

# **XLINKS' MOROCCO-UK POWER PROJECT**

## **Environmental Statement**

**Volume 4, Chapter 5: Inter-related Effects**

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## XLINKS' MOROCCO – UK POWER PROJECT

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## Glossary

Term	Meaning
Access land	The Countryside and Rights of Way Act 2000 gives a public right of access to land mapped as 'open country' (mountain, moor, heath and down) or registered common land. These areas are known as 'access land'.
Alverdiscott Substation Site	The National Grid Electricity Transmission site within which the Alverdiscott Substation sits.
Annoyance (dust)	Loss of amenity due to dust deposition or visible dust plumes, often related to people making complaints, but not necessarily sufficient to be a legal nuisance, as defined by the Institute of Air Quality Management.
Applicant	Xlinks 1 Limited.
Aquifer	A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater.
Benthic	Associated with or occurring on the bottom of the seabed.
Best and Most Versatile	Agricultural land that is the best and most versatile for growing crops.
Bipole	A Bipole system is an electrical transmission system that comprises two Direct Current conductors of opposite polarity (one conductor with positive voltage and one with negative voltage).
Climate change	A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
Construction Environmental Management Plan	A document detailing the overarching management principles for construction, which includes construction-related environmental management measures, pollution prevention measures, the selection of appropriate construction techniques and monitoring processes.
Converter Site	The Converter Site is proposed to be located to the immediate west of the existing Alverdiscott Substation Site in north Devon. The Converter Site would contain two converter stations (known as Bipole 1 and Bipole 2) and associated infrastructure, buildings and landscaping.
Converter station	Part of an electrical transmission and distribution system. Converter stations convert electricity from Direct Current to Alternating Current, or vice versa.
Designated heritage asset	A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent.
Dust	Solid particles suspended in air or settled out onto a surface after having been suspended in air, as defined by the Institute of Air Quality Management.
Effect	The term used to express the consequence of an impact. The significance of effect is determined by correlating magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Electromagnetic Fields	Electromagnetic fields are part of the natural world, and are produced wherever electricity is generated, transmitted, or used.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.

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Term	Meaning
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Heritage asset	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest.
Impact	Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact).
Inter-related effects	Multiple effects on the same receptor as a result of the Proposed Development. These occur when a series of the same effect acts on a receptor over time to produce a potential additive effect or where a number of separate effects, such as noise and habitat loss, affect a single receptor.
National Policy Statement(s)	The current national policy statements published by the Department for Energy Security and Net Zero in 2023 and adopted in 2024.
Onshore HVDC Cable Corridor	The proposed corridor within which the onshore High Voltage Direct Current cables would be located.
Onshore Infrastructure Area	The proposed infrastructure area within the Order Limits landward of Mean High Water Springs. The Onshore Infrastructure Area comprises the transition joint bays, onshore HVDC Cables, converter stations, HVAC Cables, highways improvements, utility diversions and associated temporary and permanent infrastructure including temporary compound areas and permanent accesses.
Order Limits	The area within which all offshore and onshore components of the Proposed Development are proposed to be located, including areas required on a temporary basis during construction (such as construction compounds).
Planning Inspectorate	The agency responsible for operating the planning process for applications for development consent under the Planning Act 2008.
Preliminary Environmental Information Report	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project, and which helps to inform consultation responses.
Project lifetime effects	Assessment of the scope for effects that occur throughout more than one phase of the Proposed Development (construction, operation and maintenance, and decommissioning) to interact to potentially create a more significant effect on a receptor than if assessed in isolation in these three phases.
Proposed Development	The element of Xlinks' Morocco-UK Power Project within the UK. The Proposed Development covers all works required to construct and operate the offshore cables (from the UK Exclusive Economic Zone to Landfall), Landfall, onshore Direct Current and Alternating Current cables, converter stations, and highways improvements.
Protected species	A species of animal or plant which it is forbidden by law to harm or destroy.
Receptor	The element of the receiving environment that is affected.
Receptor-led effects	Assessment of the scope for all effects (including inter-relationships between environmental topics) to interact, spatially and temporally, to create inter-related effects on a receptor or receptor group. As an example, multiple effects on a given receptor group such as local residents – construction dust and noise, increased traffic and visual change, etc may interact to produce a greater effect on this receptor than when the effects are considered in isolation.
Runoff	Runoff occurs when there is more water than land can absorb. The excess liquid flows across the surface of the land.
Scoping Opinion	Sets out the Planning Inspectorate's response (on behalf of the Secretary of State) to the Scoping Report prepared by the Applicants. The Scoping Opinion contains the range of issues that the Planning Inspectorate, in consultation with statutory

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Term	Meaning
	stakeholders, has identified should be considered within the Environmental Impact Assessment process.
Scoping Report	The report setting out the proposed scope of the Environmental Impact Assessment process. The Scoping Report for the Proposed Development was submitted to the Planning Inspectorate (on behalf of the Secretary of State) in January 2024.
Study area	This is an area which is defined for each environmental topic which includes the Order Limits as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected.
Xlinks' Morocco UK Power Project	The overall scheme from Morocco to the national grid, including all onshore and offshore elements of the transmission network and the generation site in Morocco (referred to as the 'Project').

## Acronyms

Acronym	Meaning
CEMP	Construction Environmental Management Plan
DESNZ	Department for Energy Security and Net Zero
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
ES	Environmental Statement
GHG	Greenhouse Gas
GVA	Gross Value Added
HDD	Horizontal Directional Drilling
MoD	Ministry of Defence
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSVMP	Navigational Safety and Vessel Management Plan
NTM	Notice to Mariners
OMU	Other Marine Users
On-CEMP	Onshore Construction Environmental Management Plan
PEIR	Preliminary Environmental Information Report
PEXA	Military exercise areas and danger areas
PRoW	Public Right of Way
PTS	Permanent Threshold Shift
UK	United Kingdom
VMP	Vessel Management Plan

## 5 INTRODUCTION

### 5.1 Background

- 5.1.1 This chapter of the Environmental Statement (ES) presents the findings of the Environmental Impact Assessment (EIA) undertaken for the United Kingdom (UK) elements of Xlinks' Morocco-UK Power Project (the 'Project'). For ease of reference, the UK elements of the Project are referred to in this chapter as the 'Proposed Development'. The ES accompanies the application to the Planning Inspectorate for development consent for the Proposed Development.
- 5.1.2 This chapter considers the potential offshore and onshore inter-related effects associated with potential impacts of the Proposed Development during the construction, operation and maintenance, and decommissioning phases. Inter-related effects refer to the interactions between aspect assessments and are considered for 'project lifetime effects' and 'receptor-led effects'. Further detail is provided in **section 5.5**.
- 5.1.3 The assessment presented in this chapter has taken into account relevant impact assessments provided in the ES as set out in **Table 5.1**.

