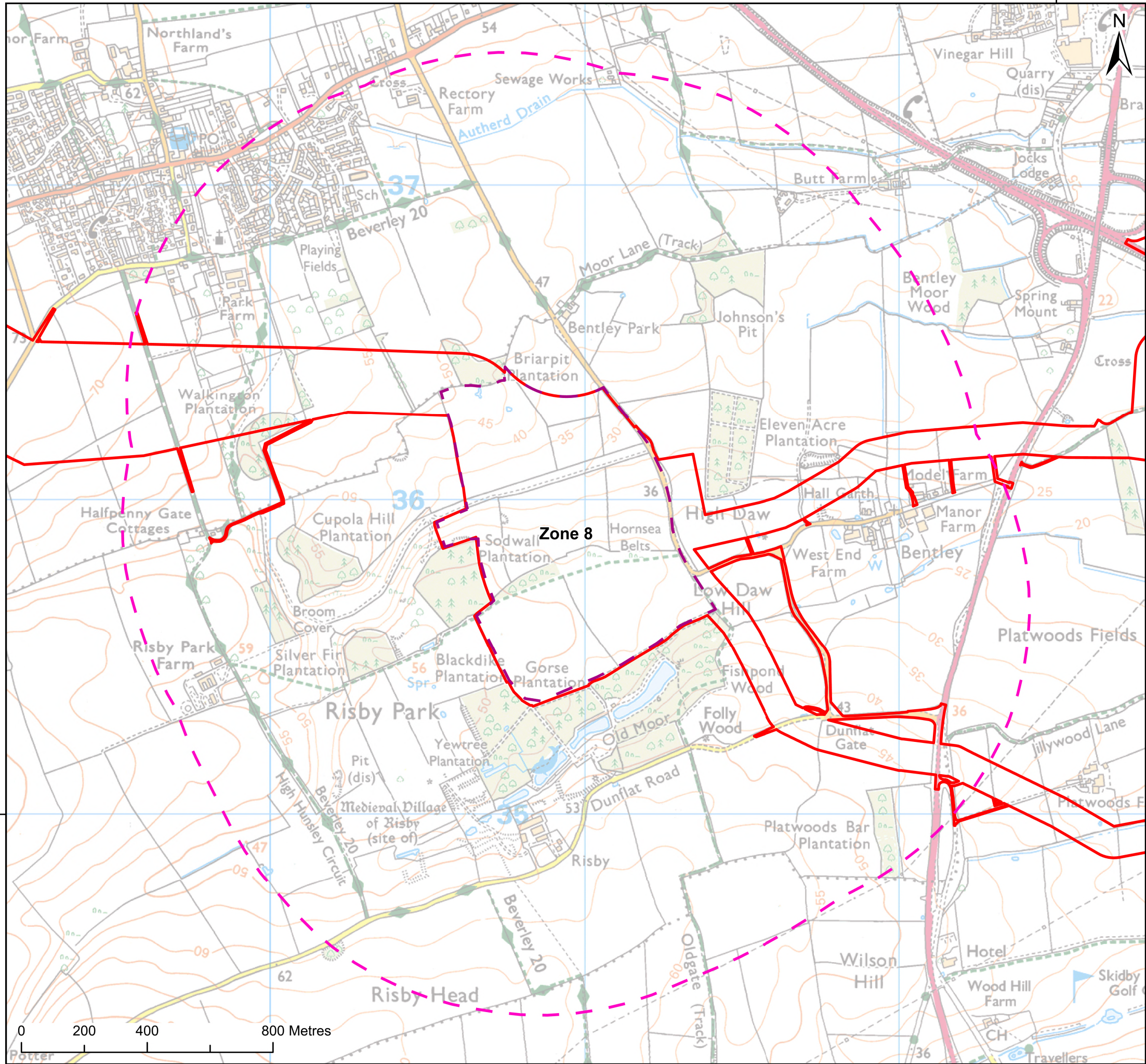
Major Accidents and Disasters Assessment Study Area
- Sheet 1 of 2

Figure: 28-1 Drawing No: PC6250-RHD-XX-ON-DR-GS-0384

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
03	19/03/2025	JH	AB	A3	1:12,500
02	05/02/2025	JH	AB	A3	1:12,500

Co-ordinate system: British National Grid





28.4.2 Scope of the Assessment

38. A number of impacts have been scoped out of the major accidents and disasters assessment. These impacts are outlined in **Volume 2, Appendix 6.2 Impacts Register**, along with supporting justification in line with the Scoping Opinion and the project description outlined in **Chapter 4 Project Description**.
39. The Scoping Report (Royal HaskoningDHV, 2024) recorded the findings of the scoping exercise and detailed the technical guidance, standards, and best practice to be used in the assessment to identify and evaluate the risk of major accidents and disasters.
40. The following were confirmed by the Planning Inspectorate to be scoped out of the major accidents and disasters assessment:
- Offshore major accidents and disasters (noting that the ES Chapter should provide clear cross-referencing to where the relevant impacts are considered);
 - Impacts during construction including:
 - Major accident or disaster impact arising from the ESBI element of the OCS zone upon the Project site, human or environmental receptors;
 - Impact of an incident associated with an existing major accident hazard risk on the ESBI element of the OCS zone;
 - Impact of natural hazards on the ESBI element of the OCS zone. However, identified risks and corresponding mitigation should be referenced and cross referenced within the ES where applicable; and
 - Transboundary impacts from all phases: the Planning Inspectorate stated in its Transboundary Screening Assessment (January 2024, and revised October 2024) that *“the Inspectorate has not identified any potential effects on [European Economic Area] EEA states as a result of the onshore works.”*
41. The cumulative impacts of construction were proposed to be scoped out; however, the Planning Inspectorate made the following observations:
- “The [Planning] Inspectorate is not in a position to agree that this matter can be scoped out. The ES should assess potential cumulative impacts from risks of major accidents and disasters during construction, or include information to demonstrate agreement with the relevant consultation bodies and the absence of a LSE.”*

42. It is considered that where impacts have been scoped out of the assessment, no cumulative effects have been considered. In addition, cumulative construction impacts have been scoped out as the majority of the cumulative projects will have completed their respective construction phases. Where there is temporal overlap between construction phases, due to the embedded mitigation proposed by other projects based on industry best practice and regulatory requirements, there is no potential for significant cumulative effects (**Table 28-18**).
43. Impacts scoped into the assessment relating to major accidents and disasters are outlined in **Table 28-3** and discussed further in **Section 28.7**.
44. The major accidents and disasters considered in the assessment are rare events. As detailed previously in **Section 28.1**, low consequence events, whatever their likelihood, do not meet the definition of a major accident or disaster (IEMA, 2020).
45. Low consequence events such as minor spills which may occur during both construction and O&M are likely to be limited in nature and scale and are assessed within the relevant technical assessments (where applicable).
46. A full list of impacts scoped in / out of the major accidents and disasters assessment is summarised in **Volume 2, Appendix 6.2 Impacts Register**. A description of how the Impacts Register should be used alongside the PEIR chapter is provided in **Volume 2, Appendix 1.2 Guide to PEIR** and **Chapter 6 Environmental Impact Assessment Methodology**.

Table 28-3 Major Accidents and Disasters – Impacts Scoped into the Assessment

Impact ID	Impact and Project Activity	Rationale
Operation and Maintenance		
MAD-O-01	Major accident or disaster impact arising from the ESBI element of the OCS zone upon the Project site, human or environmental receptors – on-site incidents during the O&M and commissioning of the ESBI	An on-site incident, e.g. fire, has the potential to damage the ESBI and other infrastructure in the OCS zone and impact human and infrastructure receptors both on- and off-site, such as maintenance personnel / local residents, e.g. smoke from fire impacting on nearby residential or commercial properties, as well as environmental receptors off-site, e.g., watercourses being impacted by the discharge of fire water.

Impact ID	Impact and Project Activity	Rationale
MAD-O-02	Impact of an incident associated with an existing major accident hazard risk on the ESBI element of the OCS zone, human or environmental receptors – off-site incidents during the O&M and commissioning of the ESBI	There is potential for an off-site event to impact the ESBI and other infrastructure in the OCS zone and subsequently human and environmental receptors, e.g. fire at a nearby property, that has the potential to cause damage to the Project’s infrastructure.
MAD-O-03	Impact of natural hazards on the ESBI element of the OCS zone, human or environmental receptors – natural hazards during the O&M and commissioning of the ESBI	There is the potential for a natural hazard to impact upon the ESBI and other infrastructure in the OCS zone that causes damage to the on-site infrastructure resulting in an accident / event, e.g. flooding, and impacting both human and environment receptors.
Decommissioning		
MAD-D-01	Major accident or disaster impact arising from the ESBI element of the OCS zone upon the Project site, human or environmental receptors – decommissioning activities not yet defined	Decommissioning impacts are scoped in; however, details of onshore decommissioning activities are not known at this stage. As discussed in Section 28.7.2 , decommissioning impacts will be assessed in detail through the Onshore Decommissioning Plan (see Table 28-4 , Commitment ID CO56) where relevant, which will be developed prior to the commencement of onshore decommissioning works. In this assessment, it is assumed that the risks associated with the ESBI during decommissioning would be no worse than those identified during commissioning and O&M of the ESBI.
MAD-D-02	Impact of an incident associated with an existing major accident hazard risk on the ESBI element of the OCS zone, human or environmental receptors – decommissioning activities not yet defined	
MAD-D-03	Impact of natural hazards on the ESBI element of the OCS zone, human or environmental receptors – decommissioning activities not yet defined	

28.4.3 Embedded Mitigation Measures

47. The Project has made several commitments to avoid, prevent, reduce or, if possible, offset potential adverse environmental effects through mitigation measures embedded into the evolution of the Project Design Envelope. These embedded mitigation measures include actions that will be undertaken to meet other existing legislative requirements and those considered to be standard or best practice to manage commonly occurring environmental effects.
48. The assessment of likely significant effects has therefore been undertaken on the assumption that these measures are adopted during the construction, O&M and decommissioning phases. **Table 28-4** identifies proposed embedded mitigation measures that are relevant to the major accidents and disasters assessment.
49. Full details of all commitments made by the Project are provided in **Volume 2, Appendix 6.3 Commitments Register**. A description of how the Commitments Register should be used alongside the PEIR chapter is provided in **Volume 2, Appendix 1.2 Guide to PEIR** and **Chapter 6 Environmental Impact Assessment Methodology**. In addition, a list of draft outline management plans which are submitted with the PEIR for consultation is provided in **Section 1.10 of Chapter 1 Introduction**. These documents will be further refined and submitted along with the DCO application. See **Volume 2, Appendix 1.2 Guide to PEIR** for a list of all PEIR documents.
50. The Commitments Register is provided at PEIR stage to provide stakeholders with an early opportunity to review and comment on the proposed commitments. Proposed commitments may evolve during the pre-application phase as the EIA progresses and in response to refinements to the Project Design Envelope and stakeholder feedback. The final commitments will be confirmed in the Commitments Register submitted along with the DCO application.

Table 28-4 Embedded Mitigation Measures Relevant to Major Accidents and Disasters

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Major Accidents and Disasters Assessment	Relevance to Impact ID
CO50	Health, safety and environmental risks will be identified and managed in accordance with the latest relevant regulatory requirements and best practice methods and construction activities will be informed by appropriate risk assessments and undertaken with appropriate personal protective equipment.	DCO Requirement - Code of Construction Practice DML Condition - Project Environmental Management Plan	Limits the potential impacts of construction-related events on receptors located within the OCS zone during the construction phase.	Risks during the construction phase, including cumulative construction impacts.
CO56	An Onshore Decommissioning Plan will be developed prior to commencement of onshore decommissioning works based on the relevant available guidance and legislative requirements. The scope and methodology of onshore decommissioning works and appropriate mitigation measures will be detailed in the plan.	DCO Requirement - Onshore Decommissioning Plan	Limits the potential impacts of major accidents and disasters that could potentially occur during the decommissioning phase to impact the ESBI and other receptors within the OCS zone.	MAD-D-01 MAD-D-02 MAD-D-03
CO79	A Battery Safety Management Plan (BSMP) will be developed in accordance with the Outline BSMP. The BSMP will provide a health and safety risk assessment of the Energy Storage and Balancing Infrastructure (ESBI) and detail appropriate prevention, monitoring and contingency measures for any identified hazards, including fire and chemical leak containment, to ensure compliance with latest relevant regulations and standards. The BSMP will also include measures for provision of information to the local community on ESBI risks and how these risks are appropriately mitigated and managed.	DCO Requirement - Battery Safety Management Plan	Limits the potential impacts of an event caused by the O&M of the ESBI on both on- and off-site receptors. Limits potential impacts of an off-site event impacting the ESBI and other receptors in the OCS zone.	MAD-O-01 MAD-O-02 MAD-O-03
CO94	An appropriate Project Emergency Response Plan or similar will be provided as part of the Project Environmental Management Plan (PEMP) and Emergency Response and Contingency Plan (ERCoP) for offshore construction works and the Code of Construction Practice (CoCP) for onshore construction works. The PEMP and CoCP will be developed in accordance with the Outline PEMP and Outline CoCP respectively. The Project Emergency Response Plan will detail protocols that would be undertaken in the event of an emergency, including occupational health and safety and environmental incidents, and set out clear roles and responsibilities, emergency contacts and reporting and escalation pathways. Protocols for extreme weather events will also be included.	DCO Requirement - Code of Construction Practice DML Condition - Project Environmental Management Plan	Details the appropriate emergency response actions to be undertaken should a major accident or disaster event occur.	Risks during the construction phase, including cumulative construction impacts.
CO96	The detailed design will ensure that the Project remain resilient to current and future climate conditions during the Project's operational lifetime. The design will be informed by relevant climate change projection data and include sufficient safety margins to withstand foreseeable extreme weather events.	DCO Requirement - Detailed Design (Onshore) DML Condition (Offshore)	Limits the potential impacts of climate-related natural hazards on the ESBI and other receptors in the OCS zone during the O&M phase.	MAD-O-01 MAD-O-02 MAD-O-03
CO97	Regular and periodic inspections and maintenance of all infrastructure will be undertaken over the operational lifetime of the Project to identify and remediate any damage and deterioration and where necessary to maintain good working condition. Monitoring of site-specific weather metocean conditions, recent extreme weather events and up-to-date climate change projection data will be undertaken to provide a dynamic risk assessment of climate change impacts and inform O&M planning.	DML Condition – Offshore Operations and Maintenance Plan DCO Requirement– Onshore Operations and Maintenance Plan		

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Major Accidents and Disasters Assessment	Relevance to Impact ID
CO105	<p>Prior to detailed design and commencement of the construction works within the Onshore Converter Station (OCS) zone, consultation with the appropriate stakeholders such as National Grid Gas, the operator of the Central Area Transmission Systems (CATS) Pipeline, the Environment Agency and Health and Safety Executive, will be undertaken to manage interfaces and define appropriate control measures when working close to live pipelines.</p> <p>Safety buffer zones, agreed with relevant stakeholders, will be created and clearly delineated that prohibits work from occurring in proximity to these receptors.</p>	DCO Requirement - Code of Construction Practice	The location of the OCS zone and layout of ESBI within the OCS zone influence the outcome of the major accidents and disasters assessment.	MAD-O-02

51. An Outline BSMP will be developed at ES stage and submitted with the DCO application, which will detail measures relevant to major accidents and disasters with respect to the ESBI. Indicative embedded mitigation measures which are proposed to be included in the plan are set out in **Table 28-5**.

