

**The Great Grid Upgrade**

Eastern Green Link 5 (EGL 5)

# Preliminary Environmental Information Report

Volume 2

Part 1

Appendix 2.C Habitats Regulations Assessment (HRA)  
Stage 1 Screening Report

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nationalgrid

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## Annex A: List of Relevant Marine Mammal Transboundary European Sites

## Abbreviations

<b>Term</b>	<b>Definition</b>
AA	Appropriate Assessment
AC	Alternating Current
AEoI	Adverse Effect on Integrity
AIL	Abnormal Indivisible Load
ALC	Agricultural Land Classification
BEIS	Department for Business, Energy & Industrial Strategy
CFE	Controlled Flow Excavator
CLB	Cable Lay Barge
CLV	Cable Lay Vessel
CoCP	Outline Code of Construction Practice
DC	Direct Current
DCO	Development Consent Order
DTS	Distributed Temperature Sensing
EC	European Commission
EDR	Effective Deterrent Range
EGL	Eastern Green Link
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
ES	Environmental Statement
EU	European Union
FCS	Favourable Conservation Status
FLL	Functionally Linked Land

<b>Term</b>	<b>Definition</b>
GIS	Geographical Information System
GNS	Greater North Sea
GW	Gigawatt
HRA	Habitats Regulations Assessment
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IAMMWG	Inter-Agency Marine Mammal Working Group
INNPS	Invasive Non-Native Plant Species
IAQM	Institute of Air Quality Management
ICG-C	Intercessional Correspondence Group on Cumulative Effects
IDP	Initial Decommissioning Plan
IROPI	Imperative Reasons of Overriding Public Interest
ISEP	Institute of Sustainability and Environmental Professionals
JNCC	Joint Nature Conservation Committee
km	Kilometre
kV	Kilovolt
LAT	Lowest Astronomical Tide
LCS-B	Lincolnshire Connection Substation B
LSE	Likely Significant Effect
MARPOL	International Convention for the Prevention of Pollution from Ships
m	Metre
MBES	Multibeam Echosounder

<b>Term</b>	<b>Definition</b>
MCAA	Marine and Coastal Access Act 2009
MHWS	Mean High Water Springs
MINNS	Marine Invasive Non-Native Species
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MU	Management Unit
NGET	National Grid Electricity Transmission plc
NM	Nautical Mile
NPWS	National Parks and Wildlife Service
NS	North Sea
NSTA	North Sea Transmission Authority
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo and Paris Convention
OWF	Offshore Wind Farm
PINS	Planning Inspectorate
PLGR	Pre-Lay Grapple Run
RIAA	Report to Inform an Appropriate Assessment
SAC	Special Area of Conservation
SACO	Supplementary Advice on Conservation Objectives
SBP	Sub-Bottom Profiler
SCI	Site of Community Importance
SNCB	Statutory Nature Conservation Body
SoS	Secretary of State

<b>Term</b>	<b>Definition</b>
SPA	Special Protection Area
SSCs	Suspended Sediment Concentrations
SSS	Side-Scan Sonar
SSSI	Site of Special Scientific Interest
TJB	Transition Joint Bay
TTS	Temporary Threshold Shift
UK	United Kingdom
UXO	Unexploded Ordnance
XLPE	Cross Linked Polyethylene
ZoI	Zone of Influence

# 1. Introduction

## 1.1 Scope of this Report

- 1.1.1 This report is provided to support the preliminary assessment of environmental effects for an intended Development Consent Order (DCO) application by National Grid Electricity Transmission plc. (NGET) (the Applicant) to the Secretary of State (SoS) for the construction and operation of the English components of Eastern Green Link (EGL) 5 (referred to as the 'Project'). As part of the DCO application process, the Planning Inspectorate (PINS) (in consultation with the Marine Management Organisation (MMO)) will examine the report, and the SoS is required to complete a Habitats Regulations Assessment (HRA) process for the Project under The Conservation of Habitats and Species Regulations 2017 (as amended) and The Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) (collectively referred to as the 'Habitats Regulations').
- 1.1.2 This report aims to support the HRA process and provide the necessary information to assist the relevant authorities in making an informed decision on the likely impact of the Project on European Sites (Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites) and their designated Annex I habitats and Annex II species. This document addresses Stage 1 of the HRA process – Screening.
- 1.1.3 The Project is not directly connected with or necessary to the management of any of the identified European Sites, therefore it is regarded as necessary that the Project should be subject to the HRA process.
- 1.1.4 Under the Habitats Regulations, the SoS must consider whether the Project will have a Likely Significant Effect (LSE) on a European site, either alone or in combination with other plans or projects. Where an LSE cannot be ruled out, an Appropriate Assessment (AA) is required to assess the implications of the Project on that European site in view of the European site's conservation objectives. If a conclusion of no LSE is reached at this Screening stage for a European site (or a specific designated feature of a European site), it is not necessary to proceed to the next stage (i.e., AA) of the HRA process.
- 1.1.5 The aim of this report is to present NGET's findings, recording the reasoning and conclusions in relation to its screening of the Project. Where it is considered that there is no potential for LSE, it is proposed that the European site (or designated feature) will be 'screened out' from further consideration in the HRA process. Where the potential for LSE is uncertain or cannot be discounted for a European site, it is proposed that the European site will remain 'screened in' and will progress to the next stage of the HRA process.
- 1.1.6 This Screening Report considers all phases of the Project; construction, operation and maintenance (including repair and maintenance) and decommissioning. All assumptions made with respect to the description of the Project are clearly outlined, and where engineering details are uncertain, available maximum design parameters have been used to provide a worst-case assessment. The methodology followed in this Screening has also had regard to UK and European Case Law on the Habitats Directive, including People Over Wind, Peter Sweetman v Coillte Teoranta (C-323/17), which established that

it is not appropriate at the Screening stage to take account of measures intended to avoid or reduce the harmful effects of the plan or project, on a European site.

## 1.2 Overview of the Project

- 1.2.1 EGL 5 is a proposed new primarily marine high voltage electricity link, with associated onshore infrastructure, between Scotland and England. This report is written with specific regard to the English components of EGL 5 i.e., where the Project falls within England or English waters. Therefore, as the Transmission Operator in England and Wales, NGET is the sole applicant for the DCO. The English components of EGL 5 i.e., those which are the subject of this report, are referred to as the 'Project'. For context purpose only, details of the entire extent of EGL 5 are outlined below.
- 1.2.2 EGL 5 is a joint venture between NGET and Scottish and Southern Electricity Network Transmission (SSEN-T). NGET is responsible for all onshore infrastructure in England, and offshore infrastructure in English waters. SSEN-T are responsible for the onshore infrastructure in Scotland and offshore infrastructure in Scottish waters.
- 1.2.3 EGL 5 comprises 2-Gigawatt (GW) High Voltage Direct Current (HVDC) system linking Peterhead, Aberdeenshire (Connecting into Netherton Hub) and Anderby Creek, Lincolnshire (connecting into Lincolnshire Connection Substation B (LCS-B) which is being consented by the Grimsby to Walpole project). The entire extent between both connection points onshore in Scotland and the connection points onshore in England, are referred to as 'EGL 5'.
- 1.2.4 EGL 5 would transport enough clean energy from Scotland to power up to two million homes in parts of the North, Midlands and South of England. By doing so, it would play an important role in building a more secure and resilient future energy system and support decarbonising the UK.
- 1.2.5 EGL 5 forms part of NGETs 'The Great Grid Upgrade', which is building the significant new electricity network infrastructure required to reduce the UK's reliance on fossil fuels by connecting 50 GW of offshore wind by 2030. The Great Grid Upgrade is the largest overhaul of the electricity grid in generations and will play a big part in the UK government's plan to boost homegrown power.
- 1.2.6 An overview of the Project is shown in **Plate 1-1** below.

## Plate 1-1 Overview of EGL 5



1.2.7 EGL 5 is split into two geographical parts, ‘the English Onshore Scheme’ and ‘the English Offshore Scheme’, collectively termed ‘the Project’. The following definitions are relevant to this report:

- “English Offshore Scheme” - All components of EGL 5 within the English marine environment up to the Mean High Water Springs (MHWS) in England.
- “English Onshore Scheme” - All components of EGL 5 between the electricity transmission connection point in England and the Mean Low Water Springs (MLWS) in England.
- “the Project” – is the term used to refer all elements of EGL 5 which are the subject of this report i.e., the English Onshore Scheme and the English Offshore Scheme. More specifically, the Project comprises the ‘Authorised’ development and ‘Associated’ development for EGL 5 that will be subject to an application for Development Consent.
- “Intertidal Zone” – The area between MLWS and MHWS where the English Offshore Scheme and English Onshore Scheme overlap and transition from subsea cables to land cables. The intertidal zone is described and primarily assessed within **PEIR Volume 1, Part 3, English Offshore Scheme**; however, appropriate references are made within the **Volume 1, Part 2, English Onshore Scheme** to ensure that both offshore and onshore considerations are taken into account to prevent duplication of assessments and reporting of potential effects.
- “EGL 5” – EGL 5 comprises a 2 GW HVDC system linking Peterhead, Aberdeenshire and Anderby Creek, Lincolnshire. EGL 5 comprises the following Schemes: Scottish Onshore; Scottish Offshore; English Offshore; and English Onshore.
- “Scottish Onshore Scheme” – All components of EGL 5 between the electricity transmission connection point in Scotland (at Netherpton Hub) and the MLWS in Scotland, which fall under the responsibility of SSEN-T. These include a proposed converter station located in Scotland, from which an underground HVDC cable would route to a proposed landfall on the Scottish coastline (at Scotstown Beach South).