**Table 5.1: Topic chapters of the ES used to inform the assessment**

Topic Chapters
<b>Volume 2 – Effects on the Onshore Environment</b>
Chapter 1: Onshore Ecology and Nature Conservation
Chapter 2: Historic Environment
Chapter 3: Hydrology and Flood Risk
Chapter 4: Geology, Hydrogeology and Ground Conditions
Chapter 5: Traffic and Transport
Chapter 6: Noise and Vibration
Chapter 7: Air Quality
Chapter 8: Land Use and Recreation
<b>Volume 3 – Effects on the Offshore Environment</b>
Chapter 1: Benthic Ecology
Chapter 2: Fish and Shellfish Ecology
Chapter 3: Commercial Fisheries
Chapter 4: Marine Mammals and Turtles
Chapter 5: Shipping and Navigation
Chapter 6: Other Marine Users
Chapter 7: Marine Archaeology and Cultural Heritage
Chapter 8: Physical Processes
Chapter 9: Offshore Ornithology
<b>Volume 4 – Combined Effects on the Onshore and Offshore Environment</b>
Chapter 1: Climate Change
Chapter 2: Landscape, Seascape and Visual Resources
Chapter 3: Socioeconomics and Tourism
Chapter 4: Human Health



## 5.2 Legislative and Policy Context

### Legislation

5.2.1 Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Regulation 5(2)(e)) require that the EIA process should identify, describe and assess the significant effects in relation to:

*‘(e) the interaction between the factors referred to in sub-paragraphs (a) to (d) [population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and the landscape]’.*

### Planning Policy Context

5.2.2 The Proposed Development would be located within the UK Exclusive Economic Zone offshore waters (beyond 12 nautical miles from the English coast) and inshore waters, with the onshore infrastructure proposed to be located wholly within Devon, England. As set out in Volume 1, Chapter 1: Introduction of the ES, the Secretary of State for the Department for Energy Security and Net Zero (DESNZ) has directed that elements of the Proposed Development are to be treated as development for which development consent is required under the Planning Act 2008, as amended.

### National Policy Statements

5.2.3 There are currently six energy National Policy Statements (NPSs), three of which contain policy relevant to the Proposed Development, specifically:

- Overarching NPS for Energy (NPS EN-1) which sets out the UK Government’s policy for the delivery of major energy infrastructure (Department for Energy Security & Net Zero 2023a);
- NPS for Renewable Energy Infrastructure (NPS EN-3) (Department for Energy Security & Net Zero 2023b); and
- NPS for Electricity Networks Infrastructure (NPS EN-5) (Department for Energy Security & Net Zero 2023c).

5.2.4 Of the three NPSs identified, one of these, NPS EN-1 addresses the consideration of inter-related effects, and this is summarised in **Table 5.2** below.

**Table 5.2: Summary of relevant NPS policy**

Summary of NPS requirement	How and where considered in the ES
<b>NPS EN-1</b>	
<i>‘The Secretary of State should consider how the accumulation of, and interrelationship between, effects might affect the environment, economy, or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place.’ (paragraph 4.3.19).</i>	Project lifetime effects and receptor-led effects are assessed throughout this ES chapter. <b>Section 5.6</b> provides the inter-related effects assessment.

## National Planning Policy Framework

- 5.2.5 The National Planning Policy Framework (NPPF) was published in 2012 and updated in 2018, 2019, 2021 and 2023 (Department for Levelling Up, Housing and Communities, 2023). The NPPF sets out the Government's planning policies for England.
- 5.2.6 The Government published proposed reforms to the NPPF for consultation on 30 July 2024 (Ministry of Housing, Communities and Local Government, 2024). Following consultation, the NPPF will be updated.
- 5.2.7 In relation to various specific environmental topics, the NPPF reiterates the need to consider inter-related effects.

## 5.3 Consultation and Engagement

### Scoping

- 5.3.1 In January 2024, the Applicant submitted a Scoping Report to the Planning Inspectorate, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development. It also described those topics or sub-topics which are proposed to be scoped out of the EIA process and provided justification as to why the Proposed Development would not have the potential to give rise to significant environmental effects in these areas.
- 5.3.2 Following consultation with the appropriate statutory bodies, the Planning Inspectorate (on behalf of the Secretary of State) provided a Scoping Opinion on 7 March 2024. Key issues raised during the scoping process specific to inter-related effects are listed in **Table 5.3**, together with details of how these issues have been addressed within the ES.

### Preliminary Environmental Information Report

- 5.3.3 The preliminary findings of the EIA process were published in the Preliminary Environmental Information Report (PEIR) on 16 May 2024. The PEIR was prepared to provide the basis for statutory public consultation under the Planning Act 2008. This included consultation with statutory bodies under section 42 of the Planning Act 2008.
- 5.3.4 A summary of the key items raised specific to inter-related effects is presented in **Table 5.3**, together with how these issues have been considered in the production of this ES chapter.

**Table 5.3: Summary of consultation relevant to this chapter**

Date	Consultee and type of response	Issues raised	How and where considered in the ES
March 2024	Planning Inspectorate, Scoping Opinion (ID 3.4.10)	<p><i>'The Scoping Report states that inter-related effects will be considered in this chapter of the ES, including in relation to potential for a reduction in groundwater levels to impact on flow of surface watercourses. It is not apparent from the Scoping Report where this would be considered and presented. The ES must include an assessment of any likely significant effects on groundwater flow arising from the Proposed Development. Any proposed mitigation and monitoring with regards to groundwater flow effects must be clearly described in the ES, including likely efficacy. Mitigation and monitoring measures should be appropriately secured.'</i></p>	<p>Inter-related effects are presented within Volume 4, Chapter 5: Inter-related Effects of the ES.</p> <p>The impact of the Proposed Development on groundwater quantity in aquifers is provided within Volume 2, Chapter 4: Geology, Hydrogeology and Ground Conditions of the ES, including the proposed mitigation measures and how they would be secured.</p>

## 5.4 Study Area

5.4.1 Due to the differing spatial extent of potential effects experienced by different receptors, the study area and baseline environments for potential inter-related effects varies according to individual topics and receptor(s). The potential inter-related effects considered in this chapter are, therefore, also limited to the study areas defined in each of the topic chapters.

## 5.5 Impact Assessment Methodology

### Overview

- 5.5.1 Specific to the inter-related effects impact assessment, the Planning Inspectorate Advice Note 9 (Planning Inspectorate, 2018) has been considered while writing this chapter, with specific regard to the following text (paragraph 4.13):
- *'ensure that interactions (interactions between aspect assessments includes where a number of separate impacts, e.g. noise and air quality, affect a single receptor such as fauna) between aspect (the Planning Inspectorate refers to 'aspects' as meaning the relevant descriptions of the environment identified in accordance with the EIA Regulations) assessments are taken into account relevant to the worst case scenario(s) established and that careful consideration is given to how these are assessed.*
  - *ensure that the assessment of the worst case scenario(s) addresses impacts which may not be significant on their own but could become significant when they inter-relate with other impacts alone or cumulatively with impacts from other development (including those identified in other aspect assessments).'*
- 5.5.2 The approach to assessing inter-related effects has followed a four-stage process, as summarised in **Table 5.4** below and discussed in the following paragraphs.

**Table 5.4: Summary of staged approach to the inter-related effects assessment**

Stage	Description
1	Assessments undertaken for individual EIA topic areas within Volume 2, 3 and 4.
2	Review of the likely receptor(s)/resource(s) affected by more than one impact through analysis of the assessment of effect sections undertaken for individual EIA topic areas within ES chapters.
3	Identification of potential combination effects on these receptor groups through review of the topic assessments in the ES chapters.
4	Assessment undertaken on how individual effects may combine to create inter-related effects on each receptor group for: <ul style="list-style-type: none"> <li>• 'project lifetime effects', i.e., during construction, operation and maintenance and decommissioning phases; and</li> <li>• 'receptor-led effects', i.e., multiple simultaneous effects on a single receptor/resource.</li> </ul>

### Stage 1: Topic-Specific Assessments

5.5.3 The first stage of the assessment was undertaken as part of the individual ES topic assessments i.e., comprising the individual assessment of effects on receptors across the construction, operation and maintenance and decommissioning phases of the Proposed Development. These topic specific assessments are reported as significance levels using methodologies set out in

the respective chapters. Those assessments of significance are compiled for ease in this chapter i.e. within **section 5.6**.