Table 28-5 Indicative Embedded Mitigation Measures to be Included in the Outline Battery Safety Management Plan

Outline BSMP: Embedded Mitigation Measures for Major Accidents and Disasters
A Hazard Identification (HAZID) or Design Risk review will be undertaken to identify major accidents and disasters, including the identification of explosion and fire risks and risks from flooding.
Fire Stop system to be installed to electrically isolate batteries (if used, dependent on technology choice during detailed design stage post-consent) in the event of a fire or other emergency situation.
Tertiary containment and automatic shut-off valve installed to prevent the discharge of spill and / or fire water to nearby sensitive receptors, e.g. adjacent land and surface watercourse.
The volumes of hazardous substances, e.g. gases such as sulphur hexafluoride, used in electrical switchgear and circuit breakers, as well as other substances, e.g. oil / chemicals, will be minimised and where practicable, be kept below the COMAH Regulations 2015 and the Planning (Hazardous Substances) Regulations 2015 thresholds.
Primary containment to be stored within suitable secondary containment systems designed to hold 11% of the largest container or 25% of the total volume, whichever is the greater of the two.
ESBI layout to avoid areas at risk of flooding, and operator to use the Environment Agency’s Flood Alert service.
Selection of battery units which promote safety in design through: <ul style="list-style-type: none">Battery chemistry;Alarms and monitoring:<ul style="list-style-type: none">Fire alarms – monitoring battery ‘failure state’ and smoke detectors;Temperature;Humidity compliance with relevant engineering standards;Fire rating and firewalls;Ventilation and cooling systems; andDeflagration panels.
Implementation of separation distances both between individual battery blocks (indicatively 3.1m) and between groups of battery blocks to provide a fire break (indicatively 6.1m).

52. In addition, a draft version of the **Outline Code of Construction Practice** (document reference 8.9) is provided with the PEIR for consultation, which will be updated post-PEIR and submitted with the DCO application. The Outline CoCP will detail measures relevant to health and safety during construction. Indicative embedded mitigation measures which are included in the Outline CoCP are set out in **Table 28-6**.

Table 28-6 Indicative Embedded Mitigation Measures Included in the Outline Code of Construction Practice

Outline CoCP: Embedded Mitigation Measures for Major Accidents and Disasters
Project Emergency Response Plan (part of CoCP developed post-consent)
A Project Emergency Response Plan for the specific stage of construction works will be developed by the Principal Contractor(s) and included in the CoCP. The plan will cover: <ul style="list-style-type: none">Identified hazards based on site-specific risk assessments;Provision of on-site first aid facilities, pollution, fire containment measures and service shut-off points;Evacuation routes and designated assembly points;Roles and responsibilities in the event of emergencies and key contacts for notifying emergency services and other relevant authorities;Response procedures for health and safety (e.g. injuries) and environmental incidents (e.g. spillages, leakages and fires) to protect workers, plant and equipment and other assets and control the risk;Protocols for incident reporting, recordkeeping of emergency health and safety and environmental incidents and implementation of remedial actions; andA schedule for emergency response testing at appropriate intervals based on site activities.

28.4.4 Realistic Worst-Case Scenarios

53. To provide a precautionary, but robust, assessment at this stage of the Project’s development process, a realistic worst-case scenario has been defined in **Table 28-7** for each impact scoped into the assessment (as outlined in **Section 28.4.2**). The realistic worst-case scenarios are derived from the range of parameters included in the Project Design Envelope. They ensure that the assessment of likely significant effects is based on the maximum potential impact on the environment. Should an alternative development scenario be taken forward in the final design of the Project, the resulting effects would not be greater in effect significance. Further details on the Project Design Envelope are provided in **Chapter 6 Environmental Impact Assessment Methodology**.

54. The realistic worst-case scenarios used to assess impacts on major accidents and disasters are defined in **Table 28-7**. Following the PEIR publication, further design refinements will be made based on ongoing engineering studies and considerations of the EIA and stakeholder feedback. Therefore, realistic worst-case scenarios presented in the PEIR may be updated in the ES. The Project Design Envelope will be refined where possible to retain design flexibility only where it is needed.

28.4.5 Development Scenarios

55. Consideration is also given to the different development scenarios with respect to the OCS zones. At this stage, two OCS zone options remain in the Project Design Envelope (see **Chapter 4 Project Description** for further details) noting that only one option will be developed. The two development scenarios are:
- Infrastructure located in OCS Zone 4; or
 - Infrastructure located in OCS Zone 8.
56. With respect to the major accidents and disasters assessment, it is noted that the assessment of likely significant effects is not materially affected by the two development scenarios, as the same broad receptors, realistic worst-case scenarios and potential effects are applicable to both OCS zone options. Therefore, the assessment outcomes presented in **Section 28.7** are the same for both development scenarios. Where relevant, the assessment will be split between OCS Zone 4 and OCS Zone 8.

Table 28-7 Realistic Worst-Case Scenarios for Impacts on Major Accidents and Disasters

Impact ID	Impact and Project Activity	Realistic Worst-Case Scenario	Rationale
Operation and Maintenance			
MAD-O-01	Major accident or disaster impact arising from the ESBI element of the OCS zone upon the Project site, human or environmental receptors – on-site incidents during the O&M and commissioning of the ESBI	<p>Anticipated duration of O&M phase: approximately 35 years</p> <p>ESBI</p> <ul style="list-style-type: none"> Maximum developable area for OCS and ESBI: 25ha (including but not limited to platform footprint, landscaping, access, drainage and attenuation but exclude areas for ecological mitigation / enhancement) Total permanent area: 20.5ha (including but not limited to platform footprint, landscaping, access, drainage and attenuation but exclude areas for ecological mitigation / enhancement). An indicative split of permanent area within the OCS zone between the OCS and ESBI is provided below to support this preliminary assessment: <ul style="list-style-type: none"> Maximum permanent OCS area: 9.5ha Maximum permanent ESBI area: 11ha Indicative number of battery block and composition for ESBI: 50 (each block with up to 24 battery units and 2 power conversion system (PCS) units) Indicative battery unit dimensions (length-width-height): 20m x 5m x 4m Indicative PCS unit dimensions (length-width-height): 6.1m x 2.5m x 4m Indicative number of ESBI buildings: 6 (excluding smaller shed structures) Maximum ESBI building height: 20m Maximum ESBI outdoor electrical equipment height: 25m Indicative key components: Battery blocks, each containing: <ul style="list-style-type: none"> Battery units; PCS units to convert electricity between AC and DC during electricity import and export processes; Heating, ventilation and air conditioning (HVAC) system; Battery management system; Fire suppression system; Energy management system; Other monitoring and control systems; An outdoor substation containing transformers, busbars, switchgear and concrete fire walls; Harmonic filters; A service building to support O&M activities; Storage buildings; 	<p>These parameters represent the maximum footprint of ESBI within the OCS zone that would interact with the baseline environment and provide an indicative description of components associated with the ESBI.</p>
MAD-O-02	Impact of an incident associated with an existing major accident hazard risk on the ESBI element of the OCS zone, human or environmental receptors – off-site incidents during the O&M and commissioning of the ESBI		
MAD-O-03	Impact of natural hazards on the ESBI element of the OCS zone, human or environmental receptors – natural hazards during the O&M and commissioning of the ESBI		

Impact ID	Impact and Project Activity	Realistic Worst-Case Scenario	Rationale
		<ul style="list-style-type: none">• Switch rooms and auxiliary transformers;• Lightning protection masts; and• Firefighting water tanks and pumps.	
Decommissioning			
MAD-D-01	Major accident or disaster impact arising from the ESBI element of the OCS zone upon the Project site, human or environmental receptors – decommissioning activities not yet defined	The final decommissioning strategy of the Project’s onshore infrastructure has not yet been decided. For a description of potential onshore decommissioning works, refer to Chapter 4 Project Description . It is recognised that regulatory requirements and industry best practice change over time. Therefore, the details and scope of onshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning. Specific arrangements will be detailed in an Onshore Decommissioning Plan (see Table 28-4 , Commitment ID CO56), which will be submitted and agreed with the relevant authorities prior to the commencement of onshore decommissioning works. For this assessment, it is assumed that the risks associated with the ESBI during decommissioning would be no worse than those identified during commissioning and O&M of the ESBI.	
MAD-D-02	Impact of an incident associated with an existing major accident hazard risk on the ESBI element of the OCS zone, human or environmental receptors – decommissioning activities not yet defined		
MAD-D-03	Impact of natural hazards on the ESBI element of the OCS zone, human or environmental receptors – decommissioning activities not yet defined		

28.5 Assessment Methodology

28.5.1 Guidance Documents

57. The following guidance documents have been used to inform the baseline characterisation, assessment methodology and mitigation design for major accidents and disasters:
- Institute of Environmental Management and Assessment (IEMA) on Major Accidents and Disasters in Environmental Impact Assessment (EIA) (2020);
 - Reducing Risks, Protecting People, R2P2 Guidance, HSE 2001;
 - Chemical and Downstream Oil Industries Forum (CDOIF) Guidance, 2015; and
 - UK Government Emergency Preparedness Guidance: Part 1 of the Civil Contingencies Act 2004, in particular, Chapter 5 Emergency Planning, Chapter 6 Business Continuity Management and Chapter 7 Communications with the Public.

28.5.2 Data and Information Sources

28.5.2.1 Desk Study

58. A desk study has been undertaken to compile baseline information in the previously defined Study Area(s) (**Section 28.4.1**) using the following sources of information (**Table 28-8**).

Table 28-8 Desk-Based Sources for Major Accidents and Disasters Data

Data Source	Spatial Coverage	Year(s)	Summary of Data Contents
The British Geological Society Geoindex	100% coverage of the OCS zones (within which the ESBI will be located)	2023	Regional mapping of natural hazards, e.g. earthquakes, landslides etc.
The Coal Authority Interactive Map	100% coverage of the OCS zones (within which the ESBI will be located)	2023	Regional mapping of assets related to coal mining.
East Riding of Yorkshire District Council	100% coverage of the OCS zones (within which the ESBI will be located)	2024	Review of publicly available data for explosives' licenses.
Environment Agency Public Register	UK wide coverage	2024	Public register of permitted regulated activities including installations, water discharge activities and waste facilities including exemptions.

Data Source	Spatial Coverage	Year(s)	Summary of Data Contents
Environment Agency Flood Risk Maps for Planning	UK wide coverage	2024	Regional flood risk maps for planning applications.
Meteorological Office weather and climate data	UK wide coverage	2024	Regional summary of climate and weather and analysis of the potential effects of climate change.
Health and Safety Executive COMAH 2015 public information	UK wide coverage	2024	Public register of currently notified COMAH Establishments.
Open source UK Infrastructure Map	UK wide coverage	2024	Open source mapping of power generation, solar generation, telecommunications, oil and gas, and water infrastructure.
UK Government National Risk Register	UK wide coverage	2023	Summary of major accidents and disasters that could impact the UK and UK Overseas Territories.
EPSON Avalanche Hazard Map	European wide coverage	2012	Maps highlighting regional areas that have the potential to be affected by avalanches.

28.5.2.2 Site-Specific Surveys

59. No site-specific surveys were undertaken for the major accidents and disasters assessment.

28.5.3 Impact Assessment Methodology

60. **Chapter 6 Environmental Impact Assessment Methodology** sets out the overarching approach to the impact assessment methodology. The topic-specific methodology for the major accidents and disasters assessment is described further in this section.
61. Identified impacts have been considered using a detailed assessment of the potential for major accidents and disasters in relation to the Project. The assessment considered the project design and activities and the proposed embedded mitigation. These factors will be reviewed against the baseline with additional mitigation proposed where relevant.