The proposed converter station would be connected to a substation by underground HVAC cables. The substation connects EGL 5 to the existing Scottish transmission system.

- “Scottish Offshore Scheme” - All components of EGL 5 within the Scottish marine environment up to the MHWS in Scotland, which fall under the responsibility of SSEN-T. These include up to 185 km of subsea HVDC cable from the intersection with the EGL 5 Offshore Elements, at the marine boundary between English and Scottish adjacent waters, to the MHWS mark at Scotstown Beach South in Scotland. The subsea cable system would consist of two HVDC cables.

## English Offshore Scheme

- 1.2.8 The English Offshore Scheme is sited within the English marine environment, through offshore waters (>12 Nautical Miles (NM) from the coast) and inshore (<12 NM from the coast), and up to MHWS at Anderby Creek Landfall. The most northerly elements of the English Offshore Scheme would be located at the boundary of English Waters where it meets Scottish Waters, and the most southerly elements would be located at MHWS at the proposed Anderby Creek Landfall area. The location of the English Offshore Scheme is illustrated in **Volume 3, Part 1, Figure 1-3** of the Preliminary Environmental Information Report (PEIR).
- 1.2.9 The key elements of the English Offshore Scheme are up to 423 km of subsea HVDC cable from the landfall at Anderby Creek, Lincolnshire to where it meets the boundary between English and Scottish waters. The subsea cable system would consist of two HVDC cables and a fibre optic cable for control and monitoring purposes.

## English Onshore Scheme

- 1.2.10 The English Onshore Scheme is sited within Lincolnshire, with all elements located in East Lindsey. The location of English Onshore Scheme is illustrated in **Volume 3, Part 1, Figure 1-2** of the PEIR.
- 1.2.11 The English Onshore Scheme would comprise up to 8 km of new underground HVDC cable from landfall point (at Anderby Creek) to a new EGL 5 converter station, and up to approximately 1 km of new underground HVAC cable between the new EGL 5 converter station and the proposed connection point at the proposed 400 kV LCS-B (LCS-B is being consented as part of the NGET Grimsby to Walpole Project).
- 1.2.12 The key elements of the English Onshore Scheme include:
- A new converter station, in the vicinity of the proposed 400 kV LCS-B in East Lindsey;
  - A Transition Joint Bay (TJB) connecting the offshore and onshore HVDC underground cables at the Anderby Creek Landfall;
  - Up to approximately 8 km of new underground HVDC cable, from the landfall point at Anderby Creek to the EGL 5 converter station in the vicinity of the proposed 400 kV LCS-B in East Lindsey; and
  - Up to approximately 1 km of new underground HVAC cable, between the EGL 5 converter station and the connection point at the proposed 400 kV LCS-B considered as part of the NGET Grimsby to Walpole Project.

## 1.3 Structure of the Report

1.3.1 This report is structured into the following sections to include information relating to the HRA process, relevant European Sites, potential impacts, and LSEs and it discusses separately the English Offshore Scheme and the English Onshore Scheme. Specifically, the sections of this report are as follows:

- **Section 1:** (this section): Introduction to the report;
- **Section 2:** Description of the Project (outlines the key aspects of the Project relevant to the HRA process);
- **Section 3:** Overview of HRA process (outlines key aspects of the HRA process and sets the legislative context);
- **Section 4:** Screening Approach;
- **Section 5:** Identification of Relevant European Sites;
- **Section 6:** Potential Impact Pathways;
- **Section 7:** Screening for LSE; and
- **Section 8:** Screening Statement.

## 1.4 Competent Experts

1.4.1 Competent experts have prepared this report. All experts are either members of the Chartered Institute of Ecology and Environmental Management (MCIEEM) or are accredited at a Company level by the Institute of Sustainability and Environmental Professionals (ISEP) (formerly Institute of Environmental Management and Assessment IEMA) Environmental Impact Assessment (EIA) Quality Mark Scheme. The scheme allows organisations that lead the co-ordination of EIAs in the UK to make a commitment to excellence in their EIA activities and have this commitment independently reviewed.

## 2. Description of the Project

### 2.1 English Offshore Scheme

- 2.1.1 A full description of the English Offshore main elements is provided in **Volume 1, Part 1, Chapter 4: Description of the Project** of the PEIR.
- 2.1.2 The English Offshore Scheme comprises approximately 423 km of subsea HVDC cables from the Anderby Creek Landfall on the Lincolnshire coastline to the border between English and Scottish adjacent waters. The subsea cable system would consist of two bundled HVDC cables and a fibre optic cable.
- 2.1.3 The construction programme for the English Offshore Scheme is expected to commence in 2030. It is anticipated that construction would take approximately 5 years with the English Offshore Scheme becoming operational in 2035. Works at the Anderby Creek Landfall may commence in 2031 with installation of the ducts ahead of the main construction works.
- 2.1.4 A summary of the key maximum design parameters for the English Offshore Scheme is provided in **Table 2-1**.

Table 2-1 Rochdale Envelope – Cable Corridor and Cable Configuration

Aspect	Parameter	Maximum Design Parameter
Offshore draft Order Limits	Minimum Width in English Waters	1 km
	Maximum Width in English Waters	1.5 km
	Maximum Length in English Waters	423 km
HVDC cables	Configuration	Bi-pole One cable per pole
	Number	2
	Maximum Number of Joints	8
	Outer Diameter	175 mm
Fibre optic cable	Number	1
	Joints	1

Aspect	Parameter	Maximum Design Parameter
	Outer Diameter	20 - 30 mm
Cable Trench	Number	2 (from trenchless technique exit pit before being bundled into 1 trench for majority of route)
	Maximum Depth of Burial	3.5 m (1.5 m average)
	Maximum Width of Trench	1.5 m
	Maximum Width of Disturbed Area (From footprint of burial equipment)	25 m

## Subsea cables

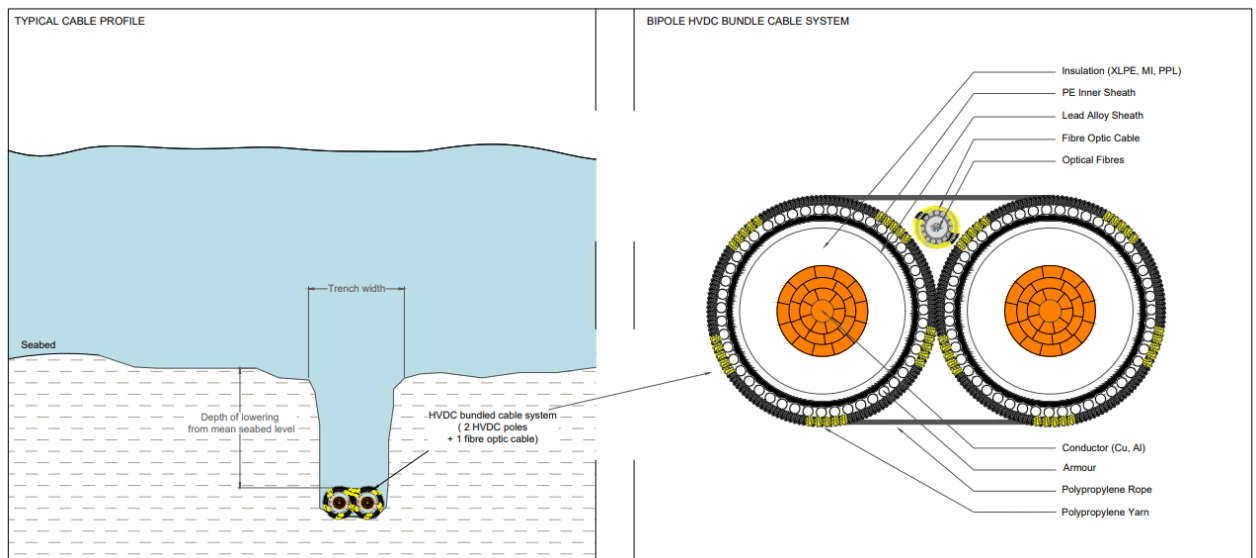
### Cable configuration

- 2.1.5 The HVDC cables would comprise two single core metallic conductors (one positive, one negative) and a fibre optic cable. The cables would be installed as a single bundle of two conductors and the fibre optic cable laid in a single trench. The configuration is shown in **Plate 2-1**. As the cables approach the Anderby Creek Landfall, they would be unbundled and each core passed through its own duct. Two ducts in total would be installed at the Anderby Creek Landfall. The fibre optic cable would be installed with one of the HVDC cables in one of the two ducts.
- 2.1.6 The cable system will be installed in a minimum of four sections (offshore campaigns), with each section connected by a joint. However, there could be up to eight in-field joints (eight campaigns).

### HVDC cable design

- 2.1.7 The cables would likely be cross linked polyethylene (XLPE). As illustrated in **Plate 2-1**, the cables would have a central core (comprising of aluminium or copper), protected by insulation and a lead sheath. Heavy steel wire is wound in a helical form around the cable as armour to protect the cable from external damage during construction and operation and maintenance.
- 2.1.8 The cables would have a nominal voltage of 525 kV and typically have an outer diameter of up to 175 mm. The cables would be non-draining, containing no free liquid or gases that could be released into the marine environment even in the event of severe mechanical damage to the cables.