## Stage 2: Identification of Receptor Groups

- 5.5.4 Stage 2 involved a review of the assessments undertaken in the topic chapters to identify 'receptor groups' requiring assessment within the inter-related effects assessment (i.e. those which may be affected by more than one impact or project phase). The term 'receptor group' is used to highlight that the approach taken for the inter-related effects assessment will not consider each individual receptor, but rather potentially sensitive groups of receptors.
- 5.5.5 The potential receptor groups have been identified from the topic assessments (see **Table 5.1**) and these have been considered in further detail at Stage 3 and 4. The specific potential receptor groups can be found within the respective ES chapters within Volume 2, 3 and 4.

## Stage 3: Identification of Potential Inter-Related Effect on Receptor Groups

- 5.5.6 Following the identification of receptor groups the potential inter-related effects on the receptor groups were identified. This was informed by the topic assessments together with expert judgement. Consideration was given to the potential for inter-related effects to arise for each of the identified receptor groups across each phase of the Proposed Development i.e. construction, operation and maintenance and decommissioning (project lifetime) as well as the interaction of multiple effects on a receptor (i.e. receptor-led effects).

## Stage 4: Assessment of Inter-Related Effects on Each Receptor Group

- 5.5.7 A qualitative assessment has been undertaken to identify project lifetime effects and receptor led effects as defined in **Table 5.5** below.

**Table 5.5: Definitions of project lifetime and receptor-led inter-related effects**

Effect Type	Description
Project lifetime effects	Assessment of the scope for effects that occur throughout more than one phase of the Proposed Development (construction, operation and maintenance, and decommissioning) to interact to potentially create a more significant effect on a receptor than if assessed in isolation in these three phases.
Receptor-led effects	Assessment of the scope for all effects (including inter-relationships between environmental topics) to interact, spatially and temporally, to create inter-related effects on a receptor or receptor group. As an example, multiple effects on a given receptor group such as local residents – construction dust and noise, increased traffic and visual change, etc may interact to produce a greater effect on this receptor than when the effects are considered in isolation.  Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

- 5.5.8 The assessment has considered the potential for individual effects to interact to create a different or greater effect. Where potential project lifetime effects on

receptor groups have already been considered within the topic chapters of the ES, these receptor groups have not been considered further in this assessment of inter-related effects.

- 5.5.9 The assignment of significance of effect to any such inter-related effect is not undertaken, rather, any inter-related effects that may be of greater significance than the individual effects in isolation on a given receptor are identified.

## **5.6 Assessment of Inter-Related Effects**

5.6.1 The receptor groups for each topic are identified within the individual topic chapters (see Volumes 2, 3 and 4, of the ES).

5.6.2 The assessment of inter-related effects is presented within tables in this section, as follows:

- **Table 5.6** - Onshore Ecology and Nature Conservation;
- **Table 5.7** - Historic Environment;
- **Table 5.8** - Hydrology and Flood Risk;
- **Table 5.9** - Geology, Hydrogeology and Ground Conditions;
- **Table 5.10** - Traffic and Transport;
- **Table 5.11** - Noise and Vibration;
- **Table 5.12** - Air Quality;
- **Table 5.13** - Land Use and Recreation;
- **Table 5.14** - Benthic Ecology;
- **Table 5.15** - Fish and Shellfish Ecology;
- **Table 5.16** - Commercial Fisheries;
- **Table 5.17** - Marine Mammals and Turtles;
- **Table 5.18** - Shipping and Navigation;
- **Table 5.19** - Other Marine Users;
- **Table 5.20** - Marine Archaeology and Cultural Heritage;
- **Table 5.21** - Physical Processes;
- **Table 5.22** - Offshore Ornithology;
- **Table 5.23** - Climate Change;
- **Table 5.24** - Landscape, Seascape and Visual Resources;
- **Table 5.25** - Socioeconomics and Tourism; and
- **Table 5.26** - Human Health.

**Table 5.6: Onshore ecology and nature conservation – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Potential impacts of habitat loss or damage	Following the implementation of mitigation strategies set out for the Proposed Development, the significance of project lifetime effects are unlikely to exceed those stated in the ES for any individual phase. The assessment on construction phase effects has been undertaken assuming that all elements could take place over the long-term (i.e. up to seven years), although it is recognised that many of the task level workings will not in fact take this long. Operation and maintenance phase impacts will be restricted to those associated with the Converter Site only and these will not increase above that identified during the construction phase. Decommissioning effects, given the timeframe intervening, will also be unlikely to have significant inter-related effects above those identified for construction phase, although the ecological baseline at that time will require careful review to ensure that receptors currently identified are still relevant at that time.	The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment.
Potential impacts of fragmentation, contamination	In considering the significance of project lifetime effects in relation to fragmentation and potential contamination, the inter-related effects are unlikely to exceed those assessed for individual phases, particularly construction, assuming that all proposed mitigation set out is implemented. Decommissioning effects, given the timeframe intervening, will also be unlikely to have significant inter-related effects above those identified for construction phase, although the ecological baseline at that time will require careful review to ensure that receptors currently identified are still relevant at that time.	
Potential impacts of disturbance to habitats utilised by protected or otherwise notable species or injuries to individuals	Considering the project lifetime effects on protected or otherwise notable species, assuming that all proposed mitigation set out is implemented, it is unlikely that these will exceed the significance of effects identified for individual phases of the scheme. Those identified for construction phase are likely to represent the most significant effects, with little additional effect to be expected during the operational phase. Decommissioning effects are also unlikely to exceed those identified for construction, although the ecological baseline at that time will require careful review to ensure that receptors currently identified are still relevant at that time.	
<b>Receptor-led Effects</b>		
The potential for receptor-led effects associated with elements from other disciplines on the onshore ecology and nature conservation would be a result of impacts such as habitat effects from issues such as spills/contamination during all phases, construction air contamination and or noise disturbance. Changes to habitats as a possible result of changes to water regime resulting from the Proposed Development are unlikely, although changes over time resulting from climate change may occur. Effects on onshore ecology and nature conservation are considered within Volume 2, Chapter 1: Onshore Ecology and Nature Conservation of the ES.		

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Description of Impact	Likely significant inter-related effects	Significance
<p>Effects on the hydrological regime are also assessed in Volume 2, Chapter 3, Hydrology and Flood Risk of the ES, and other potential effects on ground conditions are assessed in Volume 2, Chapter 4, Hydrogeology, Geology and Ground Conditions of the ES. Similarly, effects on air quality and potential disturbance are addressed in Volume 2, Chapter 7, Air Quality and Volume 2, Chapter 6, Noise and Vibration respectively of the ES. These have bearing on potential effects on designated sites such as the Taw-Torridge Estuary SSSI, which lies downstream of the Proposed Development, or other locally-designated sites which lie close to the Proposed Development and which could be affected by water or airborne contamination issues.</p> <p>Positive effects such as those associated with habitat creation necessary for species mitigation are set out in this chapter and also detailed in Volume 4, Chapter 2: Landscape, Seascape and Visual Resources of the ES.</p> <p>Assuming that mitigation measures set out in the various chapters above are implemented, it is unlikely that the significance of inter-related receptor-led effects would increase over that which has already been reported in the individual chapters. Therefore there is no change from the inter-related assessment of receptor-led effects.</p>		