62. The detailed assessment has considered the potential hazards scoped in to identify the following:
- The cause of the potential hazard or impact located within the ESBI, OCS zone or 1km buffer (the Study Area);
 - The likelihood of interaction with the O&M and decommissioning phases of the Project; and
 - The receptors that are located within the Study Area.
63. The assessment uses the source-pathway-receptor approach. The potential for identified relevant major accident and / or disaster events to result in a significant adverse environmental effect will be evaluated using a risk-based approach. The approach will consider the environmental consequences of a major accident or disaster event occurring, the likelihood of any event occurring, taking into account the project design and activities and embedded mitigation, and the acceptability of the subsequent risk to the environment. The process used the following approach:
- Identification of potential major accident and disaster hazards and receptors;
 - Screening of risks; and
 - Evaluation of significance.
64. There is no industry standard approach to the assessment of major accidents and disasters, therefore, this assessment uses a combination of impact magnitude and likelihood of occurrence for assessing these impacts.

28.5.3.1 Impact Assessment Criteria

28.5.3.1.1 Definitions

65. For each potential impact, the assessment identifies sensitive receptors, and their sensitivity, to an impact and implements a systematic approach to understanding the impact pathways and the level of impacts, i.e. magnitude, on given receptors.

28.5.3.1.2 Receptor Sensitivity

66. The IEMA guidance (2020) defines receptor sensitivity as “the capacity to accommodate change reflecting its ability to recover if it affected”, and consists of:
- *“Adaptability – the degree to which a receptor can avoid, adapt or recover from an effect;*
 - *Tolerance – the ability of a receptor to accommodate temporary or permanent changes; and*

- *Recoverability – the temporal scale over and extent to which a receptor will recover following an effect”.*

67. The definitions of sensitivity for the purpose of the major accidents and disaster assessment are presented in **Table 28-9**.
68. Risk tolerability for major accidents and disasters in the UK generally falls under the principle “ALARP”, i.e. as low as reasonably practicable (IEMA, 2020). For major accidents and disasters assessments this means that intolerable risk should be eliminated, and residual risk should be reduced where practicable. For the EIA, the definition of intolerable risk is interpreted as meaning significant adverse effects.

Table 28-9 Definition of Sensitivity

Sensitivity	Infrastructure and Buildings	Human and Socio-Economic	Environmental and Biodiversity
Negligible	Affected receptors would have a high tolerability and low vulnerability to any event to the extent where the event would not cause any damage, or its impacts would not be noticeable.		
Low	Affected receptors have a high tolerability and low vulnerability to events and would likely maintain pre-impact status.	Affected receptors have high tolerability and low vulnerability to events and would likely maintain pre-impact status.	Affected receptors are not protected or are listed as common or abundant, or are not critical to other ecosystem functions, e.g. key prey species to other species, and therefore, have a high tolerability and low vulnerability.
Medium	Affected receptors have medium tolerability and vulnerability and as the impact of an event is likely to cause property damage, that require repairs thereby reducing the capacity and functionality of the receptor in the short-term, but which will regain its pre-impact status.	Affected receptors have medium tolerability and vulnerability as the event impact has the potential to cause injuries and / or impact on the socio-economic status of a receptor. The impact of an event will reduce the capacity and functionality of the receptor in the short-term. Receptors can adapt with some difficulty and regain its pre-impact status but only with a degree of support.	Species not protected or listed but may be common globally though rare in the UK with little resilience to ecosystem changes, important to ecosystem functions, or one under threat or population decline.

Sensitivity	Infrastructure and Buildings	Human and Socio-Economic	Environmental and Biodiversity
High	Affected receptors have low tolerability and high vulnerability as the impact of an event would significantly damage receptors so that the financial cost of repairs is not economic.	Affected receptors have low tolerability and high vulnerability as the event impact has the potential to cause injuries and / or fatalities impact as well as impact the socio-economic status of a receptor. Affected receptors will not be able to adapt to changes and continue to maintain pre-impact status.	Specifically protected under UK legislation and / or international conventions e.g. CITIES Listed as rare, threatened, or endangered e.g. IUCN.

69. The severity of harm (**Table 28-10**) is considered using a threshold based approach that has been developed further from that set out in the Scoping Report (Royal HaskoningDHV, 2024), where a determination was made regarding which accidents and disasters required further assessment. The thresholds used in the assessment have been developed using the HSE’s Reducing Risks, Protecting People R2P2 guidance (2001), the Chemical and Downstream Oil Industries Forum guidance (2015) and the Environmental Liability and Damage (Prevention and Remediation) (England) Regulations 2015.
70. In the absence of any industry specific guidance, the duration of harm (**Table 28-11**) has been derived from the Chemical and Downstream Oil Industries Forum guidance (2015) to provide an indication of timescales each receptor type would require to recover.

Table 28-10 Definition of Severity of Harm

Receptor	Sensitivity	Severity of Harm			
		Not Significant	Severe	Major	Catastrophic
Humans	High	No injuries or limited number of minor injuries No evacuation or confinement	No deaths <six persons injured within the establishment and hospitalized for at least 24 hours Evacuation or confinement of persons for more than two hours where the value (persons x hours) is <500	One death ~six persons injured within the establishment and hospitalised for at least 24 hours One person outside the establishment hospitalized for at least 24 hours Evacuation or confinement of persons for more than two hours where the value (persons x hours) is ≥500	>one death >six persons injured within the establishment and hospitalised for >24 hours >one person outside the establishment hospitalised for at least 24 hours.
Property - damage	Medium to high	No or very little property damage	Within the establishment, to the value <EUR 2,000,000 Outside the establishment, to the value <EUR 500,000	Within the establishment, to the value of at least EUR 2,000,000 Outside the establishment, to the value of at least EUR 500,000	Not defined by CDOIF (2015) guidance.
Property – utilities	Medium to high	No loss of utilities	Loss of utilities, e.g. drinking water supply for more than two hours where the value (persons v hours) is <1,000	Loss of utilities, e.g. drinking water supply, telecommunications, for more than two hours where the value (persons x hours) is ≥1,000.	Not defined by CDOIF (2015) guidance.
Terrestrial – nationally important habitat or environmental or conservation site protected by legislation*	Medium to high	No permanent or long-term damage, e.g. minor spill<0.5ha or <10% of site area, linear feature or population	Permanent or long-term damage >0.5ha or 10% to 50% of the site area, linear feature or population adversely affected,	Permanent or long-term damage >50% site area, associate linear feature or population adversely affected	Not defined by CDOIF (2015) guidance.
Terrestrial – internationally important habitat or environmental or conservation site protected by legislation*	High	<0.5ha or <5% of site area, linear feature or population	Permanent or long-term damage >0.5ha or 10% to 25% of the site area, linear feature or population	Permanent or long-term damage between 25% to 50% site area, associate linear feature or population	Permanent or long-term damage >50% site area, associate linear feature or population
Terrestrial - widespread habitat including agricultural land*	Low to medium	<10ha of site area, linear feature or population	Contamination of 10 to 100ha of land preventing growing of crops, grazing of domestic animals or prevents public access	Contamination of 100 to 1,000ha of land preventing growing of crops, grazing of domestic animals or prevents public access	Contamination of >1,000ha of land preventing growing of crops, grazing of domestic animals or prevents public access
Freshwater habitat*	Medium	No discernible damage, e.g. minor spill	<10km of a river or canal <1ha of a lake or pond	>10km or more of a river or canal >1ha or more of a lake or pond	Not defined by CDOIF (2015) guidance.

Receptor	Sensitivity	Severity of Harm			
		Not Significant	Severe	Major	Catastrophic
Groundwater (source of drinking water) *	Medium to high	Interruption of drinking water supply <1,000 person / hours, or affects <1ha of the source protection zone	Interruption of drinking water supply >1,000 person / hours, or affects 1 to 10ha of the source protection zone where drinking water standards are breached	Interruption of drinking water supply 1,000,000 person / hours (in a population of ~100,000 losing supply for one month), or affects 10 to 100ha of the source protection zone where drinking water standards are breached	Interruption of drinking water supply 100,000,000 person / hour (in a population of ~1,000,000 losing supply for one month), or affects >100ha of the source protection zone where drinking water standards are breached
Groundwater (non-drinking water source) *	Medium to high	<1ha affected	1-100ha of aquifer where water quality standards are breached (or hazardous substance is discernible)	100 to 10,000ha of aquifer where water quality standards are breached (or hazardous substance is discernible)	>10,000ha of aquifer where water quality standards are breached (or hazardous substance is discernible)
Built environment - Grade 1 / Category A Listed Buildings, scheduled Monuments etc.**	High	Damage below a level at which designation of importance would be withdrawn.	Damage sufficient for designation of importance to be withdrawn	Feature of built environment subject to designation of importance destroyed.	Not defined by CDOIF (2015) guidance.
Biodiversity**	Low to high	Loss of <1 % of animal population or <5 % of plant ground cover in a habitat.	Loss of 1-10 % of animal population or 5-50 % of plant ground cover.	Loss of 10-90 % of animal population or 50-90 % of plant ground cover.	Total loss (>90 %) of animal population or plant ground cover.

* with reference to the Environmental Liability and Damage (Prevention and Remediation) (England) Regulations 2015

** Chemical and Downstream Oil Industries Forum guidance, 2015.

Table 28-11 Duration of Harm Criteria

Description		Short-Term	Medium-Term	Long-term	Very Long-Term
Human		Not applicable	Low number of people affected, i.e. 10's	High numbers of people affected, i.e. 100's	
Property / built environment		Can be repaired in <three years – designation reinstated	Can be repaired in >three years – designation reinstated	Feature destroyed and cannot be rebuilt; all features excluding World Heritage Sites	Feature destroyed and cannot be rebuilt; all features including World Heritage Sites
Terrestrial (widespread)		<three years / <two growing seasons on agricultural land	>three years / >two growing seasons on agricultural land	>20 years	>50 years
Groundwater (non-drinking water) -	Water Framework Directive hazardous substances	<three months	>three months	>six years	>20 years
	Water Framework Directive non-hazardous substances	<one year	>one year	>10 years	>20 years
Drinking water source (groundwater and surface water)		Not applicable	Not applicable	A harm that impacts a drinking water source or Source Protection Zone for <six years	A harm that impacts a drinking water source or Source Protection Zone for >six years
Surface water (non-drinking water)		<one year	>one year	>10 years	>20 years
Biodiversity		Recovery <one year	Recovery >one year	Recovery >10 years	Recovery >20 years

28.5.3.1.3 Impact Magnitude

71. The assessment of impact magnitude (**Table 28-12**) is based on the severity and the duration of the harm. It is assessed according to the criteria defined in **Table 28-10** and **Table 28-11** and developed using a threshold-based approach based upon IEMA Guidance (2020). Unless otherwise specified, the assessment also follows the HSE’s Reducing Risks, Protecting People R2P2 guidance (2001) and the CDOIF environmental guidance (2015).

Table 28-12 Magnitude of Impact

Severity of Harm	Duration			
	Short-Term	Medium-Term	Long-Term	Very Long-Term
Catastrophic	Scoped Out	High	Very high	Very high
Major		Medium	High	Very high
Severe		Low	Medium	High
Not Significant		Scoped Out		

28.5.3.1.4 Effect Significance

72. The assessment of effect significance is informed by the sensitivity of the receptor and the magnitude of the impact (**Chapter 6 Environmental Impact Assessment Methodology**). The determination of significance is guided by the use of a significance of effect matrix (**Table 28-13**).
73. For the purpose of this assessment, any effect that is of major or moderate significance is considered to be significant in EIA terms, whether this be adverse or beneficial. Any effect that has a minor or negligible significance is not significant in EIA terms.

Table 28-13 Major Accidents and Disasters Significance of Effects Matrix

Magnitude	Likelihood of Effect			
	Reasonably Likely	Unlikely	Very Unlikely	Extremely Unlikely
	Reasonable likelihood / possible at the Project during its lifetime	Unlikely / low possibility at the Project during its lifetime	Remote possibility at the Project during its lifetime	Highly improbable during the lifetime of the Project
Very High	Major	Major	Moderate	Minor
High	Major	Moderate	Minor	Minor
Medium	Moderate	Minor	Minor	Negligible
Low	Minor	Minor	Negligible	Negligible

28.5.4 Cumulative Effects Assessment Methodology

74. The cumulative effect assessment (CEA) considers other plans and projects that may act collectively with the Project to give rise to cumulative effects on receptors. The general approach to the CEA for major accident and disaster assessments involves screening for potential cumulative effects by identifying a short list of plans and projects for consideration and evaluating the significance of cumulative effects. **Chapter 6 Environmental Impact Assessment Methodology** provides further details on the general framework and approach to the CEA.

28.5.5 Assumptions and Limitations

75. This chapter provides a preliminary assessment of the likely significant effects of the Project in relation to major accidents and disasters with respect to the ESBI using information available at the time of drafting as described in **Chapter 6 Environmental Impact Assessment Methodology**. This assessment will be refined and presented in the ES to be submitted with the DCO application.
76. While IEMA (2020) has produced guidance regarding preparing major accident and hazard chapters for EIA, the assessment approach draws from a range of guidance and sources as previously detailed in this chapter. The assessment is also dependent on information from other technical assessments within this PEIR, which utilise third party data and information sources. The third-party information has been taken at face value and no further check or validation of this information has been made.

77. The design of the ESBI will be guided by relevant industry standards and codes to ensure that risks are eliminated or reduced and mitigated.