## Plate 2-1 Offshore illustrative drawing of HVDC Bundled Cable System Profile / Configuration



### Fibre optic cable design

- 2.1.9 One fibre optic cable would be required and would not run through the entire length of the cables offshore, typically up to the first joint offshore from the Anderby Creek Landfall (approximately 140 km offshore). The cable would comprise a core of optical fibres, armoured with layers of steel wires, and sheathed with either a polypropylene or polyethylene material for outer protection. The outer diameter of the fibre optic cable would be expected to be between 20 mm and 30 mm.
- 2.1.10 The fibre optic cable would not include any repeaters and would not have an electrical current running through it.

### Pre-construction Activities

- 2.1.11 Preparation activities that would be required for the cable installation are listed below. Cable route preparation may be undertaken in one single campaign along the entire length of the cable within the English Offshore Scheme or may be split and undertaken separately.
- Pre-installation surveys;
  - Pre-construction Unexploded Ordnance (UXO) survey and identification (UXO clearance excluded from the DCO); and
  - Cable route preparation, Pre-Lay Grapnel Run (PLGR), boulder clearance, pre-sweeping, infrastructure crossing preparation.
- 2.1.12 Prior to the commencement of offshore cable installation, it is essential to ensure that the seabed is clear of obstructions that may hinder the construction works. Seabed preparation (PLGR, boulder clearance, pre-sweeping, infrastructure crossing preparation) is expected to involve clearance activities to ensure the proposed subsea cable corridor is clear of boulders, dropped object debris, and other obstacles.
- 2.1.13 Seabed surveys will be carried out prior to installation by the contractor to reconfirm existing geotechnical and geophysical information regarding seabed conditions, bathymetry, and other seabed features. These may include grab sampling; Multibeam Echosounder (MBES); Side-Scan Sonar (SSS), Sub-Bottom Profiler (SBP),

magnetometer and geotechnical surveys. In addition, visual inspections may also be undertaken using drop down cameras or a Remotely Operated Vehicle (ROV).

- 2.1.14 A UXO survey would be undertaken as part of the pre-construction surveys. The results of the survey will be used to identify potential UXO. The English Offshore Scheme would seek to avoid potential UXO where possible through careful micro-routeing of the cables. If potential UXO cannot be avoided, then further investigations (either consented through the DCO deemed Marine Licence or as a separate Marine Licence) would be undertaken to determine if the potential UXO is UXO or ferrous debris, using a diver or ROV equipped with magnetometer, dredge pump and sonar. If a target is confirmed as UXO, clearance activities may be undertaken. It is assumed that UXO clearance will be undertaken under a separate Marine Licence application under the Marine and Coastal Access Act 2009 (Ref 1), subject to its own environmental assessments including HRA. However, to provide a holistic assessment of the LSEs of the English Offshore Scheme, a high-level assessment of UXO clearance has been included within this HRA Screening.

## Construction Activities

### Subsea cable installation

- 2.1.15 Subsea cable burial depth is typically 1.0 to 3.5 m below chart datum with an average depth of 1.5 m. The final target burial depth will be determined by a cable burial risk assessment which will take into consideration location specific factors such as ground conditions (i.e., ability to bury), intensity of shipping and fishing activity. The subsea cables will be buried into the seabed where feasible. It is not yet confirmed what subsea trenching equipment would be used to install the cables. However, it is anticipated that some or all of the following may be required, dependent on the seabed conditions present:
- Cable plough;
  - Jet-trenching and / or Vertical injector;
  - Backhoe excavator;
  - Cutting; and
  - Controlled Flow Excavation (CFE).
- 2.1.16 External cable protection may be required where there are existing infrastructure crossings (i.e., existing cables), where cable burial is not feasible or areas where adequate protection of the cables cannot be achieved through burial. Options for providing external protection include:
- Rock placement;
  - Concrete mattresses;
  - Flow dissipation devices;
  - Protective coverings, claddings or pipes;
  - Rock, gravel and sand bags;
  - Sand backfill; and
  - Nature inclusive design.

## Landfall

- 2.1.17 The alignment of the onshore and offshore cables through the Intertidal Zone will be informed by considerations of technical, environmental, and other relevant criteria as well as the outputs from technical and engineering studies. The cable alignment across the Anderby Creek Landfall will also be dependent on the chosen alignment for the English Onshore Scheme, which will be informed by a range of technical and environmental factors. The subsea power cables will come onshore at the Anderby Creek Landfall using a trenchless construction technique.
- 2.1.18 There would be up to two High Density Polyethylene (HDPE) ducts installed, exiting in the nearshore (between 3 m and 6 m below Lowest Astronomical Tide (LAT)).
- 2.1.19 Potential trenchless construction techniques being considered include Horizontal Directional Drilling (HDD), microtunnelling and using a direct pipe. These are techniques commonly used to install cable duct(s) underneath sensitive environmental features (such as sea defences, dune system, etc) or technical constraints (cliffs, shallow bedrock etc.).

## Construction vessels

- 2.1.20 A range of different vessels would be required during construction of the English Offshore Scheme. The use of specific vessels such as the Cable Lay Vessel (CLV) or a Cable Lay Barge (CLB) would be confirmed post-consent.
- 2.1.21 Details of vessels deployed on similar cable installation projects to the English Offshore Scheme have been used to inform the description of representative vessels. It is expected that the following types of vessels would be used;
- Survey vessels (including Autonomous Survey Vessels);
  - Dredging vessel;
  - Cable lay vessel;
  - Cable lay barge;
  - Cable pull barge;
  - Anchor handling tug;
  - Jack-up / spud barge;
  - Guard vessel;
  - Construction and dive support vessels; and
  - Rock placement vessels.
- 2.1.22 **Table 2-2** provides an indication of the types of vessels to be used during construction based on experience on other projects. Vessels would typically transit in a linear manner along the proposed English Offshore Scheme. However, their port of origin is unknown at this stage and will not be known until post consent. **Table 2-2** provides an indication of the total number of vessels that would be used for activities for the English Offshore Scheme.

Table 2-2 Indicative vessel requirements for the English Offshore Scheme

<b>Construction activity</b>	<b>Indicative maximum number of return trips per vessel type</b>
Pre-construction survey	156
UXO identification	1,500
Anchor handling tug	90
Crew transfer vessel	452
Jack-up barge / spud barge / multi-cat	50
Cable laying vessels	55
Guard vessels	600
Rock installation vessel	200

Table 2-3 Indicative total number of vessels at any one time per construction activity

<b>Construction activity</b>	<b>Indicative total number of vessels at any one time</b>
HDD / Pull in	9
Nearshore campaigns	17
Offshore campaigns	17

## Operation

2.1.23 The English Offshore Scheme would be designed to minimise any maintenance requirements. Following installation, routine maintenance of the HVDC subsea cables is not anticipated, however, the following activities may be periodically required during the operational phase:

- Inspection surveys, including geophysical surveys;
- Cable repair (if required) (noting that emergency repairs requiring immediate action are exempt and therefore not included in this DCO); and
- Reburial, remedial protection or maintenance and reinstatement of external cable protection features.

### In-Service survey operations

2.1.24 Geophysical surveys would be undertaken periodically to monitor cable burial and the status of external cable protection e.g., remedial or at infrastructure crossings. If results of the as-laid survey show that the English Offshore Scheme is not at the required burial depth or has become exposed, remedial works could be undertaken. Additional surveys may be undertaken after storm events which exceeded the design conditions.

2.1.25 Surveys would use the standard suite of geophysical techniques (i.e., MBES, SSS, SBP and magnetometer). Nearshore and offshore survey vessels or an automated underwater vehicle would be used.

### Cable repair

2.1.26 Should a fault be identified by the cable monitoring system, it would be necessary to access the relevant location of the fault and retrieve the cable to the surface for inspection. The cable would be inspected with an ROV, then cut if it needs to be retrieved to the surface. The damaged section would then be repaired or replaced. The most common reason for a repair of a subsea cable is damage caused by third parties, typically by a vessel anchor strike on a shallow or exposed cable segment.

2.1.27 A cable repair would typically be carried out by a single vessel. For a shallow water repair, in less than 10 m of water, an anchored barge would typically be used. In deeper water, a dynamic positioning cable vessel would be used. Vessels carrying out cable repair operations are restricted in their ability to manoeuvre and divers and / or ROV would be expected to be used with associated vessels.

2.1.28 The actual operational details and the precise configuration of a repair spread would depend on the type of repair identified. The typical steps would comprise:

- Loading of spare cable to the repair vessel;
- Survey to locate the damaged cable;
- Cable de-burial;
- Cable cutting and recovery to the surface;
- Splicing in the replacement section of cable; and
- Re-deployment of cable onto the seabed and re-burial.

2.1.29 A repair would require the insertion of additional cable and two additional cable joints. The additional cable length may be equal to or greater than approximately three times the depth of the water at the site, depending on how much damage the cable has sustained.

2.1.30 If the repair is of a single cable in a bundled pair, the pair of cables would need to be cut, and both brought to the surface. However, it is possible that both cables might be repaired as a precaution against undetected damage.

2.1.31 The extra length of a repaired cable section means that the repaired cable cannot be returned to its exact previous position and alignment on the seabed. The excess cable would be laid on the seabed in a loop to one side of the original route to form an 'omega' loop. This new piece of cable would then be buried into the seabed, or external cable protection would be deposited if burial is not feasible due to ground conditions or position.