**Table 5.7: Historic environment – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<p><b>Project Lifetime Effects</b></p>		
<p>Loss of, or damage to, buried archaeological remains and deposits of geoarchaeological and palaeoenvironmental interest.</p>	<p>Potential effects arising from impacts on buried archaeological remains and deposits of geoarchaeological and palaeoenvironmental interest could occur during the construction phase. However, the assessment does not identify potential effects on these resources during the operation and maintenance phase. There is potential for impacts on buried archaeological remains and deposits of geoarchaeological and palaeoenvironmental interest during the decommissioning phase but this is unlikely as decommissioning should be within the same footprint as construction and therefore all buried archaeological remains and deposits of geoarchaeological and palaeoenvironmental interest would have already been dealt with. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.</p>	<p>The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment</p>
<p>Change within the settings of designated heritage assets</p>	<p>Potential effects on designated heritage assets resulting from change within their settings could occur during construction, operation and maintenance and decommissioning. However, this only applies to heritage assets that have some level of intervisibility with one or both of the converter stations. This is a relatively small number of assets and therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group that are larger than the effects assessment within any individual phase.</p>	



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Description of Impact	Likely significant inter-related effects	Significance
Change to the character of the historic landscape	Potential effects on the character of the historic landscape could occur during all three phases, with greatest change likely to be in the area of the converter stations. However, there are no historic landscape areas with a value greater than low value, and it is considered that there is no potential for project lifetime effects to occur on this receptor group that are larger than the effects assessment within any individual phase.	
<b>Receptor-led Effects</b>		
<p>There are potential receptor led effects associated with the potential visual impacts and changes in setting of designated built heritage assets. These are assessed within Volume 3, Chapter 5: Historic Environment of the ES, including the use of the Zone of Theoretical Visibility determined as part of Volume 4, Chapter 2: Landscape, Seascape and Visual Resources of the ES to inform the historic environment study area. There are also potential receptor led effects associated with noise emissions that occur within the settings of designated built heritage assets. Tertiary mitigation is proposed to ensure suitable management of noise emissions, during construction and operation and maintenance, such that the significant impacts to the built heritage assets do not occur.</p> <p>For the receptor led effects, overall, it is unlikely that receptors would experience increased significance of inter-related effects than that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from inter-related assessment.</p>		

**Table 5.8: Hydrology and flood risk – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Contamination of groundwater (including aquifers) from polluted surface water	There is potential for receptor led effects between groundwater (including aquifers) and surface water. Contaminated surface water associated with construction, operation and maintenance and decommissioning activities has the potential to enter and contaminate groundwater receptors (including aquifers). Due to embedded measures included as part of the project design required to meet legislative requirements, it is unlikely that receptors would experience increase significance of inter-related effects that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change result from the inter-related assessment.	The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment.
Contamination of surface waters from polluted groundwater	There is a potential for receptor led effects between surface water and groundwater. Contaminated groundwater associated with construction and decommissioning activities has the potential to enter and contaminate surface water receptors.	

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Description of Impact	Likely significant inter-related effects	Significance
	<p>Due to embedded measures included as part of the project design required to meet legislative requirements, it is unlikely that receptors would experience increase significance of inter-related effects that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change result from the inter-related assessment.</p>	
<p>Contamination of habitats and detrimental effects to ecology from polluted surface waters</p>	<p>There is a potential for receptor led effects between surface water and habitat and species. Contaminated runoff associated with construction and decommissioning activities has the potential to enter and contaminate surface water receptors which can serve as a habitat for species.</p> <p>Due to embedded measures included as part of the project design required to meet legislative requirements, it is unlikely that receptors would experience increase significance of inter-related effects that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change result from the inter-related assessment.</p>	
<p><b>Receptor-led Effects</b></p>		
<p>There is potential for receptor led effects between possible groundwater contamination and surface water hydrology, especially in relation to the watercourse crossings via Horizontal Directional Drilling (HDD) or other trenchless techniques. Mitigation is proposed to ensure that contamination of groundwater does not occur. This is addressed in Volume 2, Chapter 4: Geology, Hydrogeology and Ground Conditions of the ES. There are also potential effects associated with ecology and potential pollution of watercourses during construction and this is addressed in Volume 2, Chapter 1: Onshore Ecology and Nature Conservation of the ES.</p> <p>There is also the potential receptor led effects associated with possible contamination or spillages and pollution of watercourses and therefore, water quality, including those potentially used as potable source, during construction. This is addressed in Volume 4, Chapter 4: Human Health of the ES.</p> <p>There is the potential for receptor led effects between dust emissions and surface water hydrology during construction. Tertiary mitigation is proposed to ensure suitable management of dust, such that the impacts to the quality of surface water receptors do not occur. This is addressed in Volume 2, Chapter 7: Air Quality of the ES.</p> <p>Overall, it is unlikely that receptors would experience increased significance of inter-related effects than that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from the inter-related assessment.</p>		

**Table 5.9: Geology, hydrogeology and ground conditions – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Impacts to geological designated sites, land/soil contamination.	Geological designated sites and any existing land contamination would only be impacted during the construction phase and therefore there is no potential for project lifetime effects to occur on this receptor group.	The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment.
Impacts on groundwater, including aquifers.	Potential effects on aquifers, groundwater quality and flow during the construction, operation and maintenance and decommissioning phases. However, it is not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase.	
<b>Receptor-led Effects</b>		
<p>There is potential for receptor led effects between possible groundwater contamination and surface water hydrology, especially in relation to the HDD (or other trenchless technology) proposed in proximity to the River Torridge and the adjacent potential contamination. There is also the potential for receptor led effects between groundwater dependent habitats or sites designated for conservation and possible groundwater contamination. Secondary mitigation is proposed to ensure that contamination of groundwater does not occur. This is addressed in Volume 2, Chapter 4: Geology, Hydrogeology and Ground Conditions of the ES and Volume 2, Chapter 3: Hydrology and Flood Risk of the ES.</p> <p>There is potential for receptor led effects between historical contamination disturbance or spillages and land use and soil, especially in relation to human health receptors. However, mitigation proposed as part of the Onshore Construction Environmental Management Plan(s) (On-CEMP(s)), statutory health and safety requirements and measures to secure construction areas will ensure that contamination will not affect human health receptors. This is assessed in Volume 4, Chapter 4: Human Health of the ES.</p> <p>For the receptor led effects, overall, it is unlikely that receptors would experience increased significance of inter-related effects than that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from the inter-related assessment.</p>		

**Table 5.10: Traffic and transport – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Effects on people associated with driver delay (including temporary delays to public transport services), pedestrian delay, pedestrian amenity and community severance.	These effects will be caused by construction works or construction traffic using the local road network and strategic road network and therefore are confined to this phase. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group. Whilst effects from decommissioning have been scoped out of the assessment for traffic and transport, the timescales of construction and decommissioning would be temporally separated.	No change resulting from inter-related assessment.
<b>Receptor-led Effects</b>		
Receptors include people that are living in and using facilities and using transport networks. There is potential for inter-related effects from transport with noise and vibration (Volume 2, Chapter 6: Noise and Vibration of the ES), air quality (Volume 2, Chapter 7: Air Quality of the ES), recreational resources (Volume 2, Chapter 8: Land Use and Recreation of the ES) and human health (Volume 4, Chapter 4: Human Health of the ES).		