28.6 Baseline Environment

28.6.1 Existing Baseline

78. The existing baseline environment for the ESBI, which will be located within OCS Zone 4 or Zone 8, noting that the two zones are located in proximity to each other (approximately 1.7km separation), is presented in **Table 28-14** and **Figure 28-2**. The baseline environment includes a range of environmental, human and natural events that are already present, albeit the natural hazard impacts, e.g. earthquakes, aren't physically present or occurring but have the potential to occur and could impact upon receptors located at or in proximity to the Project. These factors have been used to scope effects in or out of the assessment based upon their likelihood to occur.
79. As part of the process of defining the baseline environment, the assessment identifies those hazards that are of such low likelihood that they are scoped out and not considered further in the assessment.
80. The receptors used in the assessment are defined in **Table 28-15**.

Table 28-14 Existing Baseline Environment for both OCS Zone 4 and OCS Zone 8

Hazard	Activity	OCS Zone 4	OCS Zone 8
Geophysical	Earthquake	<p>The OCS zones are located in an area of low seismicity; the British Geological Society (BGS) seismic hazard map for the UK indicates a Peak Ground Acceleration (PGA; “g”) of 0.02-0.04 for the OCS zones. This is considered to be low in comparison to the rest of the UK and negligible in comparison to the rest of the world.</p> <p>Damaging earthquakes in the UK are very rare; the BGS carries out seismic monitoring across the UK and on average records approximately 100 earthquakes per year, of which 20 are noted by the public.</p> <p>The potential damage caused by these events is unlikely to be similar in nature and scale to those observed elsewhere globally where major infrastructure damage has occurred and is reported.</p> <p>The UK has had no significant earthquakes occur within the past decade; with the most significant being a 5.2ML magnitude earthquake at Market Rasen, Lincolnshire on the 27 February 2008, which is the largest UK earthquake since a magnitude 5.4ML earthquake in North Wales in 1984 (BGS, 2011).</p> <p>As the OCS zones are located in an area of low seismicity this hazard has been scoped out of the assessment.</p>	
	Landslides / instability	<p>The OCS zones are not located within an area affected by coal mining and BGS online records do not identify that the Study Area is at risk from land instability and landslides.</p> <p>The BGS information (Chapter 19 Geology and Ground Conditions) states:</p> <ul style="list-style-type: none">• The potential for collapsible ground stability hazards is ‘very low;• The potential for compressible ground stability hazards is ‘very low;• The potential for ground dissolution stability hazards is ‘no hazard’; and• The potential for landslide ground stability hazards is ‘very low’ to ‘low’. <p>This hazard is scoped out of the assessment.</p>	
	Tsunami	<p>The UK’s National Risk Register (2023) does not identify tsunamis as a risk within the UK. The BGS (2024) has concluded that the position of the British Isles in the middle of its tectonic plate reduces the risk of tsunamis impacting the UK, and that the earthquakes generated by the nearest plate boundary, the mid-Atlantic ridge, are likely too small to generate tsunamis.</p> <p>This hazard has been scoped out of the assessment.</p>	
	Volcanic eruption	<p>While there are several volcanoes located across Europe, there are no active volcanoes located within the UK. The UK’s National Risk Register (2023) identifies two types of volcanic eruption:</p> <ul style="list-style-type: none">• Icelandic style, i.e. gas rich and / or explosive eruptions, typically with large ash clouds, which cause disruption to air travel; and• effusive eruptions, which cause long term alterations to air quality and are associated with impacts to human health and crops. <p>Neither type is likely to affect the OCS zones, and therefore, this hazard has been scoped out of the assessment.</p>	
	Avalanche	<p>The UK’s National Risk Register (2023) does not identify avalanches as a risk within the UK, although these have occurred historically.</p> <p>Due to the topography of the Study Area, i.e. consisting of an area of relatively, low-lying flat, avalanche hazards for the OCS zones are considered unlikely.</p> <p>This hazard has been scoped out of the assessment.</p>	

Hazard	Activity	OCS Zone 4	OCS Zone 8
Hydrological	Coastal flooding	The hydrological baseline of the OCS zones is outlined in Chapter 21 Water Resources and Flood Risk . The OCS zones are located upstream of the Humber Estuary and inland of coastal regions, therefore, it is unlikely that they would be impacted by coastal flooding. This hazard has been scoped out of the assessment.	
	Tidal flooding	The OCS zones are not located within the tidal reach of the Humber Estuary (Chapter 21 Water Resources and Flood Risk). This hazard has been scoped out of the assessment.	
	Fluvial flooding	The hydrological baseline for the Project is established in Chapter 21 Water Resources and Flood Risk .	
		The Environment Agency’s flood map for planning (accessed 14 Nov. 2024), identifies that the central portion of OCS Zone 4 is located in two flood zones; Flood Zone 2 and Flood Zone 3. An area of land located immediately adjacent to the zone’s southern boundary is located in Flood Zone 3. No statutory Main Rivers are located within the zone, based on a review of the Environment Agency’s Main River map (accessed 14 November 2024). At least four watercourses, are located within the zone, with two watercourses east-west, and two trending north-south.	The Environment Agency’s flood map for planning (accessed 14 November 2024) identified that OCS Zone 8 is not located in a flood zone. No statutory Main Rivers are located within the zone, based on a review of the Environment Agency’s Main River map (accessed 14 November 2024). Surface water features, e.g. ponds, located in proximity include: <ul style="list-style-type: none">• Two small ponds located in the northern portion of the zone;• An unnamed watercourse, trending west-east approximately 100m south-west of the zone boundary;• South and south-west - up to nine ponds located between 120m and 750m;• West - one pond located ~220m; and• North - one pond located ~300m.
		Chapter 21 Water Resources and Flood Risk (Sections 21.7.1.3 and 21.7.2.1) assessed the impact of the supply of contaminants to surface and groundwater during the three project phases, e.g. spills, and concluded that the effect significant is negligible to minor and therefore not significant in EIA terms. This hazard is scoped out of the major accidents and disasters assessment.	
		Chapter 21 Water Resources and Flood Risk (Sections 21.7.1.4 and 21.7.2.2) assessed the impact changes to surface and groundwater flows and flood risk during the three project phases and concluded that the effect significant is negligible to minor and therefore not significant in EIA terms. This hazard is scoped out of the major accidents and disasters assessment.	
	Groundwater	The OCS zones underlain by bedrock geology that is designated as a principal aquifer, while the underlying superficial drift deposits are primarily designated as a Secondary (undifferentiated) aquifer. The OCS zones are located in a Source Protection Zone designated as Zone II: Outer Protection Zone, and a Drinking Water Safeguard Zone. The risk to groundwater from the ESBI comes from the discharge of contaminants, e.g. chemical spills, and fire water, however, this hazard has been assessed as part of Chapter 21 Water Resources and Flood Risk (Section 21.7.2.1.3) as negligible to minor adverse (non-significant) and has been scoped out of the major accidents and disasters assessment.	

Hazard	Activity	OCS Zone 4	OCS Zone 8
Weather and Climate	Drought	<p>Chapter 31 Climate Change sets out the climate baseline for the OCS zones, while Volume 2, Appendix 31.3 Climate Vulnerability Assessment provides an assessment that considers the potential for different climate hazards, including drought, and their impact on receptors. The assessment concludes that the embedded mitigation measures identified in the assessment ensure that the Project remains resilient to both current and future climate conditions during each project phase.</p> <p>Therefore, this hazard has been scoped out of the major accidents and disasters assessment.</p>	
	Extreme temperatures	<p>Chapter 31 Climate Change sets out the climate baseline for the OCS zones, while Volume 2, Appendix 31.3 Climate Vulnerability Assessment provides an assessment that considers the potential for different climate hazards, including extreme temperatures and heatwaves, and their impact on receptors. The assessment concludes that the embedded mitigation measures identified in the assessment ensure that the Project remains resilient to both current and future climate conditions during each project phase.</p> <p>Therefore, this hazard has been scoped out of the major accidents and disasters assessment.</p>	
	Wildfire	<p>Chapter 31 Climate Change sets out the climate baseline for the OCS zones. The UK’s National Risk Register states that “<i>climate change is likely to ... lead to longer, drier summers ...could lead to ... more frequent, larger fires</i>”. The Risk Register identifies a worst-case scenario lasting four to seven days and requiring a multi-agency response that could cause significant disruption.</p> <p>However, the likelihood of a wildfire, especially given the location of the OCS zones, i.e. close to residential properties and other energy infrastructure, is low, i.e. <1%, with a limited (regional) impact.</p> <p>This hazard has been scoped out of the assessment.</p>	
	Heavy snow / extreme cold	<p>Chapter 31 Climate Change sets out the climate baseline for the OCS zones. The UK’s National Risk register identified a worst-case scenario where snow / extreme temperatures are likely to multiple UK regions including low-lying area, defined as those located below 300 m, with disruption of up to one week. Such conditions are likely to impact a range of essential services including utilities.</p> <p>However, the UK Government has implemented measures to build community resilience to such events, e.g. multi agency alert and planning.</p> <p>While there is a 5 to 25% likelihood of such an event occurring, due to impacts of climate change, longer-term impacts from low temperatures and heavy snow are not anticipated.</p> <p>This hazard has been scoped out of the assessment.</p>	
	Hurricanes and storms	<p>While the UK is located in the path of predominantly westerly winds where low-pressure systems frequently move across the UK, the UK’s National Risk Register (2023) does not identify hurricanes as a risk to the UK. However, the aftermath of hurricanes does occasionally affect the UK bringing unsettled weather including rain, wind, and possibly lightning storms.</p> <p>While climate change has potentially altered and increased the risk of storms the Met Office (2024) states “<i>that trends in windstorms are difficult to detect due to how these vary naturally year-to-year and decade-to-decade</i>”, and that climate change influences will likely strengthen some storms but also weaken others.</p> <p>However, the UK’s National Risk Register states that the frequency and intensity is likely to increase over time with storm events now experiencing winds speeds over 100 mile per hour (mph), e.g. Storm Eunice in 2022. Most lowland areas would experience a mean average wind speed of more than 55 mph with gusts in excess of 85 mph, although storms are likely last less than one day.</p> <p>According to the Met Office, Eastern England is one of the most sheltered parts of the UK; the north and west coast regions are more exposed and therefore prone to experiencing storms (Met Office, 2016).</p> <p>Therefore, as storm conditions are unlikely to cause any major risks to the OCS zones, this hazard has been scoped out of the assessment.</p>	
	Space weather	<p>Space weather events predominately relate to variations in solar activity, which occurs on different cycles leading to solar events occurring with varying likelihood. Low severity events occur on a cycle with an increased frequency and therefore likelihood of occurrence.</p> <p>The severity and type of event most relevant to a major hazard or accident has a low likelihood of occurrence but these events vary due to latitude.</p>	

Hazard	Activity	OCS Zone 4	OCS Zone 8
		Space weather is monitored, and therefore, can be forecast similar to other weather events allowing mitigation to be implemented prior to any impacts. This hazard has been scoped out of the assessment.	
	Storm surge	The hydrological baseline of the OCS zones is discussed in Chapter 21 Water Resource and Flood Risk . The OCS zones are not located in proximity to a coastal region therefore, they are unlikely to be affected by tidal flooding and storm surges. This hazard has been scoped out of the assessment.	
	Poor air quality	The air quality baseline of the OCS zones is outlined in Chapter 20 Air Quality . The OCS zones are not located in an area where poor air quality occurs because of natural phenomena. This hazard has been scoped out of the assessment.	
Biological	Infectious disease epidemics and pandemics	Human diseases have a variety of forms, some of which have the potential to cause a civil emergency due to the number of people they might affect in a short space of time, e.g. influenza ('flu') pandemic. Flu pandemics are natural events that happen when a unique flu virus evolves that few people (if any) are immune to. In a pandemic, the new virus will spread quickly and has the potential to cause more serious illness to a large proportion of the population due to the lack of immunity. There is a high probability of a flu pandemic occurring, but it is impossible to predict when. The most recent pandemic is the COVID-19 pandemic (2020 to 2022) which caused disruptions to businesses and organisations across the UK and the world. Emerging infectious diseases could also cause large numbers of people to fall ill as well as diseases that have recently been recognised or where cases have increased over the last 20 years in a specific place or among a specific population, e.g. Zika virus. Due to the unpredictability of a pandemic, this hazard has been scoped out of the assessment.	
	Infectious animal disease epidemics and pandemics	Animal diseases threaten the UK for two main reasons: <ul style="list-style-type: none">the potential for some diseases to spread from animals to humans and cause illness or fatalities; andthey affect the animals on which we rely for food, trade, or to maintain the ecosystem. This hazard is unlikely to affect the OCS zones as no animals will be present on site and the surrounding land is predominately arable farming rather than grazing land, therefore, the hazard has been scoped out of the assessment.	
	Animal plagues and pests (introduction of invasive species)	An invasive species is a species that is not native to a specific location and tends to spread to a degree believed to cause damage to the environment, economy or human health. The UK has a number of examples including: <ul style="list-style-type: none">Grey Squirrels <i>Sciurus carolinensis</i>;Himalayan Balsam <i>Impatiens glandulifera</i>;Japanese Knotweed <i>Reynoutria japonica</i>;Giant Hogweed <i>Heracleum mantegazzianum</i>;Signal Crayfish <i>Pacifastacus leniusculus</i>;Beetles, e.g. the elm bark beetle (<i>Scolytidae</i> sp) that carries Dutch Elm Disease and which resulted in the demise of Elm (<i>Ulmus</i>) trees; andAsh die back caused by a fungus. No invasive species were recorded within the Onshore Development Area (Chapter 23 Onshore Ecology and Ornithology). This hazard has been scoped out of the assessment.	