2.1.32 A cable repair operation would be expected to take between two and six weeks depending on the type and extent of the damage, the burial requirements, and operational constraints such as weather.

2.1.33 The requirement for repair operations during the lifetime of the proposed English Offshore Scheme would depend on the number of faults, location of the faults, and the burial / protection method used for the original installation.

2.1.34 The maximum parameters for cable repairs over the lifetime of the English Offshore Scheme is provided in **Table 2-4**.

**Table 2-4 Maximum parameters for cable repairs**

<b>Aspect</b>	<b>Parameter</b>
Total length of repairs	13,000 m
Indicative length per repair	1,000 m
Total number of repairs over Project lifetime	13
Maximum width of external cable protection for repairs	16 m
Maximum height of external cable protection for repairs	2 m
Volume of external cable protection per repair	14,000 m <sup>3</sup>
Total external cable protection area for repairs	208,000 m <sup>2</sup>
Maximum number of vessels per repair	5

### **Cable Remediation**

2.1.35 Cable remediation works may involve either reburial of exposed cables, or use of external cable protection to cover the cable, where reburial is not possible.

2.1.36 A cable remediation will typically be carried out by a single vessel (for either cable reburial or protection), although up to four vessels may be used, allowing for survey vessels and guard vessels (where required). For a shallow water repair, in less than 10 m of water, an anchored barge will typically be used. In deeper water, dynamically positioned vessels are favoured. Vessels carrying out cable remediation operations are restricted in their ability to manoeuvre.

2.1.37 The actual operational details and the precise configuration of a remediation spread will depend on the type of remediation required. However, typically, it would comprise of a survey to identify the area of exposure, cable re-burial or protection works, and a post-remediation survey to confirm that the cable is now fully protected (either by sufficient depth of lowering of the cable being achieved or through external cable protection).

2.1.38 The maximum parameters for cable remediation are provided in **Table 2-5**.

**Table 2-5 Maximum parameters for cable remediation**

<b>Aspect</b>	<b>Parameter</b>
Total length of remediations	8,000 m
Indicative length per remediation	1,000 m

Aspect	Parameter
Total number of remediations over Project lifetime	8
Maximum width of external cable protection for remediation	16 m
Maximum height of external cable protection for remediation	2 m
Volume of external cable protection per repair	14,000 m <sup>3</sup>
Total external cable protection area for remediations	128,000 m <sup>2</sup>
Maximum number of vessels per remediation	4

## Decommissioning

- 2.1.39 The minimum design life of the Project's subsea cables is 40 years, although with repairs, some cable systems last upwards of 60 years. The English Offshore Scheme will require a Licence or Lease from The Crown Estate. An Initial Decommissioning Plan (IDP) will be written once the final route and construction methodology is chosen. This is a legal requirement necessary to secure The Crown Estate Licence. The IDP will form the basis of the Final Decommissioning Plan which would be developed in consultation with The Crown Estate and in line with the following decommissioning principles:
- The measures and methods for any decommissioning would comply with any legal obligations which would apply to the decommissioning of the English Offshore Scheme when it takes place;
  - All sections of the cables within 12 NM would be removed except for any section(s) which are preferable to leave in situ having regard to the principles below;
    - that the measures and methods for any decommissioning are the best for, or minimise the risks to:
      - the safety of surface or subsurface navigation;
      - other uses of the sea;
      - the marine environment including living resources; and / or;
      - health and safety.
  - The seabed would be restored, as reasonably as possible and to the extent reasonably practicable, to the condition that it was in before the cable was installed.
- 2.1.40 The IDP is periodically reviewed and updated in line with the applicable guidance and regulations at the time of the review.
- 2.1.41 The full environmental impact of works required to decommission the English Offshore Scheme would be assessed at the time of decommissioning. Removal of the subsea cable is a similar process to the installation of the cable, but in reverse. The environmental impact can therefore not be fully assessed until the environmental conditions at the time of decommissioning are established.

## 2.2 English Onshore Scheme

- 2.2.1 The English Onshore Scheme of EGL 5 would extend from MLWS where the English Offshore Scheme intends to make landfall at the Lincolnshire coastline before continuing to the proposed 400 kV LCS-B Substation (which forms part of the proposed NGET Grimsby to Walpole project). It is noted that the boundaries for the English Onshore Scheme and the English Offshore Scheme would overlap in the intertidal zone between MLWS and MHWS.
- 2.2.2 The English Onshore Scheme draft Order Limits extend into two local authority boundaries:
- East Lindsey District Council; and
  - Lincolnshire County Council.
- 2.2.3 The English Onshore Scheme comprises new converter station, in the vicinity of the proposed 400 kV LCS-B, a new HVDC underground cables landfall at Anderby Creek, approximately 8 km of new underground HVDC cable from landfall point to the new EGL 5 converter station, up to approximately 1 km of new underground HVAC cable, between the new converter station and the proposed 400 kV LCS-B.
- 2.2.4 The specific elements and planned works at each location of the English Onshore Scheme are described in the following sections. All dimensions in the sections below are approximate as the English Onshore Scheme is at an early design phase and dimensions will be updated if required.

### EGL 5 converter station

- 2.2.5 The converter station would house the main equipment indoors to facilitate the conversion of electricity between Alternating Current (AC) and Direct Current (DC), depending on direction of electricity transmission. The height of the converter station is determined by the size of the equipment required, the space required around the equipment, any permanently installed lifting equipment and any required roof structures.
- 2.2.6 The platform for the converter station would be approximately 8.8 ha. It should be noted that this excludes related development including permanent access, peripheral landscaping, earthworks, drainage (i.e., attenuation basins) and other related works. The height of the platform above (or below) the existing ground level will vary according to existing ground levels and will be designed to mitigate against flood risk.
- 2.2.7 The converter station would comprise the following main components within a secure fenced compound. The parameters, as set out below, set the maximum parameters within which the detailed design would be developed:
- DC Hall - the underground DC cables terminate here. The DC Hall would also contain indoor DC switchgear to connect to power electronics. This equipment would be enclosed in a building up to 30 m in height (not including aerials and lightning protection that may be required for safety).
  - Valve Hall – contains high voltage power electronics equipment that would convert electricity from DC to AC and vice-versa. This equipment must be located indoors in buildings up to 30 m in height within a clean and controlled environment.

- Control Building – would contain control panels and associated operator stations, protection and communication equipment, offices and welfare facilities and other auxiliary systems all located within an enclosed building up to 15 m in height.
- Transformer bays – these change the AC voltage to an appropriate level for onward transmission via the AC system / or prior to conversion to DC. The transformers are normally sited outdoors and may be separated by concrete fire protection walls. Typical dimensions are 15 m long by 15 m wide by 16 m high. Cooling fans are also provided on transformers. Noise enclosures will be fitted around the transformers if required.
- AC Switchgear and filters (“switchyard”) – connects the converter station to the 400 kV AC transmission system. It includes a range of electrical equipment including harmonic filtration and reactive compensation equipment (if required), circuit breakers, transformers, busbars and insulators. The main function is to allow the effective integration of the DC system into the AC system. Commonly the AC switchyard and associated equipment is located outdoors although this equipment can be enclosed in a building or series of buildings to be determined through detailed design.
- Diesel Backup Generator – the converter station requires its own power typically provided at 11 kV; up to two diesel back-up generators would be used to provide back-up electricity supply in the event of a failure of the low voltage electricity supply. Approximate dimensions are 15 m long, 3 m wide and 5 m high.
- Spares Building – a building to house spare parts and components; this would be supplemented by hardstanding areas provided for storage of a spare transformer and spare cable drums.

2.2.8 These components could be arranged differently, subject to the ongoing design process taking into account engineering, environmental and other requirements.

2.2.9 The converter station site would be within a fenced compound with restricted access. A palisade fence would be erected around the converter station site established at the start of construction and retained for operation. The site would also be monitored by CCTV and security gates would be in place for restricted / controlled access.

2.2.10 External lighting would be installed on the perimeter and within the converter station for safety and security purposes and to facilitate maintenance or repair works during the hours of darkness or low light. Additional temporary task lighting will also be used in any area in which maintenance or repair works are being undertaken. Internal amenity lighting would also be required for any necessary overnight works. All lighting would be designed in accordance with the appropriate design standards and would be designed to be environmentally sensitive. Further information regarding lighting design will be provided within the project description within the ES.

2.2.11 As described above, the converter station would require a new permanent access road, which would need to be suitable for operational works and would likely consist of a bituminous surface. There may also be a need for an additional permanent access route for the replacement of the transformer unit which would be transported as an abnormal indivisible load (AIL). If the main access road is not suitable for this purpose, provision of another AIL permanent access route will be identified. This may involve having the permanent rights to build an access route to the converter site / s or installation of a new road (typically grasscrete or similar). Further definition of the access route and requirements will be provided as the design of the English Onshore Scheme progresses.

- 2.2.12 At this stage, the exact location and position of the converter station buildings (known as micro-siting) has not been determined, however, the indicative location for the converter station siting has been identified and is shown on **Volume 3, Part 1, Figure 4-1: English Onshore Scheme Components**.
- 2.2.13 The converter station would require a permanent access road, connecting to the A111 Sutton Road. Where the permanent accesses connect to the public highway, a permanent bellmouth would also be required.