**Table 5.11: Noise and vibration – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Noise and vibration impacts due to the Onshore HVDC Cable Corridor landward of the transition joint bay.	Effects on human receptors from noise associated with the construction activities would be temporally separate to the decommissioning activities. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	No change resulting from inter-related assessment.
The impact of noise generated by additional vehicle movements on the local highway network during the construction and decommissioning phases for the Proposed Development on human receptors.	Effects on human receptors from noise generated by additional vehicle movements would be temporally separate to the decommissioning activities. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	
The impact of noise generated during operation and maintenance of the converter stations on human receptors.	Effects on human receptors generated by noise during operation and maintenance of the converter stations would be confined to the operation and maintenance phase. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	

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Description of Impact	Likely significant inter-related effects	Significance
<b>Receptor-led Effects</b>		
<p>There are potential inter-related effects on ecological habitats and species due to disturbance from noise and vibration associated with construction activities. The inter-related effects to ecology of noise and vibration, particularly in relation to disturbance, are considered in Volume 2, Chapter 1: Onshore Ecology and Nature Conservation of the ES. There are also potential effects on human health in areas where HDD is required since loud equipment may be required to operate at night-time. Receptors exposed to high noise levels unmitigated may be subjected to sleep disturbance and increased stress. Further details of the effects on health are set out in Volume 4, Chapter 4: Human Health of the ES. Also, inter-related effects on the setting of heritage features due to disturbance from noise and vibration associated with construction activities. The inter-related effects of noise and vibration with historic environment are considered in Volume 2, Chapter 2: Historic Environment of the ES.</p>		

**Table 5.12: Air quality – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
The impact of dust soiling (annoyance) on property arising from dust emissions generated by onsite construction and decommissioning activities.	The potential impacts of dust soiling during the operation and maintenance phase of the Proposed Development were scoped out of the assessment on the basis that they were unlikely to be significant. Following the implementation of measures adopted as part of the Proposed Development, project lifetime effects would be no greater than those experienced during the construction phase (i.e. negligible). Therefore, it is considered that project lifetime effects of the Proposed Development on humans will be negligible, which is not significant in EIA terms	The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment.
The impact of an increase in suspended particulate matter on people arising from dust emissions generated by onsite construction and decommissioning activities.	The potential impacts of suspended particulate matter on people during the operation and maintenance phase of the Proposed Development were scoped out of the assessment on the basis that they were unlikely to be significant. Following the implementation of measures adopted as part of the Proposed Development project lifetime effects would be no greater than those experienced during the construction phase (i.e., negligible). Therefore, it is considered that project lifetime effects of the Proposed Development on humans will be negligible, which is not significant in EIA terms	
The impact of an increase in suspended particulate matter on ecology arising from dust emissions	The potential impacts of suspended particulate matter on ecology during the operation and maintenance phase of the Proposed Development were scoped out of the assessment on the basis that they were unlikely to be significant. Following the	

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Description of Impact	Likely significant inter-related effects	Significance
generated by onsite construction and decommissioning activities.	implementation of measures adopted as part of the Proposed Development, project lifetime effects would be no greater than those experienced during the construction phase (i.e. negligible). Therefore, it is considered that project lifetime effects of the Proposed Development on ecology will be negligible, which is not significant in EIA terms	
<b>Receptor-led Effects</b>		
Dust generated during the construction phase will also affect human receptors that are also likely to experience increased noise and traffic levels. However, embedded mitigation is proposed to ensure suitable management of emissions to air during construction. This is assessed in Volume 4, Chapter 4: Human Health of the ES. Ecological receptors will also be affected by dust and there is the potential for inter-related effects with ecology (Volume 2, Chapter 1: Onshore Ecology and Nature Conservation of the ES) and hydrology (Volume 2, Chapter 3: Hydrology and Flood Risk of the ES). Mitigation measures to reduce the dust impact to a level that it not significant will be implemented as documented in the Outline On-CEMP (document reference 7.7). Noise and traffic will also be managed through the Outline On-CEMP so the inter-related effects are considered to remain not significant. For the receptor led effects, overall, it is unlikely that receptors would experience increased significance of inter-related effects than that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from the inter-related assessment.		

**Table 5.13: Land use and recreation – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
The temporary and permanent loss of agricultural land including Best and Most Versatile.	The agricultural land holdings considered in the assessment would be potentially affected at the construction stage only, with the exception of areas associated with the converter stations, joint bays and link boxes that would be affected during both construction and decommissioning. However, these would be temporally separate. Furthermore, these are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	No change resulting from inter-related assessment.
Temporary and permanent disruption to agricultural land holdings.		

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Description of Impact	Likely significant inter-related effects	Significance
Temporary and permanent disruption to the recreational use of recreational resources (coastal areas, Access Land, open greenspace, Coastal Path, other Public Rights of Way (PRoW), recreational resources).	The recreational receptors considered in the assessment would be potentially affected at the construction stage only with the exception of other PRoW that would be affected during both construction and decommissioning. However, these would be temporally separate. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	
<b>Receptor-led Effects</b>		
Potential receptor led effects are those affecting the amenity of recreational resources as a result of changes to the visual and acoustic environments arising from the construction, operation and maintenance and decommissioning of the Proposed Development. These are assessed, where relevant, in Volume 4, Chapter 2: Landscape, Seascape and Visual Resources and Volume 2, Chapter 6: Noise and Vibration of the ES. The potential effects arising from the Proposed Development on tourism are considered in Volume 4, Chapter 3: Socio-economics of the ES.		

**Table 5.14: Benthic ecology - summary of likely significant inter-related effects**

Description of Impact	Phase <sup>a</sup>					Likely significant inter-related effects	Significance
	C	Op	O repair	D In- situ	D removal		
Temporary habitat loss/disturbance	Yes	No	Yes	No	Yes	The construction, operation and decommissioning phases are significantly separate temporally such that there will be no interaction between them. As a result, the effects across the Proposed Development lifetime on benthic ecology receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments for each individual phase.	Not Significant
Temporary increase in suspended sediments and sediment deposition	Yes	No	Yes	No	Yes		Not Significant
Changes to water quality (release of hazardous substances from sediments)	Yes	No	Yes	No	Yes		Not Significant
Introduction and spread of INNS	Yes	No	Yes	Yes	Yes		Not Significant
Underwater noise & vibration	Yes	No	No	No	No		Not Significant

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Description of Impact	Phase <sup>a</sup>					Likely significant inter-related effects	Significance
	C	Op	O repair	D <i>In-situ</i>	D removal		
Change in hydrodynamic regime (scour & accretion)	No	Yes	No	No	Yes		Not Significant
Sediment heating	No	Yes	No	No	No		Not Significant
Electromagnetic Fields (EMF)	No	Yes	No	No	No		Not Significant
Long-term habitat loss/change	No	Yes	No	Yes	No		Not Significant
Accidental pollution	Yes	No	Yes	Yes	Yes		Not Significant
<b>Receptor-led Effects</b>							
Receptor-led effects are most likely to occur during the construction phase, whereby multiple impacts may occur simultaneously. Receptor-led effects could occur if a particular benthic receptor was influenced by multiple impacts (e.g. temporary habitat loss/disturbance and temporary increase in suspended sediments and sediment deposition). However, these impacts are of such low magnitude, that it is not anticipated that any inter-related effects will be produced that are of greater significance than the assessments presented for each individual impact.							