Hazard	Activity	OCS Zone 4	OCS Zone 8
Malicious	Industrial action	<p>The Criminal Justice and Public Order Act 1994 prevents certain critical sectors, e.g. policing and prison officers, from undertaking industrial action and limits the length of any strike. Industrial action, in certain circumstances is unlawful. The consequences of industrial action may include:</p> <ul style="list-style-type: none">• Disruption to essential services, particularly transport, health and education;• Disruption to business (via lost working hours);• Possible public order challenges (with associated pressure on policing); and• Economic damage (particularly for transport sector industrial action). <p>Since 2000, there have been several instances of industrial action predominately in the public sector including: fuel tanker drivers, firefighters, teachers, health service staff, London Underground workers, and Government employees. The majority of the recent industrial action and associated activity at picket lines has been peaceful.</p> <p>This hazard has been scoped out of the assessment as most of the recent industrial action has occurred in the public, and not the private, sector.</p>	
	Public disorder and civil unrest	<p>Public disorder can take many forms, including rioting, looting, vandalism, violence and arson, and is highly unpredictable with peaceful protests quickly escalating when small numbers of individuals are intent on provoking violence. Disorder can be influenced by a variety of factors, e.g. a breakdown in community and police relations, or other community tensions.</p> <p>Public disorder may be caused by long-standing grievances or as a spontaneous response to a single incident. Peaceful protests are not considered a form of public disorder. Consequences of public disorder may include:</p> <ul style="list-style-type: none">• Physical and / or psychological casualties;• Disruption to critical services, particularly policing and health;• Damage to property and infrastructure;• Possible evacuation or temporary shelter requirements; and• Possible economic damage. <p>Public order incidences are considered unlikely to occur at the OCS zones as these forms of protest typically occur at company head offices, public buildings e.g. rail station and local authority buildings, or in public spaces such as parks and squares; therefore, this hazard has been scoped out of the assessment.</p>	
	Terrorism – general	<p>The UK’s National Risk Register (2023) identifies two main types of general terrorism within the UK:</p> <ul style="list-style-type: none">• Northern Ireland related; and• Terrorist attacks in venues and public spaces. <p>Northern Ireland</p> <p>An attack is considered highly likely; however, any attack is likely to be targeted at a site viewed “<i>as symbolic of the British State</i>”, and therefore any attack is unlikely to be targeted at energy infrastructure. However, any such attack could pose a risk to the public and nearby infrastructure.</p> <p>Terrorist attacks in venues and public spaces</p> <p>Such attacks are likely to involve the use of an improvised explosive device and / or an attacker or attackers carrying out indiscriminate attacks using explosives and hand-held weapons such as knives, guns etc. Violent far-right extremism is relatively infrequent in the UK but does happen with individuals and groups seeking to target specific individuals, minorities, and politically affiliated groups rather than the wider public.</p> <p>Such attacks are likely to occur at locations with high crowd densities and are likely to result in multiple injuries and / or fatalities. However, the likelihood of such attacks occurring is extremely low due to UK Government introducing controls on explosives etc., and the authorities and intelligence services working collaboratively to reduce the threat posed.</p>	

Hazard	Activity	OCS Zone 4	OCS Zone 8
		It is therefore considered unlikely that such attacks could occur within the OCS zones as these are not public spaces with high crowd densities or sites could be considered symbolic of the British State. This hazard has been scoped out of the assessment.	
	Terrorism – electrical infrastructure	The UK’s National Risk Register (2023) states that the UK has a highly resilient electrical infrastructure work, with the sector working continually to minimise the risk of any unplanned disruption. Emergency response plans are in place in the unlikely event that any disruption occurs. Any attack would result in the loss of electrical output on a regional basis, which would result in the National Grid reconfiguring the network to stabilise the grid and reconnect end users. In the event of any disruption, the electricity network would be restored gradually with the majority of end users re-connected within 24-hours. However, it could take up to 12-months to repair any affected parts of the electrical infrastructure. This hazard has been scoped out of the assessment.	
	Cyber-attacks – electrical infrastructure	The UK’s National Risk Register (2023) defines a cyber-attack as “ <i>encrypting, stealing or destroying data upon which critical systems depend or disruption to operational systems leading to the failure of the National Electricity Transmission System (NETS)</i> ”, and which has the potential to cause severe disruption to a wide range of critical systems and services. The reasonable worst-case scenario is defined as an attack on a critical electricity system that leads to the total failure of the NETS, which would result in a nationwide loss of power and a wide range of impacts including communication, utilities and loss of public services as well as business and household disruption. Fortunately, the UK has never experienced a nationwide loss of power and has one of the most reliable NETS globally; there is a greater risk of loss of power associated with natural events than there is associated with cyber-attacks. A cyber-attack is unlikely to affect the ESBI and the loss of the ESBI as a standalone unit is unlikely to result in a significant impact of the NETS. However cyber security measures would be required to be implemented and maintained to protect the ESBI from cyber-attack. This hazard has been scoped out of the assessment.	
	Chemical, biological, radiological and Nuclear attacks	While a large-scale chemical, biological, radiological and nuclear (CBRN) attack has never occurred in the UK, some smaller events have occurred and were managed by the emergency services, e.g. poisoning of former Russian spies, illegal drugs laboratories. The vulnerability to attack is reduced through limiting access to hazardous materials and improving intelligence and controls on materials entering and leaving the UK. However, such attacks have the potential to cause harm by contaminating people, animals, buildings, outdoor environments, water supplies and food. Their scale and impacts could vary widely depending on the materials involved and the way they are used, and smaller-scale incidents could include targeted releases of chemical, biological or radiological materials in indoor or outdoor environments, or assassination. Larger-scale incidents could include the widespread use of biological agents or an improvised nuclear device, resulting in much greater numbers of casualties and widespread, long-term impacts of a magnitude above all other terrorist attacks. While the likelihood of terrorists successfully conducting a larger-scale CBRN attack in the UK is highly unlikely, it cannot be ruled out. However, this hazard is unlikely to occur or impact the ESBI, it has been scoped out of the assessment.	
Major Accidents	Widespread electricity failure and infrastructure failures	The loss of the electricity network, which would potentially impact millions of people as well as businesses and public services, could potentially be caused by major weather events including strong winds, lightning and flooding. These failures could be localized, e.g. a metropolitan area, regional, e.g. East Yorkshire, or national, however a regional or national failure has not occurred previously. The National Grid has a recovery process called ‘Black Start’ to recover the network from a total or partial shutdown. Based on current plans, Black Start recovery could take up to five days with potential for some additional disruption beyond this timescale in the event of significant network damage. Any disruption to the ESBI is likely to be short-term and unlikely to result in any damage, therefore, this hazard has been scoped out of the assessment.	
	Transport accidents	The transport baseline of the OCS zones is outlined in Chapter 26 Traffic and Transport . Transport accidents occur across the UK daily, mainly on roads, and involving private vehicles. Well-practiced plans exist to deal with these locally and large-scale transport accidents are very rare.	

Hazard	Activity	OCS Zone 4	OCS Zone 8
		Road Incidents on the public highway including large-scale incidents are unlikely to involve a coordinated Government or devolved administration response and would instead be managed by local authorities and the emergency services. The above hazards are unlikely to occur as the ESBI is unlikely to be positioned immediately adjacent to a public highway, i.e. there will be a separation distance between the public highway and the ESBI, in addition to any fence line and, potentially, protection barriers may be used; therefore, this hazard has been scoped out of the assessment.	
	Industrial accidents	Industrial and urban accidents can take a wide variety of forms, and their impacts vary considerably in both scale and nature. In some cases, these accidents will have very limited impacts beyond the immediate accident location and can be dealt with locally, although others can have cascading effects that will have a wider impact. Industrial accidents can include: <ul style="list-style-type: none">Fires and explosions that affect residential buildings, power plants, refineries or oil rigs;Chemical and biological contamination, e.g. oil spills or food contamination;Radiological contamination, e.g. from nuclear accidents in the UK or abroad; andDam breach leading to a sudden emptying of reservoirs and subsequent flooding. In December 2005 Europe’s largest peacetime fire occurred at the Buncefield Oil Storage Terminal in Hemel Hempstead, England, resulting in a number of injuries but no fatalities. The surrounding area was temporarily evacuated, and some local businesses experienced long-term disruption to operations. Industrial operations located within the OCS zones are detailed below (non-permitted and permitted installations). This hazard has been scoped in of the assessment.	
Industrial / Man-made	Airports / Air	The topic is addressed in Chapter 16 Aviation, Radar and Military . There are no public or private airports located on-site or within 1km of the OCS zones. This hazard has been scoped out of the assessment.	
	COMAH Establishments	There are no COMAH Establishments located onsite or within 1km of the OCS zones. This hazard has been scoped out of the assessment.	
	Explosives	East Riding of Yorkshire Council website (accessed 18 November 2024) states that there are currently no premises registered or licenced to store explosives, including fireworks, in quantities that exceed the following thresholds: <ul style="list-style-type: none">Type 1 or 2 - > 500 kilograms;Type 3 or 4 - > 2,000 kilograms; and Any explosions stored for a period exceeding four weeks. There is no requirement on East Riding of Yorkshire Council to provide information to the public regarding any premises etc. where explosives are stored in volumes below the above stated thresholds. This hazard has been scoped out of the assessment.	
	Non-permitted installations	Two non-permitted installations are located within 1km of OCS Zone 4: <ul style="list-style-type: none">Farm with a silage tank located approximately 100m west of the zone’s western boundary;600kW Solar facility located approximately 600m west of the zone’s western boundary on the opposite side of the A164 public highway and operated by Morrisons Supermarket; andA solar array is located approximately 900m east of the OCS zone.	Two non-permitted installations are located on-site at OCS Zone 8: <ul style="list-style-type: none">Petroleum Well registered to Candecca Resources Ltd (ref. RISBY1, well ID L46/08-1) is located on site at 53.8093333, -0.4653333;Silage / water tank located within the zone on the eastern boundary; andSeveral farms are located within 1km of the zone, the closest being approximately 300m south.

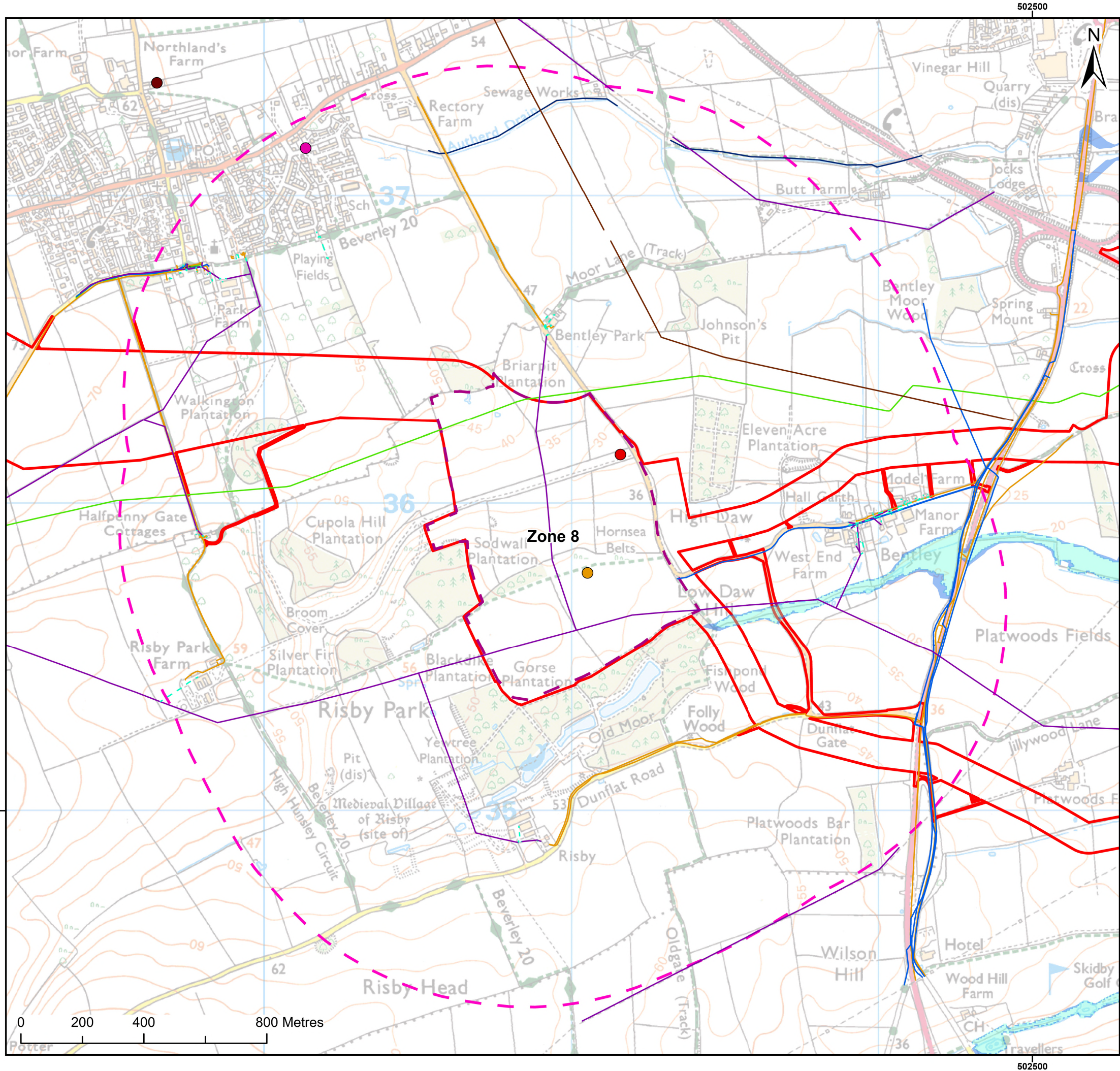
CHAPTER 28 MAJOR ACCIDENTS AND DISASTERS