Plate 2-2 Indicative model for a converter station

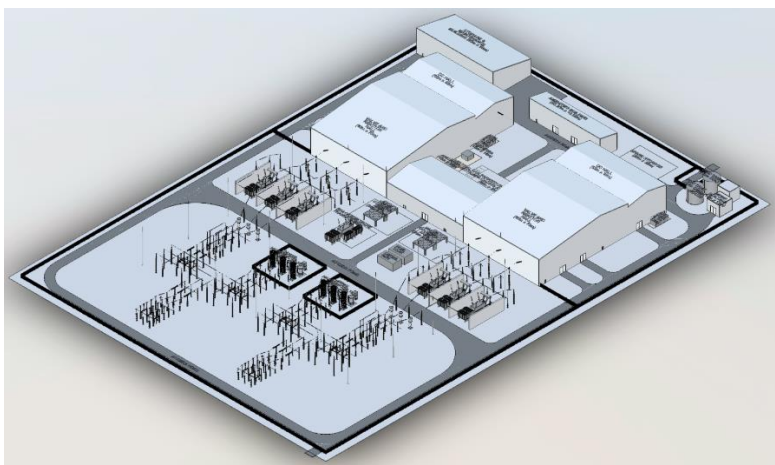


Table 2-6 Rochdale Envelope - Converter station

Parameter	Maximum design parameter
Indicative converter station platform footprint	8.8 ha. The footprint excludes any drainage (i.e., attenuation basins), permanent access roads or landscaping requirements
Converter station platform height	Preliminary calculations suggest a worst-case range of up to 4.6 m to 7 m above sea level (above ordnance datum) across the platform, depending on existing variation. This is in addition to the converter station building heights.
Maximum height of structures	30 m (excluding lightning protection and aerials). Not including the platform height.
Height of lightning protection	To be established at detailed design.

### Anderby creek landfall

- 2.2.14 The landfall is the interface between the English Onshore Scheme and the English Offshore Scheme and would be located at Anderby Creek, East Lindsey, Lincolnshire.
- 2.2.15 This is the location where subsea cables (which are commonly of a greater diameter compared to the onshore cables due to increased protection), would connect to the onshore underground cables at a buried Transition Joint Bay (TJB) located above MHSW illustrated on **Volume 3, Part 1, Figure 4-3: English Onshore Scheme Permanent**

**Components.** More specifically, the landfall is considered to extend from the trenchless solution exit point below MLWS (where it overlaps with the English Offshore Scheme components) beneath the intertidal zone to terminate at a buried TJB located a short distance inland. A TJB is a permanent underground chamber constructed of reinforced concrete that houses the cable joints and a fibre chamber / link pit. It is currently anticipated that a single TJB would be required for the Project with a maximum footprint of 15 m by 4 m (60 m<sup>2</sup>). This would be confirmed at the detailed design stage.

- 2.2.16 No permanent above ground infrastructure would be required for the TJBs; however, there may be a requirement to permanently raise the platform for the TJBs. The height of the platform is not yet known; this will be confirmed by the Contractor at the detailed design stage. Once installation has been completed, the land would be reinstated to pre-existing conditions (but at a higher elevation due to the raised platform) if required; the only infrastructure visible on the surface (on otherwise fully reinstated land) would be the cover of the link box pit and marker posts. Fencing surrounding the link box pit may be required depending on land use.
- 2.2.17 All aspects of the landfall that are above MLWS will be assessed as part of the English Onshore Scheme and conversely everything that is below MHWS will be assessed as part of the English Offshore Scheme. Therefore, the overlap between the English Onshore Scheme and English Offshore Scheme i.e. in the intertidal zone between MLWS and MHWS will be considered within **Part 3, English Offshore Scheme** only.
- 2.2.18 The landfall would be constructed using a trenchless technique and in this location only for the purposes of this report, an open cut technique will be ruled out. Two bores will be drilled and then ducted. Each cable duct would be installed from the TJB to a point below 0 m LAT. Within each cable duct a HVDC power cable would be pulled through to make the transition from the subsea environment to the TJB. A fibre optic cable (for control and monitoring purposes) would be installed with one of the power cables. The exact exit points for the trenchless technique and the cable ducts would depend on further technical studies and design. The trenchless technique would 'punch out' (exit the seabed) between the 3 m and 6 m LAT water depth contours.
- 2.2.19 It is proposed that although only two cable ducts are required for the Project at the Anderby Creek Landfall, allowance will be included within this HRA, along with the Environmental Statement (ES) and DCO, for an additional trenchless technique bore, should one fail during construction.
- 2.2.20 A summary of the key characteristics of the landfall is outlined in **Table 2-7**.

**Table 2-7 Rochdale Envelope - Anderby Creek Landfall and transition joint bay**

<b>Parameter</b>	<b>Maximum design parameter</b>
<b>Transition Joint Bays</b>	
Number of TJBs	It is currently anticipated that one single TJB would be required for the English Onshore Scheme. This would be confirmed at the detailed design stage.
Maximum permanent area of above ground transition joint bay covers (m <sup>2</sup> )	TJB is typically buried in a concrete chamber with no above ground infrastructure; however, there may be a requirement to permanently raise the platform for the TJB.

Parameter	Maximum design parameter
	TJB dimensions are approximately 15 m by 4 m (60 m <sup>2</sup> ). It is to be noted that this area would increase if a raised TJB platform is required to account for slopes on surrounding sides (to 50 m x 50 m plus slopes on surrounding sides).
<b>Landfall</b>	
	Potential trenchless construction techniques include Horizontal Directional Drilling (HDD), microtunnelling and using a direct pipe. These are techniques commonly used to install cable duct(s) underneath sensitive environmental features (such as sea defences, dune system, etc) or technical constraints (cliffs, shallow bedrock etc.). It is expected that up to two permanent cable ducts would be installed at the landfall.
Number of cable ducts	Two permanent ducts would be installed between the onshore TJB and the offshore exit location.  Assessment of three trenchless technique drill attempts, in the instance that one fails during construction.
Indicative length of duct (m)	It is currently assumed that the length of each duct would likely extend from a compound location above MHWS to a punch-out point below MLWS, indicatively between 650 m to 1600 m from the TJB.
Number of exit pits (below MHWS)	Two
Volume of excavated material per exit pit (below MHWS)	1,875 m <sup>3</sup>

### Underground HVDC cables

- 2.2.21 The term Indicative Zone of Underground Cable Assets is used throughout this report and refers to the areas within which the permanent cable assets would be constructed, comprising the trench (or installation area) and the associated temporary working width which would be required for excavation of the cable trench as described below. **Volume 3, Part 1, Figures 4-2 and 4-3** show the temporary and permanent elements and development zones of the English Onshore Scheme starting from Anderby Creek before continuing to the north west of Huttoft.
- 2.2.22 The exact configuration of the underground HVDC cables route would depend on a number of factors including the constraints (such as crossings of major rivers, roads and utilities) which are present, prevailing ground conditions, the length of each cable section, suitability of jointing positions and the number of bends and topography of the route.

### Underground HVDC Cable Route Overview

- 2.2.23 At the landfall, where the English Onshore Scheme and English Offshore Scheme are expected to overlap, the DC cables would continue from offshore to onshore environment.

The English Onshore Scheme's DC cables would begin at MLWS and extend across the intertidal zone (via HDD) to connect into a buried TJB (where the subsea and onshore DC cables connect). From the TJB, the DC cables would route towards the new converter station.

### Physical description of the DC Cables

- 2.2.24 The English Onshore Scheme would comprise two DC cables. Each DC cable is typically 15 cm in diameter and would be installed in plastic ducts; cable installation methods are outlined in detail in the PEIR in **Volume 1, Part 1, Chapter 4: Description of the Project**.
- 2.2.25 The type of underground cable proposed for this installation has not yet been determined. For example, the cable may comprise a single core copper conductor, insulated with cross linked polyethylene, shielded with a metallic screen and finished with a non-metallic outer sheath. Cable conductors are most often either aluminium or copper, depending on the electrical capacity required.
- 2.2.26 The English Onshore Scheme would require the construction of approximately 8 km of DC cables, connecting from the Anderby Creek Landfall to the proposed new converter station. The exact configuration of the DC cables is subject to detailed design following appointment of the Contractor; however, the general characteristics below have informed this report and the PEIR.
- 2.2.27 The DC cables would have a permanent easement. The exact width of the permanent easement is still to be determined; this would be established during the detailed design stage of the English Onshore Scheme.
- 2.2.28 The DC cables would be installed in sections, typically every 800 m to 1.5 km, although spacing would be subject to site conditions and the design. These sections would be connected at buried cable joint bays. The number, location and dimensions of cable joint bays required would be determined through consultation feedback, information from surveys and ongoing design studies.
- 2.2.29 There would be no permanent above ground infrastructure required along the new DC cables route except for small marker posts and at least one link pit. Marker posts may be installed at field boundaries, crossings, and other locations as appropriate to highlight the presence of the DC cables to landowners, asset owners and those undertaking works within the vicinity. The link pit(s) would be required for monitoring the cables and would comprise a chamber lid on the surface. The link pit(s) may need to be fenced depending on land use.
- 2.2.30 The construction and cable installation methodology are detailed in the PEIR in **Volume 1, Part 1, Chapter 4: Description of the Project**.
- 2.2.31 A summary of the key characteristics of the underground DC cable route are outlined in **Table 2-8**.