**Table 5.15: Fish and shellfish ecology – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Temporary habitat loss/disturbance	In large part the construction, operation and decommissioning activities are significantly separate temporally such that there will be no interaction of effects on fish and shellfish receptors between them.  The exception will be where bipole/bundle 1 (and associated rock protection etc) is in place at the same time as bipole/bundle 2 is still under construction. Given the separation distance and the different foci of construction and operational impacts, there are not anticipated to be any significant inter-related effects (or impacts of greater significance than the assessments for each individual phase).	Not significant
Temporary increase in suspended sediments and deposition		Not significant
Injury and disturbance for underwater noise and vibration		Not significant
Collision risk to basking sharks from increased vessel activity		Not significant
Changes to water quality from resuspension of sediments		Not significant
Changes to water quality as a result of accidental pollution		Not significant



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Description of Impact	Likely significant inter-related effects	Significance
Introduction of invasive non-native species		Not significant
Change in hydrodynamic regime		Not significant
EMF effects		Not significant
Sediment heating		Not significant
<b>Receptor-led Effects</b>		
<p>Receptor led effects are most likely to occur during the construction phase, whereby multiple impacts may occur simultaneously (e.g. Temporary habitat loss/disturbance, Injury and disturbance for underwater noise and vibration and Temporary increase in suspended sediments and deposition will occur at the same time). However, these impacts will tend to affect IEFs differently (e.g. Nephrops are vulnerable to habitat loss but are not vulnerable to increased suspended sediments) and / or have minimal additive impact effect. Therefore, it is not anticipated that any inter-related effects will be produced that are of greater significance than the assessments presented for each individual phase.</p> <p>Some of these interactions are mutually exclusive (e.g. Injury and disturbance for underwater noise and vibration will mean reduced potential for collision risk with basking sharks).</p>		

**Table 5.16: Commercial Fisheries – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Reduction in access to, or exclusion from established fishing grounds	Across the Proposed Development lifetime, the effects on commercial fisheries are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase.	Not significant
Displacement leading to gear conflict and increased fishing pressure on adjacent grounds		
Displacement or disruption of commercially important fish and shellfish resources		
Increased vessel traffic associated with the Proposed Development within fishing grounds leading to interference with fishing activity		

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Description of Impact	Likely significant inter-related effects	Significance
Physical presence of infrastructure leading to gear snagging		
<b>Receptor-led Effects</b>		
An inter-related receptor led effect may occur from the combination of the reduction in access to fishing grounds and the subsequent displacement and increased pressure on adjacent grounds. While these two affects may act together, it is considered that any inter-related effect will not be of any greater significance than those already assessed in isolation		

**Table 5.17: Marine mammals and turtles - summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Injury and temporary changes in hearing from anthropogenic noise	The impacts of Permanent Threshold Shift (PTS) on marine mammals and PTS and Temporary Threshold Shift on sea turtles will be mainly caused by underwater noise from ground preparation activities, trenching works and rock placement during the construction phase and removal of structures in the decommissioning phase (assuming the cable is not de-energised and left <i>in-situ</i> ). The construction and decommissioning phases are significantly separate temporally such that there will be no interaction between the two. As a result, the effects across the Proposed Development lifetime on marine mammal and sea turtle receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments for each individual phase. Any operational-repair activities are, in this context, considered suitably unlikely, or intermittent, that no inter-related effects are predicted.	No change resulting from interrelated assessment (compared to assessment of effects in isolation)
Disturbance from anthropogenic noise	Disturbance to marine mammals and sea turtles will be mainly caused by underwater noise from ground preparation activities, trenching works and rock placement during the construction phase and removal of structures in the decommissioning phase (assuming the cable is not de-energised and left <i>in-situ</i> ). The construction and decommissioning phases are significantly separate temporally such that there will be no interaction between the two. As a result, the effects across the Proposed Development lifetime on marine mammal and sea turtle receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments for each individual phase. Any operational-repair activities are, in this context, considered suitably unlikely, or intermittent, that no inter-related effects are predicted.	
Increased vessel disturbance	The potential for disturbance effects to marine mammals and sea turtles will arise during the construction, operation and maintenance and decommissioning phase (assuming	

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Description of Impact	Likely significant inter-related effects	Significance
	<p>the cable is not deenergised and left <i>in-situ</i>). The construction and decommissioning phases are significantly separate temporally such that there will be no interaction between the two. With implementation of a Navigational Safety and Vessel Management Plan (NSVMP), impacts from vessel activity are assessed as minor and therefore, not significant across the relevant phases. As a result, the effects across the Proposed Development lifetime are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments for each individual phase. Any operational-repair activities are, in this context, considered suitably unlikely, or intermittent, that no inter-related effects are predicted.</p>	
Vessel collision risk	<p>The potential for vessel collision risk impacts on marine mammals and sea turtles will arise during the construction and decommissioning phase (assuming the cable is not deenergised and left <i>in-situ</i>). The construction and decommissioning phases are significantly separate temporally such that there will be no interaction between the two. With implementation of a NSVMP, impacts from vessel activity are assessed as minor and therefore, not significant across the relevant phases. As a result, the effects across the Proposed Development lifetime are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments for each individual phase. Any operational-repair activities are, in this context, considered suitably unlikely, or intermittent, that no inter-related effects are predicted.</p>	
Indirect effects on prey species	<p>The potential impact of indirect effects on marine mammals and sea turtles via effects on prey species will primarily arise during the construction and decommissioning phase (assuming the cable is not deenergised and left <i>in-situ</i>). The construction and decommissioning phases are significantly separate temporally such that there will be no interaction between the two. As a result, the effects across the Proposed Development lifetime on marine mammal and sea turtle receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments for each individual phase. Any operational-repair activities are, in this context, considered suitably unlikely, or intermittent, that no inter-related effects are predicted.</p>	
<b>Receptor-led Effects</b>		
<p>Inter-related effects from the combination of Injury and temporary changes in hearing from anthropogenic noise impacts, disturbance from underwater noise, the presence of vessels and loss of prey resources on marine mammals – The greatest potential for spatial and temporal interactions is likely to occur with underwater construction noise impacts (i.e. during the construction phase). It is noted that some of these interactions are mutually exclusive (i.e. disturbance/displacement resulting from underwater noise will mean reduced potential for vessel interactions). It is therefore not anticipated that any inter-related effects will be produced that are of greater significance than the assessments presented for each individual phase/impact. The assessment of potential effects on marine mammals presented in this ES chapter already considers pathways for impact described e.g. in Volume 3, Chapter 8: Physical Processes of the ES and Volume 3, Appendix 4.1: Underwater Noise Technical Assessment of the ES.</p>		

**Table 5.18: Shipping and navigation – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Collision of a passing third-party vessel with a vessel associated with cable installation, maintenance or decommissioning.	Across the Proposed Development lifetime, the effects on Shipping and Navigation receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase, as installation, maintenance and decommissioning works are not expected to overlap and any effects on shipping and navigation are considered to be short term and only during the specified works. This includes no additional inter-related effects from the concurrent operational-normal and operational-repair phases.	No change resulting from inter-related assessment (compared to assessment of effects in isolation).
Cable installation/decommissioning causing disruption to passing vessel routing/timetables.		
Increase in the risk of a vessel-to-vessel collision due to cable installation, maintenance or decommissioning.		
Cable installation/decommissioning causing disruption to fishing and recreational activities.		
Cable installation/ decommissioning causing disruption to third party marine activities (e.g., military, dredging)		
Reduced access to local ports/harbours		
Anchor interaction with the cable		
A vessel engaged in fishing snags its gear on the cable		
Reduction in under keel clearance from laid cable associated protection		
Interference with marine navigational equipment		
<b>Receptor-led Effects</b>		
The potential displacement of commercial fishing vessels from fishing grounds may lead to an increase in collision risk between third party vessels. However, as these effects are already assessed within the Shipping and Navigation assessment, they are not anticipated to interact in such a way to result		

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Description of Impact	Likely significant inter-related effects	Significance
in combined effects of greater significance than the assessments presented in the individual receptor assessments (Volume 3, Chapter 3: Commercial Fisheries of the ES).		