Hazard	Activity	OCS Zone 4	OCS Zone 8
		This hazard has been scoped into the assessment.	
	Permitted Installations	<p>There are no Permitted Installations, as defined in the Environmental Permitting Regulations (England and Wales) Regulations 2016 as amended, located on-site or within 1km of OCS Zone 4.</p> <p>A waste exemption, reference WEX351947, granted to Peter Bielby for the burning of waste in the open, located at TA 04069 38116, ~950m north-east of the zone.</p>	<p>There are no Permitted Installations, as defined in the Environmental Permitting Regulations (England and Wales) Regulations 2016 as amended, located on-site at OCS Zone 8.</p> <p>There is one Permitted Installation located within 1km of the zone boundary:</p> <ul style="list-style-type: none"> NE/WRA7810 & NE/YWUCD2/116, granted to Yorkshire Water for water discharge activity, located at TA 00340 37190, approximately 950m north of the zone boundary.
		This hazard has been scoped into the assessment.	
	Petrol Stations	<p>There are no petrol stations located within OCS Zone 4.</p> <p>There is one petrol station located 600m north-west of the zone boundary, operated by Morrisons Supermarket.</p> <p>This hazard has been scoped into the assessment.</p>	<p>There are no petrol stations located within the OCS Zone 8, nor are there any located within 1km of the zone boundary.</p> <p>This hazard has been scoped out of the assessment.</p>
	Pipelines	<p>An underground gas pipeline trends approximately north-east to south-west through the centre of OCS Zone 4.</p>	<p>One underground gas pipeline was identified on-site trending east-west through the northern portion of OCS Zone 8.</p> <p>One underground pipeline was identified off-site; SABIC / INEOS ethylene underground pipeline (12-inch diameter) located approximately 500m north-east of the zone boundary.</p>
		This hazard has been scoped into the assessment.	
	Rail	<p>No railways are located onsite within OCS Zone 4.</p> <p>A railway line trending north-south between Hull and York is located approximately 900m east of the zone boundary and as such is located at a distance that any event is unlikely to impact the OCS zone.</p>	<p>No railway lines are located on-site or within 1km of OCS Zone 8.</p>
		This hazard has been scoped out of the assessment.	
	Unexploded ordnance (UXO)	<p>The topic is addressed in Chapter 16 Aviation, Radar and Military.</p> <p>This hazard has been scoped out of the assessment.</p>	
	Utilities - overhead	<p>Three overhead cables are located on-site:</p> <ul style="list-style-type: none"> Two trending east-west over the central portion of OCS Zone 4; and One trending north-east-south-west located in the south-east corner of the zone. <p>There is an overhead power cable trending approximately north-south along the western boundary of the zone, plus two further overhead cables located at approximately 100m and approximately 300m from the south-west corner of zone boundary trending approximately north-west-south-east.</p>	<p>None located on-site or within 1km of OCS Zone 8.</p>

Hazard	Activity	OCS Zone 4	OCS Zone 8
		This hazard has been scoped into the assessment.	
	Utilities – underground	A 33kV power cable trends west-east through OCS Zone 4. No underground telecommunications cables have been identified on-site.	11kV power cable trends west-east along southern boundary of OCS Zone 8. No underground telecommunications cables have been identified on-site.
		This hazard has been scoped into the assessment.	
	Utilities – converter and sub-stations	The Dogger Bank A & B Offshore Wind Farms’ converter stations are located approximately 420m south of OCS Zone 4.	No converter or substations are located within 1km of OCS Zone 8.

Table 28-15 Potential Receptors Identified in the Major Accidents and Disasters Assessment

Receptor	Baseline
Humans	Chapter 29 Human Health provides a baseline and assessment of human receptors. For the purposes of the major accident and disasters assessment, human receptors include on-site personnel (O&M and decommissioning phases) and residents and commercial / industrial workers located within 1km.
Buildings	The receptors include the ESBI and other infrastructure in the OCS zone, plus residential, farm, commercial and industrial premises located within 1km of the OCS zone boundary. Chapter 24 Onshore Archaeology and Cultural Heritage provides the cultural heritage baseline and assessment of the Project’s impacts. No above ground heritage assets are present in the OCS zones and no designated heritage assets located within the 1km buffer zone.
Soils	The baseline for agricultural land use is provided in Chapter 22 Soils and Land Use , with the majority of soils having an Agricultural Land Classification (ALC) Grade of 2 (very good) or 3 (good) and are described as clayey / loamy.
Water	Chapter 21 Water Resources and Flood Risk describes the hydrological baseline for the Project, while Chapter 19 Geology and Ground Conditions describes the hydrogeological baseline. Surface water As noted in Table 28-14 , part of OCS Zone 4 is located within a flood risk zone and has four surface watercourses present within the zone boundary. OCS Zone 8 is not located within a flood risk zone, however, a flood risk zone is located immediately adjacent to the south-eastern zone boundary, while two surface water features are located in the northern portion of the zone. Groundwater As noted in Table 28-14 , the OCS zones underlain by bedrock geology that is designated as a principal aquifer, while the underlying superficial drift deposits are primarily designated as a Secondary (undifferentiated) aquifer. Both OCS zones are located in a Source Protection Zone designated as Zone II: Outer Protection Zone, and a Drinking Water Safeguard Zone.
Environment	Chapter 23 Onshore Ecology and Ornithology provides the ecological baseline for the Project. OCS Zone 4 Beverley Parks Local Nature Reserve (LNR), a non-statutory designated site, is located approximately 530m east. Chapter 23 Onshore Ecology and Ornithology defines the LNR as consisting of broadleaved woodland, orchard and grassland and is considered less sensitive than other designated sites and has the tolerability to cope with and recover from disturbance. <ul style="list-style-type: none">Two areas of ancient / semi-natural woodland:<ul style="list-style-type: none">Bentley Moor Wood, is located approximately 630m west; andBirkill Wood is located approximately 880m south (including an area of replanted ancient woodland).Several deciduous woodland (priority habitat) are located within 1km of the OCS zone. OCS Zone 8 A deciduous woodland, designated as a priority habitat is located within the zone. Several deciduous woodlands (priority habitat) are located within 1km of the OCS zone.



Legend:

Onshore Development Area	Utilities
Onshore Converter Station Zone 8	Pipeline
Onshore Converter Station Zone 8 1km Buffer	Water
Flood Zone 2	Telecom
Flood Zone 3	Sewerage
Non-permitted Installations	Gas
Permitted Installations	Overhead Electric
Underground Utilities	Underground Electric
Waste Exemptions	

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Project:	DOGGER BANK WIND FARM
Dogger Bank D Offshore Wind Farm	

Title:	Major Accidents and Disasters Assessment Baseline Environment - Sheet 2 of 2
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Figure:	28-2	Drawing No:	PC6250-RHD-XX-ON-DR-GS-0226			
Revision:	Date:	Drawn:	Checked:	Size:	Scale:	
03	19/03/2025	JH	AB	A3	1:12,500	
02	05/02/2025	JH	AB	A3	1:12,500	

Co-ordinate system: British National Grid



28.6.2 Predicted Future Baseline

82. The future baseline of the Study Area, in the context of major accidents and disasters, and in the absence of the Project, may experience the following changes:
- The potential effects of climate change are projected to lead to warmer, wetter winters, hotter and drier summers (see **Chapter 31 Climate Change**).
 - OCS Zone 4 may potentially experience an increase in the density and volume of residential and associated commercial development, as it is located on the southern extent of the town of Beverley.
 - OCS Zone 8 is located in a largely agricultural / rural setting, although the nearby village of Walkington may expand, i.e. there may be an increase in the density and volume of residential properties.
 - Additional, primarily energy-related, infrastructure is proposed to be constructed and operated in proximity to the Project, including:
 - Dogger Bank South Offshore Wind Farms converter stations;
 - Dogger Bank A & B Offshore Wind Farms converter stations;
 - North Humber to High Marnham Grid Upgrade; and
 - Changes to road and rail transport corridors.

28.7 Assessment of Effects

83. The likely significant effects to receptors, from major accidents and disasters, that may occur during the commissioning, O&M and decommissioning of the Project are assessed in the following sections. The assessment follows the methodology set out in **Section 28.5** and is based on the realistic worst-case scenarios defined in **Section 28.4.4**, with consideration of embedded mitigation measures identified in **Section 28.4.3**.
84. Note that a comprehensive range of hazards that have been considered and scoped out as part of this assessment are provided in **Table 28-14**. No potential effects related to any of the hazards scoped out are considered likely to cause any significant effects.
85. For clarity, the assessment is also presented in tabular form in **Table 28-16**.

28.7.1 Potential Effects during Operation and Maintenance

28.7.1.1 Major Accident or Disaster Impact Arising from the ESBI Element of the OCS Zone upon the Project Site, Human or Environmental Receptors (MAD-O-01)

86. The O&M activities at the ESBI within the OCS zone will include planned and unplanned maintenance activities within the infrastructure footprint.
87. The ESBI could potentially be impacted by an on-site fire caused by the battery unit overheating, extreme temperatures, or an electrical fault, or the ignition of a combustible material, e.g. chemicals such as fire-fighting foam or hydrocarbons. This could result in direct impacts to on-site maintenance workers and / or nearby residents and commercial / industrial workers.
88. Additionally, there is the potential for off-site environmental receptors to be affected by fire and fugitive smoke, in particular the woodlands located immediately adjacent to the boundary of OCS Zone 8. While environmental receptors, e.g. woodlands and Beverley Parks LNR, are located within the Study Area of OCS Zone 4, they are not located immediately adjacent to the zone boundary and are separated by a distance of several hundred metres.
89. Any on-site fire could result in contaminated fire-fighting water or foam being discharged into the environment, e.g. on to land or into a nearby watercourse via the on-site drainage network. Any uncontrolled discharge of fire-fighting water or foam could result in impacts to the quality of the underlying groundwater and connected surface waters, and any associated licensed or unlicensed abstractions. However, the drainage system will be designed to prevent such discharges through the use of tertiary containment and penstock valves.

28.7.1.1.1 Receptor Sensitivity, Severity and Duration

90. The receptor sensitivity is described in **Table 28-9**, with the sensitivity of the ESBI and human receptors considered **high**, while the sensitivity of environmental receptors is considered **medium**. Severity of harm and duration of harm for each receptor is presented in **Table 28-16**.

28.7.1.1.2 Impact Magnitude

91. An on-site event at the ESBI, e.g. an explosion or fire could result in the complete and / or permanent loss of the ESBI, injuries and potential loss of life (in low numbers) to human receptors, and potential damage to the surrounding environment due to the loss of containment of fire-fighting water or foam.

92. The use of appropriate embedded mitigation measures including the design of the ESBI, e.g. relevant safety features, and the implementation of a BSMP and operational emergency response planning (see **Table 28-4**, Commitment IDs CO79, CO96 and CO97) will seek to prevent and contain any fire, as well as the discharge of firewater to the environment.

93. The magnitude of impact, as determined by the severity of harm and duration (see **Table 28-12**), is considered to be **low to medium**.

28.7.1.1.3 Effect Significance

94. The effect significance matrix for a major accident or disaster impact arising from the ESBI is presented in **Table 28-13**. Overall, it is predicted that the sensitivity is **medium to high**, and magnitude of impact is **low to medium**. However, the likelihood of such an event occurring is very unlikely, therefore, the effect is of **negligible to minor adverse** significance, which is **not significant** in EIA terms.

28.7.1.2 Impact of an Incident Associated with an Existing Major Accident Hazard Risk on the ESBI Element of the OCS Zone, Human or Environmental Receptors (MAD-O-02)

95. There are limited off-site sources that have the potential to cause an incident that would impact on the ESBI, human and environmental receptors, as defined in **Table 28-14**, and including both permitted and non-permitted installations.

96. Natural gas pipelines are located within both OCS zones (see **Figure 28-2**). However, these have been designed and managed to relevant industry safety codes, standards and legislation to prevent any events occurring. Prior to construction of the ESBI within the OCS zone, consultation would be undertaken with the pipeline operator(s) to identify any additional mitigation required to prevent an event occurring (see **Table 28-4**, Commitment ID CO105), therefore, the impact is tolerable.

97. As part of the ongoing site selection process, the ESBI will be positioned away from areas where underground pipelines are located during further site selection refinements (see **Chapter 5 Site Selection and Consideration of Alternatives**). The specific location of the ESBI within the OCS zone as determined for the DCO application will be fully assessed in the ES.

98. In addition, the use of appropriate embedded mitigation measures including the design of the ESBI, e.g. relevant safety features, and the implementation of a BSMP and operational emergency response planning (see **Table 28-4**, Commitment IDs CO79, CO96 and CO97) would reduce any potential risks.

28.7.1.2.1 Receptor Sensitivity, Severity and Duration

99. The receptor sensitivity is described in **Table 28-9**, with the sensitivity of the ESBI and human receptors considered **medium to high**, while the sensitivity of environmental receptors is considered **medium**. Severity of harm and duration of harm for each receptor is presented in **Table 28-16**.