Table 2-8 Rochdale Envelope - Underground DC Cables Route

Parameter	Maximum design parameter
Indicative Length of Route	Up to 8 km
Cable number	There would be up to one fibre optic cable on each DC cable for monitoring purposes.
Indicative cable dimensions	Each DC cable is approximately 15 cm in diameter. Each cable duct has an outer diameter of 250 mm.
Number of trenches	One trench
Number of cable joint bays	Required approximately every 800 m to 1.5 km
Permanent easement	The exact width of the permanent easement is still to be determined, this would be established during the detailed design stage.
Permanent infrastructure above ground	Cable markers may be installed at field boundaries, crossings, and other locations as appropriate to highlight the presence of the DC cables to landowners, asset owners and those undertaking works within the vicinity.
Trench width at base	Approximately 1.4 m wide (subject to local ground conditions and obstacles).
Trench width at surface	Approximately 1.4 m wide (subject to local ground conditions and obstacles). The surface width of the trench would however be dependent on the Contractor's construction methodology. If the excavation is splayed (i.e. if the trench is battered (sloped) back) to reduce the risk of collapse, the surface width could extend to approximately 7.4 m, assuming a slope angle of 1:2.
Target depth of trench	The depth of the cables would vary, subject to the outcome of soil Agricultural Land Classification (ALC), agricultural land drainage, engineering and ground investigation surveys. The minimum depth coverage would be 900 mm to the cable protective tiles. Where justified, it may be laid deeper. The depth of installation would also be deeper at locations where trenchless methods e.g., HDD, are required.
Depth / thickness of specialised backfill	<p>The cement bound sand (CBS) (or equivalent) would have an approximate depth of 600 mm; however, this is subject to further engineering studies, including the undertaking of a final cable system study.</p> <p>Above the CBS (or equivalent) would be a well compacted thermally suitable backfill (including the topsoil) to a</p>

Parameter	Maximum design parameter
	minimum depth of approximately 900 mm from the ground surface level.
Working width (temporary)	<p>Approximately 49 m where open-cut installation methods would be used. Working width includes provision for the cable trench, cable joint bays, temporary drainage, soil storage, materials and equipment laydown, and temporary haul road.</p> <p>For trenchless cable installation, the working width would be 60 m, assuming a 10 m separation between drills.</p>
Number of haul roads	There would be one haul road which would typically be positioned adjacent to the cable trench. At certain locations, i.e., pinch points, or where physical constraints dictate, there may be a requirement for more than one haul road. Additional haul roads may also be required to access the working area.
Width of haul roads	7 m surface (excluding levelling material and widening at corners)

### Underground HVAC cables

- 2.2.32 The term Indicative Zone of Underground Cable Assets is used throughout this report and the PEIR and refers to the areas within which the permanent cable assets would be constructed, comprising the trench (or installation area) and the associated temporary working width which would be required for cable installation as described below.
- 2.2.33 The underground HVAC cables would connect the converter station to the LCS-B Substation as shown on **Volume 3, Part 1, Figures 4-2 to 4-4**.
- 2.2.34 The exact configuration of the underground HVAC cable route would depend on several factors including the constraints which are present (such as crossings of major rivers, roads and utilities), prevailing ground conditions, the length of each cable section, suitability of jointing positions and the number of bends and topography of the route.
- 2.2.35 The following sections provide a high-level description of the design, construction, and operation of the underground HVAC cables (described interchangeably as ‘AC cables’ in this report and the PEIR).

### Physical description of the Underground AC Cables

- 2.2.36 The English Onshore Scheme would require the construction of up to approximately 1 km of AC Cables, between the converter station and the LCS-B Substation. The exact configuration of the AC cables would be subject to detailed design following appointment of a Contractor; however, the general characteristics below have informed this report and the PEIR.
- 2.2.37 The connection from the proposed converter station to the LCS-B Substation would require two sets of three AC cables. These would be installed in two cable trenches. Each AC cable is typically 15 cm in diameter and would be installed in plastic ducts; cable

installation methods are outlined in detail in **Volume 1, Part 1, Chapter 4: Description of the Project**. Each AC circuit would require both a distributed temperature sensing (DTS) cable for monitoring purposes, and a communications cable. The DTS cable and its carrier tube would be strapped to the middle of the three cable ducts in each trench. The communications cable would be installed in a separate duct, normally on one side of the trench.

- 2.2.38 The AC cables would have a permanent easement. The exact width of the permanent easement is still to be determined.
- 2.2.39 The AC cables would be installed in sections. Depending on the final length of the AC cables, these may either comprise a single cable section (with no intermediate joint bays) or three short cable sections with two intermediate joint bays. These sections would be connected at buried cable joint bays. The number, location and dimensions of cable joint bays required would be determined through consultation feedback, information from surveys and ongoing design studies.
- 2.2.40 There would be very minimal above ground infrastructure required along the proposed AC cables route. The exception to this is at cable joint bays where link pillars and small marker posts would be required along the cable alignment. Link pillars would be required at buried cable joint bays (if used), where the AC cable sections would be joined. Link pillars are typically 0.5 m by 1.2 m and are at a height of 1.5 m and are typically enclosed within a timber fence, typically at a height of 1.4 m. Underground link boxes could also be used instead of link pillars at buried cable joint bays, however, from an operational perspective, these are less preferred and would typically only be considered at specific locations (e.g., roads). Marker posts may be installed at field boundaries, crossings, and other locations as appropriate to highlight the presence of the AC cables to landowners, asset owners and those undertaking works within the vicinity.
- 2.2.41 A summary of the key characteristics of the underground AC cable route are outlined in **Table 2-9**.

**Table 2-9 Rochdale Envelope - Underground AC Cables Route**

<b>Parameter</b>	<b>Maximum design parameter</b>
Indicative Length of Route	Up to 1 km
Cable number	Each trench would include a communications cable, installed in a separate duct, and a DTS cable, usually installed in a carrier tube that is strapped to the middle of the HVAC cable duct.
Indicative cable dimensions	Each AC cable is approximately 15 cm in diameter.
Number of trenches	Two trenches  Each trench would contain three AC cables (subject to cable system design)
Number of cable joint bays	Dependent on the final length of the AC cables: these may either comprise a single cable section (with no intermediate joint bays) or three short cable sections with two intermediate joint bays.

Parameter	Maximum design parameter
Permanent easement	The exact width of the permanent easement is still to be determined, this would be established during the detailed design stage.
Permanent above ground infrastructure	<p>Cable markers may be installed at field boundaries, crossings, and other locations as appropriate to highlight the presence of the AC cables to landowners, asset owners and those undertaking works within the vicinity.</p> <p>Link pillars at buried cable joint bays which are typically 0.5 m by 1.2 m and are at a height of 1.3 m. Link pillars are typically enclosed within a timber fence typically at a height of 1.4 m.</p>
Trench width at base	Approximately 2.85 m wide (subject to local ground conditions and obstacles).
Trench width at surface	<p>Approximately 2.85 m wide (subject to local ground conditions and obstacles). The surface width of the trench would however be dependent on the Contractor's construction methodology. If the excavation is splayed (i.e., if the trench is battered (sloped) back) to eliminate the risk of collapse, the surface width could extend to approximately 9 m, assuming a slope angle of 1:2.</p>
Target depth of trench	<p>The depth of the cables would vary, subject to the outcome of soil ALC, agricultural land drainage, engineering and ground investigation surveys. The minimum depth coverage would be 900 mm to the cable protective tiles. Where justified, it may be laid deeper. The worst case assumed for the purposes of this report and the PEIR, where no crossings of utilities or watercourses are required, is 1.8 m trench depth. Where crossings are required, greater depths may be required locally.</p>
Depth / thickness of specialised backfill	<p>The cement bound sand (CBS) (or equivalent) would have an approximate depth of 550 mm; however, this is subject to further engineering studies, including the undertaking of a final cable system study.</p> <p>Above the CBS (or equivalent) would be a well compacted thermally suitable backfill (including the topsoil) to a depth of approximately 900 mm from the ground surface level.</p>
Working width (temporary)	<p>Approximately 84 m where open-cut installation methods would be used. Working width includes provision for both cable trenches, cable joint bays, temporary drainage, soil storage, materials and equipment laydown, and temporary haul road.</p>
Number of haul roads	<p>Should the HVAC cable trenches be located next to each other, there would be one haul road which would typically be positioned in the centre of the two sets of trenches. If it is not possible to locate the HVAC cables alongside each other, then</p>

Parameter	Maximum design parameter
	<p>two separate haul roads may be required to facilitate the transport and delivery of materials to the site.</p> <p>Additional haul roads may be required to provide access to the HVAC cable alignments.</p>
Width of haul roads excluding passing bays	7 m surface (excluding levelling material), increasing at bends to a maximum of 15 m to suit vehicle tracking.

## Construction Traffic Routes

### Highway Modifications and AIL delivery

2.2.42 At this preliminary stage in the project, EGL 5 is continuing to explore methods of transporting abnormal indivisible loads to the proposed converter station site. This includes the possibility of utilising a beach landing, in line with the Department for Transport Water Preferred Policy Guidelines (Ref 2) for the movement of AILs. This guidance sets out a “water-preferred” policy which encourages using water transport where it is practical, economically viable, and environmentally desirable. NGET will set out within the ES why waterborne transport is or is not appropriate for the Project in line with these considerations. At this time there is insufficient information available to inform a decision or assessment as to which transport method will be taken forward (by road/by port / by beach) for the Project, however, this process will continue alongside the evolving design development, with appropriate consultation and engagement with key stakeholders to inform the final decision and assessment as part of the environmental statement and DCO application.