**Table 5.19: Other Marine Users (OMU) – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Access to Military PEXAs	During the construction, operation and maintenance (repair), and decommissioning-removal phases of the Proposed Development, safe passing zones will be used, and therefore the areas from which Ministry of Defence (MoD) activities can occur may potentially be constrained, but highly localised (there are no baseline restrictions on vessel movements associated with the MoD areas). MoD activity is able to continue operating during the Operational and maintenance phase, effects on OMU receptors across the phases are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each phase.	Minor adverse during construction, operation and maintenance and decommissioning phases
Displacement or disruption of recreationally important fish and shellfish resources	Proposed Development lifetime inter-related effects are unlikely as the majority of sediment disturbance (resulting in highest Suspended Sediment Concentration / deposition) will be during the construction and decommissioning (removal) phases with minimal disturbance likely during the operational and maintenance phase, primarily occurring during repair activities. Impacts to fish will be at their maximum during the construction phase as a result of (any) effects associated with underwater noise and resuspension of suspended sediments from seabed clearance and cable burial. Across the Proposed Development lifetime, the effects on recreational fishing are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each phase. Impacts on fish and shellfish has been carried out in Volume 3, Chapter 2: Fish and Shellfish Ecology of the ES, impacts to commercial fisheries has been undertaken in Volume 3, Chapter 3: Commercial Fisheries of the ES and impacts on socio-economics has been undertaken in Volume 4, Chapter 3: Socio-Economics and Tourism of the ES.	Minor adverse during construction, operation and maintenance and decommissioning phases.

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Description of Impact	Likely significant inter-related effects	Significance
Increased vessel traffic within recreational areas as a result of changes to shipping routes and construction vessel traffic leading to interference with recreational activity.	With the successful implementation of measures adopted for this development (i.e. issue Notice to Mariners and Vessel Management Plan), no likely significant effects are predicted for the construction, operational and maintenance, and decommissioning phases of the Proposed Development. The majority of vessel traffic (resulting in interference with recreational activities) is predicted to peak during construction and decommissioning with reduced potential for interference during operational and maintenance phase, with impacts limited to repair activities. Therefore, across the Proposed Development lifetime, the effects on recreational areas are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each phase. Impacts to shipping and navigation has been carried out in Volume 3, Chapter 5: Shipping and Navigation of the ES.	Minor adverse during construction, operation and maintenance and decommissioning phases.
<b>Receptor-led Effects</b>		
Inter-related effects from the combination of impacts from different activities on the same OMU receptors have been considered. The maximum design scenario promotes a generally precautionary approach throughout. The linear nature of the Proposed Development will also tend to separate individually distinct and temporary (phased) activities (rather than layer impacts together). It is not anticipated that any inter-related effects on OMU receptors will be produced that are of greater significance than the assessments presented for each individual activity.		

**Table 5.20: Marine archaeology and cultural heritage – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
None identified	N/A. Mitigation strategies are designed to where possible avoid impacts through use of e.g. Archaeological Exclusion Zone. Individual impact avoidance (rather than reduction to significance) means that there is limited potential for inter-related effects over the course of the project lifetime.	N/A
<b>Receptor-led Effects</b>		
Loss or damage to marine heritage receptors of high importance discovered during the project from other marine users has the potential to degrade the receptor through salvage activity or looting once the discovery is made public.		

**Table 5.21: Physical processes - summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Sediment disturbance or Seabed Change	<p>During the construction, operation and maintenance (repair), and decommissioning phases of the Proposed Development, activities will not occur simultaneously (i.e. assumed construction will be complete before maintenance activities are required). Therefore, there is not expected to be a combined effect of greater significance than already presented within the assessments presented for each individual Proposed Development phase.</p> <p>There will be no change resulting from inter-related assessment (compared to assessment of effects in isolation – see Volume 3, Chapter 8: Physical Processes of the ES).</p>	Not Significant.
Changes to Water Quality		
Scour/ Secondary scour		
<b>Receptor-led Effects</b>		
<p>Sediment disturbance or seabed change is also considered within Volume 3, Chapter 1: Benthic Ecology, Volume 3, Chapter 2: Fish, and Volume 3, Chapter 7: Marine Archaeology and Cultural Heritage of the ES, with regards to likely effects on e.g. designated habitats and heritage assets. These chapters draw on the assessment work completed within the Physical Processes assessments (refer to Volume 3, Appendix 8.1 High Level Assessment of Sediment Disturbance of the ES) and already incorporate inherent inter-related considerations.</p> <p>Water quality is also considered within e.g. Volume 3, Chapter 1: Benthic Ecology and Volume 3, Chapter 2: Fish and Shellfish of the ES, with regards to likely effects on e.g. designated habitats. These chapters draw upon the assessment work completed within the Physical Processes assessments (including Volume 3, Appendix 8.1 High Level Assessment of Sediment Disturbance of the ES) and already incorporate inherent inter-related considerations.</p>		

**Table 5.22: Offshore ornithology - summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Visual and Noise disturbance	Potential ornithological impacts are principally related to vessel movements and the different phase activities will largely be separated temporally, such that there will be no interaction of effects across different phases.	Negligible
Indirect impacts via loss/disturbance to habitats and prey		
Pollution incidents		
<b>Receptor-led Effects</b>		
The scale of each individual impact on birds and lack of any clear dependencies means there will be no receptor-led effects. Indirect impacts on habitats and prey have been assessed in Volume 3, Chapter 9: Offshore Ornithology of the ES.		

**Table 5.23: Climate change – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
The impact of Greenhouse Gas (GHG) emissions arising from the manufacturing and installation of the Proposed Development	These effects will only occur during one phase (construction) therefore there would be no change over the three phases.	No change resulting from inter-related assessment.
The impact of GHG emissions arising from the consumption of materials and activities required to facilitate the operation and maintenance of the Proposed Development.	These effects will only occur during one phase (construction) therefore there would be no change over the three phases.	
The impact of GHG emissions arising from land use change during the construction, operation and maintenance and decommissioning phases.	Negligible effects are identified for each phase and with the phases together but would be temporally separate to the for each of the phases. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	
The impact of GHG emissions arising from decommissioning works (e.g., plant, fuel and vessel use) and the recovery (or disposal) of materials.	These effects will only occur during one phase (decommissioning) therefore there would be no change over the three phases.	