28.7.1.2.2 Impact Magnitude

100. The impact magnitude, as determined by the severity of harm and duration (see **Table 28-12**), of an incident associated with an existing major accident hazard risk, e.g. underground pipeline, petrol station, which could result in damage to the ESBI, e.g. an explosion or fire, injuries and potential loss of life (in low numbers) to human receptors, and potential damage to the surrounding environment is considered to be **low to high**.

28.7.1.2.3 Effect Significance

101. The effect significance matrix for an existing major accident or hazard risk to impact the ESBI is presented in **Table 28-13**. Overall, it is predicted that the sensitivity is **medium to high**, and magnitude of impact is **low to high**. However, the likelihood of such an event occurring is extremely unlikely, therefore the effect is of **negligible to minor adverse** significance, which is **not significant** in EIA terms.

28.7.1.3 Impact of Natural Hazards on the ESBI Element of the OCS Zone Natural Hazards on ESBI, Human or Environmental Receptors (MAD-O-03)

102. Part of OCS Zone 4 is located within a flood risk zone and has four surface water watercourses located within the zone boundary. While OCS Zone 8 is not located within a flood risk zone, such a zone does extend up to the OCS zone boundary. There are at least two surface water features located within the OCS Zone 8 boundary, as well as several off-site features (see **Table 28-14**).

103. Due to a changing climate, climatic conditions are likely to change with the UK experienced extreme weather events such as higher temperatures and potential more frequent and / or intense storm (rainfall) events. **Chapter 31 Climate Change** concludes that the Project remains resilient to both current and future climate conditions with the implementation of embedded mitigation measures.

104. The BSMP (see **Table 28-4**, Commitment ID CO79) and climate change resilience measures embedded in the project design and Onshore O&M Plan (see **Table 28-4**, Commitment IDs CO96 and CO97) will provide details on managing and operating the ESBI during natural hazards including flooding and extreme climatic conditions.

105. Therefore, no further assessment of the impact of natural hazards, i.e. geophysical, hydrological, and meteorological, is required as part of the major accidents and disasters assessment and the overall effect is considered to have **no change**.

28.7.2 Potential Effects during Decommissioning

106. No decision has been made regarding the final decommissioning strategy for the onshore infrastructure, as it is recognised that regulatory requirements and industry best practice change over time.
107. Commitment ID CO56 (see **Table 28-4**) requires an Onshore Decommissioning Plan to be prepared and agreed with the relevant authorities prior to the commencement of onshore decommissioning works. This will ensure that decommissioning impacts associated with major accidents and disasters will be assessed in accordance with the applicable regulations and guidance at that time of decommissioning where relevant, with appropriate mitigation implemented as necessary to avoid significant effects.
108. The detailed activities and methodology for decommissioning will be determined later within the Project's lifetime but would be expected to include deinstallation and removal of electrical equipment, buildings and other infrastructure in the OCS zone, including the ESBI, and site reinstatement and relandscaping, ensuring that the reinstated site will present no future environmental risk.
109. Whilst a detailed assessment of decommissioning impacts cannot be undertaken at this stage, in the PEIR, it is assumed that the risks associated with the ESBI during decommissioning would be no worse than those identified during commissioning and O&M of the ESBI.

28.7.3 Additional Mitigation Measures

110. No additional mitigation measures have been proposed for major accidents and disasters.

Table 28-16 Significance of Effect During the Operation and Maintenance Phase

ID	Hazard	Extent	Source	Pathway	Receptor	Consequence	Hazard Sensitivity / Severity	Duration of Harm	Magnitude of Impact	Baseline / Embedded Mitigation	Likelihood	Significance	Effect
MAD-O-01													
1	On-site industrial accidents – fire & smoke	ESBI within OCS zone Could extend beyond OCS zone boundary	Ignition of combustible material Failure of ESBI, e.g. overheating, flood event, storm etc.	Direct	ESBI	Damage to ESBI	High / Major	Short to medium-term	Medium	A BMSP and operational emergency response planning (see Table 28-4 , Commitment ID CO79) will be developed and detail how to prevent and manage fires and the discharge of firewater. The ESBI will utilise tertiary containment and penstock valves of drainage outlets / discharge points to prevent the release of any fire water and / or spill.	Very unlikely	Minor	Not Significant
				Direct	Human Receptors	Multiple injuries Loss of life in low numbers	High / Major		Medium			Minor	
				Direct - drainage	Environmental Receptors	Discharge to contaminants to land / watercourse	Medium / Severe		Low			Negligible	
MAD-O-02													
2	Off-site industrial accidents – fire & smoke	ESBI within OCS zone	Off-site industrial accidents – fire & smoke	Indirect – air	ESBI	Disruption to ESBI operation	Medium / Major	Medium-term	Medium	A BMSP and operational emergency response planning (see Table 28-4 , Commitment ID CO79) will be developed and detail how to prevent and manage fires and the discharge of firewater.	Extremely unlikely	Negligible	Not Significant
				Indirect – air	Human Receptors	Disruption to neighbouring communities	Medium / Major		Medium			Negligible	
				Indirect – drainage / watercourse	Environmental Receptors	Generation of fire-fighting water and potential discharge to environment	Medium / Severe		Low			Negligible	

ID	Hazard	Extent	Source	Pathway	Receptor	Consequence	Hazard Sensitivity / Severity	Duration of Harm	Magnitude of Impact	Baseline / Embedded Mitigation	Likelihood	Significance	Effect
3	Off-site / externally managed pipelines and utilities	ESBI within OCS zone Could extend beyond OCS zone boundary	Failure of pipeline / utility leading to explosion and / or fire	Indirect	ESBI	Damage to ESBI	Medium / Major	Short-term	Scoped out	Consultation with the owner / operator of any pipeline / other utility assets will be undertaken to prevent accidents from occurring and to mitigate risks (see Table 28-4 , Commitment ID CO105).	Extremely Unlikely	Scoped out (Negligible)	Not Significant
					Human Receptors	Multiple injuries Loss of life in low numbers	High / Catastrophic	Medium-term	High	Utilities have been designed and are operated to relevant regulations and guidance, designed to prevent accidents.		Minor	
MAD-O-03													
Assessed within other relevant technical chapters including Chapter 21 Water Resources and Flood Risk and Chapter 31 Climate Change .													

28.8 Cumulative Effects

111. Cumulative effects are the result of the impacts of the Project acting in combination with the impacts of other proposed and reasonably foreseeable developments on receptors. This includes plans and projects that are not inherently considered as part of the current baseline.
112. The overarching framework used to identify and assess cumulative effects is set out in **Chapter 6 Environmental Impact Assessment Methodology**. The four-stage approach is based upon the Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment (Planning Inspectorate, 2024). The fourth stage of the process is the assessment stage, which is detailed within the sections below for potential cumulative effects on major accidents and disasters receptors.

28.8.1 Screening for Potential Cumulative Effects

113. The first step of the CEA identifies which impacts associated with the Project alone, as assessed under **Section 28.7**, have the potential to interact with other plans and projects to give rise to cumulative effects. All potential cumulative effects to be taken forward in the CEA are detailed in **Table 28-17** with a rationale for screening in or out. Only impacts determined to have a residual effect of negligible or greater are included in the CEA. Those assessed as ‘no change’ are excluded, as there is no potential for them to contribute to a cumulative effect.

Table 28-17 Major Accidents and Disasters – Potential Cumulative Effects

Impact ID	Impact and Project Activity	Potential for Cumulative Effects	Rationale
Operation and Maintenance			
MAD-O-01	Major accident or disaster impact arising from the ESBI element of the OCS zone upon the Project site, human or environmental receptors – on-site incidents during the O&M and commissioning of the ESBI	Yes	There is the potential for cumulative effects during the O&M phase, due to temporal overlap as well as the potential for spatial overlap due to the proximity of some projects.
MAD-O-02	Impact of an incident associated with an existing major accident hazard risk on the ESBI element of the OCS zone, human or environmental receptors – off-site incidents during the v and commissioning of the ESBI	Yes	
MAD-O-03	Impact of natural hazards on the ESBI element of the OCS zone, human or environmental receptors – natural hazards during the O&M and commissioning of the ESBI	No	Cumulative effects are not anticipated as natural hazards have a low likelihood of occurrence. Chapter 31 Climate Change provides an assessment of climate related scenarios, concluding that the Project remains resilient to both current and future climate conditions with the implementation of embedded mitigation measures. Therefore, cumulative impacts from natural hazards have been scoped out of the assessment as it is considered there is no change.
Decommissioning			
There is insufficient information available on other plans and projects which could have a spatial and temporal overlap with the Project’s onshore decommissioning works. The details and scope of onshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Onshore Decommissioning Plan (see Table 28-4 , Commitment ID CO56). This will include a detailed assessment of decommissioning impacts and appropriate mitigation measures to avoid significant effects, including cumulative effects. For this assessment, it is assumed that the cumulative decommissioning effects associated with the ESBI would be no worse than those identified during commissioning and O&M of the ESBI.			

28.8.2 Screening for Other Plans / Projects

114. The second step of the CEA identifies a short-list of other plans and projects that have the potential to interact with the Project to give rise to significant cumulative effects during the O&M phase. The short-list provided in **Table 28-18** has been produced specifically to assess cumulative effects on major accidents and disasters receptors. The exhaustive list of all onshore plans and projects considered in the development of the Project’s CEA framework is provided in **Volume 2 Appendix 6.5 Cumulative Effects Screening Report - Onshore**.
115. Developments that were fully operational during baseline characterisation, including at the time of site-specific surveys, are considered as part of baseline conditions for the surrounding environment. It is assumed that any residual effects associated with these developments are captured within the baseline information. As such, these developments are not subject to further assessment within the CEA and excluded from the screening exercise presented in **Table 28-18**.
116. For developments that were not fully operational, including those in planning / pre-construction stages or under construction, during baseline characterisation and operational developments with potential for ongoing impacts, these are included in the screening exercise presented in **Table 28-18**.
117. The screening exercise has been undertaken based on available information on each plan or project up to and including 31st December 2024. Information has been obtained from the Planning Inspectorate’s NSIP portal and ERYC and Hull City Council’s planning portal. It is noted that further information regarding the identified plans and projects may become available between PEIR publication and DCO application submission or may not be available in detail prior to construction. The assessment presented here is therefore considered to be conservative at the time of PEIR publication. The list of plans and projects will be updated at ES stage to incorporate more recent information at the time of writing.
118. Plans and projects identified in **Table 28-18** have been assigned a tier based on their development status, the level of information available to inform the CEA and the degree of confidence. A three-tier system based on the Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment has been adopted (Planning Inspectorate, 2024).
119. The Zone of Influence (Zol) used to identify relevant plans and projects for the major accidents and disasters CEA is 1km from the OCS zone boundaries.

120. Each plan or project in **Table 28-18** has been considered on a case-by-case basis. Only plans and projects with potential for significant cumulative effects with the Project are taken forward to a detailed assessment, which are screened based on the following criteria:
- There is potential that a pathway exists whereby an impact could have a cumulative effect on a receptor;
 - The impact on a receptor from the Project and the plan or project in consideration has a spatial overlap, i.e. occurring over the same area;
 - The impact on a receptor from the Project and the plan or project in consideration has a temporal overlap, e.g. occurring at the same time;
 - There is sufficient information available on the plan or project in consideration and moderate to high data confidence to undertake a meaningful assessment; and
 - There is some likelihood that the residual effect, i.e. after accounting for mitigation measures, of the Project could result in significant cumulative effects with the plan or project in consideration.

28.8.3 Assessment of Cumulative Effects

121. Similar to the approach noted in **Section 28.4.5**, the CEA for the OCS zone infrastructure will remain the same for both development scenarios. Only one OCS zone option will be taken forward to development. Therefore, there is no cumulative development scenario in which both OCS zones would be developed to be considered in the CEA.
122. As described in **Table 28-18**, there is no potential for cumulative effects on major accident and disaster ESBI receptors. Potential cumulative projects were assessed and screened out on the basis of there being either no spatial or temporal overlap, or both, with the Project and based on the nature and scale of the cumulative project.
123. The CEA for major accidents and disasters has not identified any plans or projects where significant cumulative effects could arise in combination with the Project. Therefore, no further consideration of cumulative effects is required.