2.2.43 Although further assessment and consultation is required to determine the route to site for AIL delivery during construction, the current assumed route to Site on the existing highway departs from the A16, and traverses south east via the A157, the B1373 and the A1104. A number of permanent modifications to the existing highway (one location on the A157, seven locations on the B1373, and three locations on the A1104) will be required to widen the highway along this route to enable the delivery. The current assumed construction routes to Site for AIL delivery and other construction traffic can be seen in **Volume 3, Part 1, Figure 4-2**, and these will be confirmed within the ES.

### Temporary Access from Public Highway

2.2.44 A temporary means of accessing the English Onshore Scheme from the public road network will be required during construction. Two options have been identified and are under consideration and further assessment at this stage, and are therefore both included within the draft Order Limits:

- The Alford Construction Route; and
- The Shared Grimsby to Walpole Haul Route.

2.2.45 The Alford Construction Route would consist of enabling works required to facilitate the construction and installation of the permanent assets of EGL 5. Its requirement was identified due to a potential constraint for AIL to reach the Anderby Creek Landfall and the potential converter station site. It would depart the A1104 Station Road south west of Alford, traversing north and east of Alford, crossing the A1104 East Street and A1111

Sutton Road before continuing to the north east of LCS-B substation. The Alford Construction Route would be temporarily required during construction and land would be reinstated on completion of construction.

- 2.2.46 The Shared Grimsby to Walpole Haul Route would consist of a temporary construction traffic route departing from the road network, using the same haul route proposed as part of the Grimsby to Walpole project to the LCS-B substation. The route would depart the public highway from the A1104 East Street, and continue south east, crossing over the A1111 Sutton Road and to the east of LCS-B substation. The Shared Grimsby to Walpole Haul Route would be temporarily required during construction and land would be reinstated on completion of construction.
- 2.2.47 The parameters for these haul roads are as presented within **Table 2-9**. Further details on the dimensions of bellmouths will be confirmed within the ES and DCO.

## Operation and Decommissioning

- 2.2.48 Future maintenance and repair works, if required, will be carried out as needed, with significantly less impact than the initial construction phase. These activities are typically localised, involve minimal ground disturbance and follow established industry practices, to ensure reliability while minimising ecological disruption and impacts. As such the impact of maintenance activities is expected to be less than the construction phase. Given the very limited information available on operation activities for the English Onshore Scheme at the time of writing, no assessment of these activities has been included in this report. The potential for operation activities for the English Onshore Scheme to trigger LSE will be assessed in the DCO application version of this report.
- 2.2.49 The decommissioning process will essentially be the reverse of the installation process. Decommissioning, while still in the design phase, may have impacts comparable to construction, depending on the chosen methodology. Additionally, environmental conditions may be different during the time of decommissioning and cannot be fully assessed until they are re-established at the time of decommissioning. For the purpose of this report, it is assumed that the impacts of decommissioning will be equivalent to that of the construction phase.
- 2.2.50 It should be noted that there are currently no specific plans to decommission the Project. It is expected that the transmission of electricity would continue for as long as there is a business case for doing so and that any decommissioning activity would occur decades into the future. Except for underground cables, all other infrastructure of the English Onshore Scheme is expected to have an operational lifespan of more than 40 years. Dependent on the requirements at the time, any redundant cables could either be left in-situ, or all or parts of the cable could be removed for recycling.
- 2.2.51 If the English Onshore Scheme, or any part of it, is to be decommissioned, a written scheme of decommissioning would be submitted for approval by the relevant planning authorities to any decommissioning works. The decommissioning works would follow NGET processes at the time for assessing and avoiding or reducing any environmental impacts and risks. Potential effects from works required for decommissioning would be separately assessed at the time of decommissioning.

## 3. Overview of the HRA Process

### 3.1 Legislative Context

- 3.1.1 The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) protects habitats and species of European nature conservation importance. Together with the Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds), the Habitats Directive establishes a network of internationally important sites (Natura 2000 Sites) designated for their ecological status. This includes SACs which are designated under the Habitats Directive and promote the protection of flora, fauna, and habitats, as well as SPAs designated under the Birds Directive to protect rare, vulnerable, and migratory birds. Collectively SACs and SPAs are referred to as European Sites in UK legislation.
- 3.1.2 Government policy also requires other protected sites to be treated as if they are designated European Sites. This includes proposed SAC's, potential SPAs, Ramsar sites and areas identified or required to compensate for adverse effects on the integrity of a European site.
- 3.1.3 The Habitats and Birds Directives are transposed into UK law in territorial waters (<12 NM) of the coast) by The Conservation of Habitats and Species Regulations 2017 (as amended) and in the offshore area (>12 NM from the coast) by The Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended). These regulations together with the Wildlife and Countryside Act 1981 transpose the Habitats and Birds Directives into UK legislation covering both terrestrial and marine areas except for within Scottish territorial waters, where The Conservation (Natural Habitats, &c.) Regulations 1994 continue to apply.
- 3.1.4 The Conservation of Habitats and Species Regulations 2019 make changes to the 2017 Habitats Regulations so that they continue to operate following the UK's exit from the European Union (EU) on 31st January 2020. While the basic legal framework for HRA is maintained, The Environment and Wildlife (Legislative Functions) (EU Exit) Regulations 2019 transfer functions previously undertaken by the European Commission (EC) to UK Ministers. Furthermore, where the Habitats Regulations continue to use the term European Sites, those sites on land and sea, including inshore and offshore marine areas in the UK now form part of a "national site network" and are no longer part of the EU's "Natura 2000" site network.
- 3.1.5 Under the Habitats Regulations 2017, the competent authority is required to undertake a HRA to determine whether there is potential for a plan or a project to have an adverse effect on a European site, alone or in-combination with other plans or projects. The HRA process comprises three key stages, as follows:
1. **Screening:** The process of identifying potentially relevant European Sites, and whether the Project is likely to have a significant effect on the site either alone or in-combination with other plans and projects. If it is concluded at this stage that there is no potential for LSE, there is no requirement to carry out subsequent stages of the HRA process.

2. **AA and Integrity Test:** Where an LSE for a European site cannot be ruled out, either alone or in combination with other plans and projects, it is necessary to provide further information to enable the competent authority to carry out an AA of the implications of the Project on the integrity of the site(s). This additional information also needs to consider effects either alone or in combination with other plans and projects, in view of the site's conservation objectives. At the AA stage, ways to avoid or minimise any effects (mitigation) can be considered. Where it is not possible to rule out an Adverse Effect on site Integrity (AEol) (integrity test), the HRA must progress to Stage 3.
  3. **Derogation:** Identifying and examining alternative ways of achieving the objectives of the Project to establish whether there are solutions that would avoid or have a lesser effect on European site(s). Where no alternative solution exists and where an AEol remains, the next stage of the process is to assess whether the development is necessary for Imperative Reasons of Overriding Public Interest (IROPI). If the development is necessary for IROPI, identification of compensatory measures needed to maintain site integrity and/or the overall coherence of the designated site network is also required.
- 3.1.6 An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.
  - 3.1.7 The AA is undertaken by the competent authority based on information provided by the Applicant, usually in the form of a Report to Inform an Appropriate Assessment (RIAA) or an HRA Report.

## 3.2 Guidance

- 3.2.1 The Screening has been undertaken with due regard to the following guidance:
  - Nationally Significant Infrastructure Projects: Advice on Habitats Regulations Assessment (Ref 3).
  - Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (Ref 4).
  - Managing Natura 2000 sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (Ref 5).
  - The European Commission Guidance - Article 6 of the Habitats Directive – “Rulings of the European Court of Justice. Final Draft,” September 2014 (Ref 6).
  - EU Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC (Ref 7).
  - Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (Ref 8).
  - Habitats regulations assessments: protecting a European site (Ref 9).
  - Environmental principles policy statement (Ref 10); and
  - Defra noise Policy Paper (2025) (Ref 11).

3.2.2 In relation to guidance from Statutory Nature Conservation Bodies (SNCB's) this includes:

- Joint Nature Conservation Committee (JNCC) updated Effective Deterrent Ranges (EDRs) for assessing the significance of noise disturbance against Conservation Objectives of Harbour Porpoise Special Areas of Conservation (Ref 12).
- Joint SNCB Interim Displacement Advice Note (Ref 13).
- Natural England Offshore Wind Cabling: ten years' experience and recommendations (Natural England., 2018a Ref 14).

# 4. Screening Approach

## 4.1 Approach

4.1.1 This Screening process has been undertaken with reference to the UK Government guidance which states that Screening involves:

- A description of the Project, and local site characteristics.
- Identification of relevant European Sites and compilation of information on Qualifying Interests and conservation objectives, including taking the following steps:
  - Identify all European Sites that might be affected using the Source-Pathway-Receptor model.
  - Identify the Qualifying Interests of the site concerned and the conservation objectives.
  - Determine which of those Qualifying Interests / conservation objectives could be affected by the Project.
- Assessment of likely significant direct and indirect effects on the conservation objectives of the site(s) in relation to:
  - The Project alone; and
  - The Project in-combination with other plans and projects.
- Screening determination – in the absence of mitigation measures, determine if the Project alone or in-combination with other plans and projects could undermine the conservation objectives of the site(s) and give rise to LSEs.
- Screening statement with conclusions – this includes the identification of sites (screened in sites) where it is not possible to conclude no LSEs therefore further information is required to inform an AA of these sites (Stage 2) or to revisit the Screening when additional information is available that may alter the Screening conclusions.