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Description of Impact	Likely significant inter-related effects	Significance
The impact of climate change on the Proposed Development	Negligible effects are identified for the construction, operation and maintenance and decommissioning phases, but these would be temporally separate for each of the phases. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	
<b>Receptor-led Effects</b>		
<p>There are potential inter-related effects with receptors for hydrology and flood risk, geology, hydrogeology and ground conditions, onshore ecology and nature conservation, noise and vibration, landscape, seascape and visual resources, and marine archaeology and cultural heritage.</p> <ul style="list-style-type: none"> <li>• The assessment of flood risk, including increases in rainfall rates due to climate change, has been addressed in Volume 2, Chapter 3: Hydrology and Flood Risk of the ES, ensuring the drainage design is able to accommodate increasing volumes of surface water runoff associated with the effects of climate change. As such, there will be no change in the reported significance of effect when assessed in-combination with climate impacts.</li> <li>• The assessment of Volume 2, Chapter 4: Geology, Hydrogeology and Ground Conditions of the ES considers the potential impact of climate change on the mobilisation of contaminants due to increased intensity of extreme precipitation events and increased rainfall during the wettest months. However, best practice measures will be detailed within an On-CEMP to manage any environmental risks during construction (e.g. appropriate handling and storage of materials). As such, there will be no change in the reported significance of effect when assessed in-combination with climate impacts.</li> <li>• The assessments of Volume 2, Chapter 1: Onshore Ecology and Nature Conservation of the ES and Volume 4, Chapter 2: Landscape, Seascape and Visual Resources of the ES consider future climate projections when determining appropriate mitigation measures to be implemented to manage the visual and ecological effects of the Proposed Development. When developing detailed mitigation, climate resilient plant species will be specified in order to ensure the success of the planned mitigation over the Proposed Development's lifetime. Such species will be detailed within the Landscape and Ecology Management Plan (LEMP), which will be developed in accordance with the Outline LEMP (document reference 7.10). As such, there will be no change in the reported significance of effect when assessed in-combination with climate impacts.</li> <li>• The assessment of Volume 3, Chapter 7: Marine Archaeology and Cultural Heritage of the ES considers the potential impact of climate change on the indirect disturbance of archaeological assets from scour due to more intense physical and chemical processes. The predicted scale of potential scour associated with Operational Phase structures (Volume 3, Chapter 8: Physical Processes of the ES) is very small. There are no other anticipated Operational phase pathways for potential impact on UCH receptors that might have an inter-related effect with climate change impacts. The Proposed Development includes mitigation measures to minimise potential direct and indirect disturbance including micro-routing measures to avoid known sites of archaeological significance and preservation by recording remains prior to, during, or after impact. Detailed archaeological review of geophysical survey data and borehole cores has informed the ES assessment and the Outline Offshore Archaeological Written Scheme of Investigation (which is presented as Volume 3, Appendix 7.5 of the ES) sets out the framework for appropriate and considerate offshore working with respect to marine archaeology. Therefore, there will be no change in the reported significance of effect when assessed in-combination with climate impacts.</li> </ul> <p>Therefore, for the receptor led effects, overall, it is unlikely that receptors would experience increased significance of inter-related effects than that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from the inter-related assessment.</p>		

**Table 5.24: Landscape, seascape and visual resources – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Landscape impacts - potential change to landscape character.	<p>The potential effect is directly in relation to the scale and size of development proposed, the geographic extent of impact, and the distance and context factors in relation to the receptor. The scale of potential effects on landscape character is likely to be high in relation to the converter stations and substation themselves and diminishing with distance from the Converter Site and Alverdiscott Substation Site (cumulatively). The scale of effects will also increase through the construction phase due to the nature of the impact and the increased land required for temporary construction compounds, reduce during operation and maintenance (e.g. due to planting proposals), decreasing further through the decommissioning phase.</p> <p>Although this indicates that there is a potential lengthening of the temporal effect, across the project lifetime, the effects on landscape character resources are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase.</p>	No change resulting from inter-related assessment.
<b>Receptor-led Effects</b>		
<p>There are inter-relationships with receptors for the historic environment, ecology and recreation. Whilst the assessment of effects on character includes land that contains heritage assets, effects on heritage assets and their context and settings are considered within Volume 2, Chapter 2: Historic Environment of the ES. The assessment of effects on character includes land that contains ecological assets effects on flora and fauna within habitats and is considered within Volume 2, Chapter 1: Onshore Ecology and Nature Conservation of the ES. The construction and operation of the Converter Site will change the existing farmland, resulting in some temporary and some long-term loss of features such as hedgerows, ditches and trees which have ecological value. The impacts will result in some localised major adverse effects on landscape character, which is significant. Therefore, the significance of these combined effects on visual receptors will not be of any greater significance than the effects when assessed in isolation.</p> <p>Whilst the assessment of effects on visual receptors includes people using recreational assets, effects on public open space and public rights of way (which are primarily during construction and decommissioning) are considered within Volume 2, Chapter 8: Land Use and Recreation of the ES.</p>		

**Table 5.25: Socio-economics and Tourism – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Impacts on Gross Value Add (GVA)	There may be some opportunities for skills and experience gained by local contractors during the construction phase to be useful during the operational phase, therefore allowing a greater level of local impact. However, the economic	Negligible
Impacts on employment		

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Description of Impact	Likely significant inter-related effects	Significance
	opportunities during the operational phase are negligible and therefore there will be no significant effects as a result.	
Impacts on tourism sector	Visual impacts which occur in all phases of the Proposed Development have the potential to effect some tourism and recreation receptors. However, given the smaller scale of visual impacts during the operational phase and the adaptability of visitors, it is not expected these project lifetime effects will be greater than that which is assessed for each individual phase.	
Impacts on tourism and recreation assets		
<b>Receptor-led Effects</b>		
Construction, operation and maintenance and decommissioning activities may result in visual, noise, land use, or marine recreation effects on tourism and recreation receptors. There is also the potential for shipping and navigation significant effects to have economics impacts on employment and GVA. These have been considered within the socio-economics and tourism assessment and no significant effects have been identified.		

**Table 5.26: Human health – summary of likely significant inter-related effects**

Description of Impact	Likely significant inter-related effects	Significance
<b>Project Lifetime Effects</b>		
Noise impacts	Noise effects occur in all three phases. Only close to the converter stations is there the potential for the same population to be affected in all three phases. The combined effect is not considered to be on a scale to significantly affect population health.	No change resulting from inter-related assessment.
<b>Receptor-led Effects</b>		
Transport modes, access and connections; Open space, leisure and play; Housing; Air quality; Water quality; Land quality; Noise and vibration; Health and social care services; Public understanding of risk; and Wider societal infrastructure and resources.	At the site-specific level, during construction and decommissioning the same populations would experience temporary changes in air quality, noise, recreation, water quality, land quality and transport. These populations may also experience pressures on housing and healthcare associated with the Proposed Development workforces.  During operation these populations would benefit from improved energy security, although some people may have concerns about EMF exposures.  At a population level it is not expected that the combination of effects would interact in a way that would reinforce health outcomes or exacerbate health inequalities on a scale to affect public health. No new or materially different population health effects are therefore likely.	No change

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Description of Impact	Likely significant inter-related effects	Significance
<p>Transport modes, access and connections;                      Open space, leisure and play;                      Housing;                      Air quality;                      Noise and vibration;                      Health and social care services;                      Public understanding of risk; and                      Wider societal infrastructure and resources.</p>	<p>At the local level, during the same populations would experience temporary construction and decommissioning vehicle related changes in air quality, noise and transport on the wider highway network. These populations may also experience recreation effects associate with long-distance routes and pressures on housing and healthcare associated with the Proposed Development workforces.</p> <p>During operation these populations would benefit from improved energy security, although some people may have concerns about EMF exposures, such effects not being geographically bounded.</p> <p>At a population level it is not expected that the combination of effects would interact in a way that would reinforce health outcomes or exacerbate health inequalities on a scale to affect public health. No new or materially different population health effects are therefore likely.</p>	<p>No change.</p>

## **5.7 Conclusion**

- 5.7.1 The tables presented within this chapter of the ES provide the assessment of potential inter-related effects (both project lifetime and receptor-led effects) arising from the Proposed Development on a range of receptor groups.
- 5.7.2 Following the implementation of mitigation measures adopted as part of the project and further mitigation (if required), project lifetime effects arising during the construction, operation and maintenance, and decommissioning phases of the Proposed Development are unlikely to result in effects of greater significance than those reported individually in the ES.
- 5.7.3 For receptor-led effects, overall, it is unlikely that receptors would experience increased significance of inter-related effects than that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change in significance resulting from the inter-related assessment.

## **5.8 References**

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