Table 28-18 Short List of Plans / Projects for the Major Accidents and Disasters Cumulative Effect Assessment

Project / Plan	Development Type	Status	Tier	Construction / Operation Period	Closest Distance to OCS Zone 4 (km)	Closest Distance to OCS Zone 8 (km)	Potential for Significant Cumulative Effects	Rationale
A164 And Jock's Lodge Junction Improvement Scheme Adjacent to and South of Beverley Road (20/01073/STPLF)	Road Improvement Scheme	Under Construction	1	Construction: 2024 to 2026 Operation: 2027+	0.40	1.94	No	<p>No spatial overlap between the two projects.</p> <p>Based on the currently available information, there is no potential for temporal overlap between the construction phases, as the road improvement scheme will likely complete construction prior to the commencement of the Project's construction.</p> <p>No potential for significant operational cumulative effects is anticipated based on the nature of the development.</p>
Dogger Bank A Offshore Wind Farm (EN010021)	Offshore Wind Farm	Operational	1	Construction: 2020 to 2025 Operation: 2026+	0.50	2.66	No	<p>No spatial overlap between the projects.</p> <p>Dogger Bank A & B are located outside the ZoI for OCS Zone 8, and therefore, there is no potential for significant cumulative effects.</p> <p>Additionally, both Dogger Bank A & B will have completed construction and become operational by the time the Project starts construction. Therefore, there is no potential for significant cumulative effects during the construction phase of OCS Zone 4.</p>
Dogger Bank B Offshore Wind Farm (EN010021)	Offshore Wind Farm	Under Construction	1	Construction: 2026 to 2033 Operation: 2034+	0.50	2.66	No	<p>The Project and Dogger Bank South have a temporal overlap during the O&M phases; however, Dogger Bank A & B will likely implement similar O&M measures as the Project and therefore it is considered unlikely that there is any potential for significant operational cumulative effects.</p>
Dogger Bank South Offshore Wind Farms (EN010125)	Offshore Wind Farm	Examination	1	Construction: 2026 to 2033 Operation: 2034+	0.10	0.30	No	<p>No spatial overlap between the two projects, however, there is a temporal overlap in the construction phase.</p> <p>While Dogger Bank South will be located within 100m of the OCS Zone 4 boundary, at its closest extent, the two projects are separated by a public highway, the A1079. Therefore, there is no potential for significant construction cumulative impacts.</p> <p>The Project and Dogger Bank South have a temporal overlap during the O&M phases; however, Dogger Bank South will likely implement similar O&M measures as the Project and therefore is considered unlikely to have potential for significant operational cumulative effects.</p>

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Project / Plan	Development Type	Status	Tier	Construction / Operation Period	Closest Distance to OCS Zone 4 (km)	Closest Distance to OCS Zone 8 (km)	Potential for Significant Cumulative Effects	Rationale
Erection of 90 Dwellings at Land North of 88 Poplars Way (20/02207/STREM /17/00398/STOUT)	Residential Development	Under Construction	1	Construction: Unknown	0.96	2.50	No	<p>No spatial overlap between the two projects.</p> <p>Based on the currently available information, there is no potential for temporal overlap between the construction phases, as the residential development will likely complete construction prior to the commencement of the Project's construction.</p> <p>No potential for significant operational cumulative effects is anticipated based on the nature of the development.</p>
Hornsea Project Four Offshore Wind Farm (EN010098)	Offshore Wind Farm	Under Construction	1	Construction: 2024 to 2028 Operation: 2029+	0.11	0.01	No	<p>Based on the currently available information, there is no potential for spatial or temporal overlap between the construction phases; the Hornsea Project Four boundary is located within 10m of the eastern boundary of the OCS Zone 8 (Hornsea Project Four's onshore ECC) and 100m of the OCS Zone 4 boundary (Hornsea Project Four's access point, with the main construction / operational footprint located >1km).</p> <p>There is potential for a temporal overlap during the O&M phases due to the proximity of the Hornsea Project Four boundary to OCS Zone 8, however, only Hornsea Project Four's buried onshore export cables will be sited at this location and are unlikely to impact the operation of the ESBI.</p> <p>Additionally, Hornsea Project Four has prepared an Environmental Risk Assessment for its own ESBI, which will be co-located with Hornsea Project Four's onshore substation. The risk assessment identifies and assesses the likelihood and potential severity of major accidents and disasters including fire to humans. The assessment also identifies and includes the control measures and management techniques required to eliminate or reduce these risks so that they are not significant.</p> <p>Therefore, any potential risks have been identified and are being actively managed, resulting in there being no potential for significant operational cumulative effects.</p>
North Humber to High Marnham Grid Upgrade (EN020034)	Electricity Transmission Infrastructure	Planning	3	Construction: 2028 to 2030 Operation: 2031+	0.89	0.41	No	<p>No spatial overlap between the two projects, however, there is a temporal overlap in the construction phase.</p> <p>The Project and North Humber to High Marham Grid Upgrade have a temporal overlap during the O&M phases; however, the grid upgrade project will likely implement the required management and operational controls. Therefore, it is considered unlikely that there is any potential for significant operational cumulative effects.</p>

28.9 Inter-Relationships and Effects Interactions

28.9.1 Inter-Relationships

124. Inter-relationships are defined as effects arising from residual effects associated with different environmental topics acting together upon a single receptor or receptor group. Potential inter-relationships between major accidents and disasters and other environmental topics have been considered, where relevant, within the PEIR. **Table 28-19** provides a summary of key inter-relationships and signposts to where they have been addressed in the relevant chapters.

Table 28-19 Major Accidents and Disasters – Inter-Relationships with Other Topics

Impact ID	Impact and Project Activity	Related EIA Topic	Where Assessed in the PEIR Chapter	Rationale
Operation and Maintenance				
MAD-O-01	Major accident or disaster impact arising from the ESBI element of the OCS zone upon the Project site, human or environmental receptors – on-site incidents during the O&M and commissioning of the ESBI	Chapter 21 Water Resources and Flood Risk Chapter 22 Soils and Land Use Chapter 29 Human Health	Section 28.7.1.1	On-site surface water flooding could lead to off-site flooding in nearby watercourses, discharge of fire water could cause flooding and / or a pollution incident
MAD-O-02	Impact of an incident associated with an existing major accident hazard risk on the ESBI element of the OCS zone, human or environmental receptors – off-site incidents during the O&M and commissioning of the ESBI	Chapter 21 Water Resources and Flood Risk Chapter 22 Soils and Land Use	Section 28.7.1.2	Changes in land use immediately adjacent to the ESBI, e.g. conversion from agricultural to residential or industrial land use, could result in new human receptors.

Impact ID	Impact and Project Activity	Related EIA Topic	Where Assessed in the PEIR Chapter	Rationale
MAD-O-03	Impact of natural hazards on the ESBI element of the OCS zone, human or environmental receptors – natural hazards during the O&M and commissioning of the ESBI	Chapter 21 Water Resources and Flood Risk Chapter 22 Soils and Land Use Chapter 31 Climate Change	Section 28.7.1.3	On-site surface water flooding, caused by storm events, could lead to off-site flooding in nearby watercourses Flooding of nearby watercourses could potentially impact the site.

Decommissioning

The details and scope of onshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Onshore Decommissioning Plan (see **Table 28-4**, Commitment ID CO56).

For this assessment, it is assumed that the inter-relationships during the decommissioning phase associated with the ESBI would be similar to those identified during the commissioning and O&M of the ESBI.

28.9.2 Interactions

- 125. The impacts identified and assessed in this chapter have the potential to interact with each other. Potential interactions between impacts are identified in **Table 28-20**. Where there is potential for interaction between impacts, these are assessed in **Table 28-21** for each receptor or receptor group.

- 126. Interactions are assessed by development phase (“phase assessment”) to see if multiple impacts could increase the overall effect significance experienced by a single receptor or receptor group during each phase. Following from this, a lifetime assessment is undertaken which considers the potential for multiple impacts to accumulate across the construction, O&M and decommissioning phases and result in a greater effect on a single receptor or receptor group. When considering synergistic effects from interactions, it is assumed that the receptor sensitivity remains consistent, while the magnitude of different impacts is additive.

Table 28-20 Major Accidents and Disasters – Potential Interactions between Impacts (Operation and Maintenance Phase Only)

Construction			
See Section 28.4.2, construction impacts are scoped out of the major accidents and disasters assessment.			
Operation and Maintenance			
	MAD-O-01	MAD-O-02	MAD-O-03
Major accident or disaster impact arising from the ESBI element of the OCS zone upon the Project site, human or environmental receptors (MAD-O-01)		Yes	No
Impact of an incident associated with an existing major accident hazard risk on the ESBI element of the OCS zone, human or environmental receptors (MAD-O-02)	Yes		No
Impact of natural hazards on the ESBI element of the OCS zone, human or environmental receptors (MAD-O-03)	No	No	
Decommissioning			
The details and scope of onshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Onshore Decommissioning Plan (see Table 28-4, Commitment ID CO56).			
For this assessment, it is assumed that interactions during the decommissioning phase associated with the ESBI would be similar to and no worse than those identified during commissioning and O&M of the ESBI.			

Table 28-21 Interaction Assessment – Phase and Lifetime Effects

Receptor	Impact ID	Highest Significance Level			Phase Assessment	Lifetime Assessment
		Construction	Operation and Maintenance	Decommissioning		
ESBI Human Receptors Environmental Receptors	MAD-O-01 MAD-O-02	N/A	Minor Adverse	TBC – assumed no worse than during the commissioning and O&M of the ESBI.	No greater than individually assessed impact. The proposed mitigation and best practice methodologies would minimise the potential for both on-site and off-site major accidents and disasters to occur simultaneously. The BSMP (see Table 28-4 , Commitment ID CO79) will prevent on-site incidents from extending beyond the OCS zone boundary, while also preserving ESBI assets should an off-site incident occur that poses a risk to the Project during O&M. The impacts from on-site and off-site events are considered to, at most, have a minor adverse significance on receptors as on-site and off-site events are extremely unlikely to occur at the same time.	N/A

28.10 Monitoring Measures

127. No monitoring measures have been proposed for major accidents and disasters.

28.11 Summary

128. **Table 28-22** presents a summary of the preliminary results of the assessment of likely significant effects on major accidents and disasters during the O&M and decommissioning of the Project. As discussed in **Section 28.4.2**, construction impacts are scoped out of the major accidents and disasters assessment.

28.12 Next Steps

129. The Major Accidents and Disasters ES chapter will include an updated baseline environment and impact assessment following refinement of the OCS zone boundaries and the Project Design Envelope. The chapter will also incorporate any additional data which has become available following the submission of the PEIR, as well as consideration of relevant stakeholder comments received as part of the consultation process.

Table 28-22 Summary of Potential Effects Assessed for Major Accidents and Disasters

Impact ID	Impact and Project Activity	Embedded Mitigation Measures	Receptor	Receptor Sensitivity	Impact Magnitude	Effect Significance	Additional Mitigation Measures	Residual Effect	Monitoring Measures
Operation and Maintenance									
MAD-O-01	Major accident or disaster impact arising from the ESBI element of the OCS zone upon the Project site, human or environmental receptors – on-site incidents during the O&M and commissioning of the ESBI	CO79 CO96 CO97	ESBI Human Receptors Environmental Receptors	ESBI and Human Receptors: High Environmental Receptors: Medium	ESBI and Human Receptors: Medium Environmental Receptors: Low	ESBI and Human Receptors: Minor Adverse (Not Significant) Environmental Receptors: Negligible (Not Significant)	N/A	ESBI and Human Receptors: Minor Adverse (Not Significant) Environmental Receptors: Negligible (Not Significant)	N/A
MAD-O-02	Impact of an incident associated with an existing major accident hazard risk on the ESBI element of the OCS zone, human or environmental receptors – off-site incidents during the O&M and commissioning of the ESBI	CO79 CO96 CO97 CO105	ESBI Human Receptors Environmental Receptors	ESBI and Environmental Receptors: Medium Human Receptors: Medium to High	ESBI: Medium Human Receptors: Medium to High Environmental Receptors: Low	ESBI: Negligible (Not Significant) Human Receptors: Negligible to Minor Adverse (Not Significant) Environmental Receptors: Negligible (Not Significant)	N/A	ESBI: Negligible (Not Significant) Human Receptors: Negligible to Minor Adverse (Not Significant) Environmental Receptors: Negligible (Not Significant)	N/A
MAD-O-03	Impact of natural hazards on the ESBI element of the OCS zone, human or environmental receptors – natural hazards during the O&M and commissioning of the ESBI	CO79 CO96 CO97	ESBI Human Receptors Environmental Receptors	No Change					

Impact ID	Impact and Project Activity	Embedded Mitigation Measures	Receptor	Receptor Sensitivity	Impact Magnitude	Effect Significance	Additional Mitigation Measures	Residual Effect	Monitoring Measures
Decommissioning									
MAD-D-01	Major accident or disaster impact arising from the ESBI element of the OCS zone upon the Project site, human or environmental receptors – decommissioning activities not yet defined	CO56							
MAD-D-02	Impact of an incident associated with an existing major accident hazard risk on the ESBI element of the OCS zone, human or environmental receptors – decommissioning activities not yet defined								
MAD-D-03	Impact of natural hazards on the ESBI element of the OCS zone, human or environmental receptors – decommissioning activities not yet defined								

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List of Acronyms

Acronym	Definition
AC	Alternating Current
ALARP	As Low as Reasonably Practicable
ALC	Agricultural Land Classification
BGS	British Geological Society
BSMP	Battery Safety Management Plan
CBRN	Chemical, Biological, Radiological and Nuclear
CDM	Construction Design Management
CDOIF	Chemical and Downstream Oil Industries Forum
CEA	Cumulative Effect Assessment
CoCP	Code of Construction Practice
COMAH	Control of Major Accident Hazards
DBD	Dogger Bank D
DC	Direct Current
DCO	Development Consent Order
DESNZ	Department of Energy Security and Net Zero
EEA	European Economic Area
EIA	Environmental Impact Assessment
ECC	Export Cable Corridor
EPP	Evidence Plan Process
ESBI	Energy Storage and Balancing Infrastructure
ES	Environmental Statement
ETG	Expert Topic Group
ha	Hectare

Acronym	Definition
HAZID	Hazard Identification
HSE	Health and Safety Executive
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IEMA	Institute of Environmental Management and Assessment
km	Kilometer
LNR	Local Nature Reserve
LSE	Likely Significant Effect
NETS	National Electricity Transmission System
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
OCS	Onshore Converter Station
O&M	Operation and Maintenance
PCS	Power Conversion System
PEIR	Preliminary Environmental Information Report
PEMP	Project Environmental Management Plan
PGA	Peak Ground Acceleration
SSSI	Site of Special Scientific Interest
UXO	Unexploded Ordnance
ZoI	Zone of Influence