4.1.2 Screening has been undertaken without the inclusion of mitigation measures in line with HM Government (2023) guidance (Ref 9).

4.1.3 This report has been informed by a review of the publicly available datasets and the available literature that allowed the characterisation of the receiving environment and supported the identification and assessment of potential effects and their significance. The sources of the information used are cited throughout the report and listed in the Reference section. The baseline characterisation relevant to the offshore works for this HRA can be seen in the PEIR, **Volume 1**:

- **Part 2, Chapter 6: Biodiversity;**
- **Part 3, Chapter 17: Coastal and Marine Physical Processes;**
- **Part 3, Chapter 18: Intertidal and Subtidal Benthic Ecology;**
- **Part 3, Chapter 19: Fish and Shellfish;**

- **Part 3, Chapter 20: Intertidal and Offshore Ornithology;** and
- **Part 3, Chapter 21: Marine Mammals and Marine Reptiles.**

4.1.4 The baseline characterisation relevant to the onshore works for this HRA is informed by:

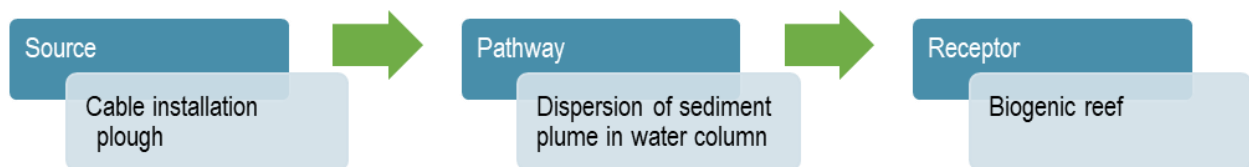
- Desk-based study data;
- Site-specific survey data; and
- Consultation feedback from Natural England and JNCC.

4.1.5 The examination, analysis and evaluation of the relevant information that supported the Screening process conducted and documented in this report were conducted following the precautionary principle where information was lacking.

## 4.2 Source-Pathway-Receptor Model

4.2.1 The potential for LSEs has been assessed using a source-pathway-receptor model. This approach identifies likely environmental effects resulting from the Project. For instance, a project activity (source) may entail a predicted change in environmental conditions affecting either directly or indirectly (the pathway) a specific component of the baseline environment (the receptor / designated feature). If the receptor / designated feature is sensitive to the change it could result in either a positive or negative effect. **Plate 4-1** presents this model with a specific example to illustrate the concept.

Plate 4-1 Source-Pathway-Receptor Model Example



# 5. Identification of Relevant European Sites

## 5.1 Search Areas

- 5.1.1 Selection of relevant European Sites has had due regard to the updated guidance in September 2024 PINS Advice Note (Ref 3). Any European site within or adjacent to the Project and within the likely Zone of Influence (Zol) of the Project, should be included if there is a potential for the proposed activities to affect it, including those sites designated for mobile Annex II species that have the potential to occur within the Project draft Order Limits or the Zol (Ref 15).
- 5.1.2 The principles outlined above have been used in this Screening assessment to identify relevant European Sites. Search Areas for Annex I habitats and Annex II species which are Qualifying Interests of a European site were developed based on either the maximum Zol of a potential impact on a designated feature (i.e., the maximum spatial extent over which potential impacts could affect receptors), or for mobile Annex II species, the spatial extent over which the impacts of anthropogenic activities should be taken into consideration.

### English Offshore Scheme

- 5.1.3 **Table 5-1** presents the search areas used in the assessment for the English Offshore Scheme, whilst providing justification for the extent of the areas from the draft Order Limits.

Table 5-1 Initial Search Areas for Relevant European Sites for the English Offshore Scheme

Interest Feature	Search Area	Justification
Annex I Habitat	19.8 km from the draft Order Limits	All direct impacts will be spatially limited and confined to the draft Order Limits. There is the potential for indirect impacts from the suspension and deposition of finer sediments to occur outside of the immediate area of activities. <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> has a study area of 19.8 km based on the maximum spring tidal excursion in the English Offshore Scheme. This study area was used to identify relevant designated sites.
	South of and along the adjacent coastline at the Anderby Creek Landfall into the Wash	Presence of external cable protection in the nearshore environment could impact sediment transport to the south of and along the adjacent coastline at Anderby Creek Landfall into the Wash.  Sediment is transported southwards along the coast from the Humber into the Wash. Coastal habitats in the Wash rely on a continuous supply

Interest Feature	Search Area	Justification
Annex Migratory Fish	II 40 km from draft Order Limits	<p>of sediment to maintain their extent. If external cable protection including infrastructure crossings is required in the nearshore as the English Offshore Scheme approaches the Anderby Creek Landfall, this may introduce changes to the local hydrodynamic and wave regime, this could affect habitats. Subsequently, this could result in changes to the sediment transport pathways of which the supporting habitats of habitats rely. Specifically, the Saltfleetby-Theddlethope Dunes, Gibraltar Point SAC, Gibraltar Point Ramsar and the Wash and North Norfolk Coast SAC.</p> <p>Underwater noise is considered to be the impact with the largest range affecting migratory fish. <b>Volume 2, Part 3, Appendix 21.A: Underwater Noise Assessment</b> identified that for the most sensitive fish species (those with a swim bladder involved in hearing) the largest range for injury would be up to 900 m as a result of high order UXO clearance, and that disturbance would occur within hundreds of metres. A search area of 40 km is considerably greater than the potential noise footprint of the English Offshore Scheme, which takes into account that highly mobile migratory fish species may travel within range for an impact to occur. Therefore, 40 km from the draft Order Limits is considered to be a precautionary and inclusive range for the screening process.</p> <p>Brook lamprey (<i>Lampetra planeri</i>) are entirely freshwater species and do not migrate out to sea. As there are no SACs with brook lamprey as a designated feature at the Anderby Creek Landfall and given that the English Offshore Scheme is offshore, they are 'screened out' for further consideration.</p>
Annex II Otter	5 km along the coast in either direction from the Anderby Creek Landfall	<p>The Eurasian otter (<i>Lutra lutra</i>) is a semi-aquatic mammal which occurs in a wide variety of aquatic habitats such as rivers, streams, lakes, estuaries and on the coast. In freshwater habitats, otters are largely (but not exclusively) nocturnal and occupy very large home ranges (around 32 km for males and 20 km for females). It has been suggested that the otter's range is approximately 80 m seaward from the coast (National Parks and Wildlife Service (NPWS), 2015, Ref 16). Coastal otters generally have much smaller home ranges than their riverine</p>

Interest Feature	Search Area	Justification
Annex Cetaceans	II North Sea (NS) Management Unit (MU) for harbour porpoise ( <i>Phocoena phocoena</i> ); Greater North Sea (GNS) MU for bottlenose dolphin ( <i>Tursiops truncatus</i> )	<p>counterparts, these can be as little as 4 to 5 km of coastline, because of the abundance of fish and crustacean prey in inshore waters (Ref 17). Therefore, any site within 5 km of the Anderby Creek Landfall (along the coastline) will be considered in the Screening.</p> <p>In the UK the only cetacean species afforded protection through the designation of a SAC are bottlenose dolphin and harbour porpoise. Most cetaceans are wide-ranging, and individuals encountered within UK waters form part of a much larger biological population whose range extends into adjacent jurisdictions. As a result, MUs have been outlined for the species by the Inter-Agency Marine Mammal Working Group (Ref 18) which comprises representatives from the UK SNCBs i.e., Natural England, NatureScot, Natural Resources Wales and the Department of Agriculture, Environment and Rural Affairs. The boundaries of a MU do not necessarily reflect the full range of a species but instead shows areas within their territory where management of human activities is undertaken. These units were defined by considering several factors including the known population structure, movement and habitat use, as well as jurisdictional boundaries and divisions already used in the management of human activities. MUs provide a wider geographic context in terms of species present and their estimated densities and abundance. This scale defines the appropriate reference populations for the assessment.</p> <p>The English Offshore Scheme lies within the NS MU for harbour porpoise the GNS MU for bottlenose dolphin. One SAC was identified for harbour porpoise within the NS MU and is therefore considered in the Screening. However, no SACs were identified for bottlenose dolphin within the GNS MU and therefore, this species is 'screened out' for further consideration.</p>
	Transboundary search area of 250 km from the draft Order Limits	<p>A distance of 250 km from the draft Order Limits has been used to screen transboundary European Sites. In UK waters harbour porpoise are observed to have seasonal grounds which stretch longitudinally for approximately 250 km. Therefore, 250 km is an appropriate distance to screen sites for mobile marine mammal species. Given that the impact with the largest Zol for marine mammals is underwater noise and that</p>

Interest Feature	Search Area	Justification
Annex II Grey Seal ( <i>Halichoerus grypus</i> )	100 km from the draft Order Limits	the Effective Deterrent Range (EDR) for geophysical surveys is 3 km (as recommended by (Ref 12) this is a precautionary and conservative value. Five transboundary sites were identified within 250 km of the draft Order Limits for harbour porpoise and are therefore considered in the Screening. However, no transboundary sites were identified for bottlenose dolphin and therefore this species is 'screened out' for further consideration.
Annex II Harbour Seal ( <i>Phoca vitulina</i> )	50 km from the draft Order Limits	The Zol has been established based on information presented in the Offshore Energy Strategic Environmental Assessment 4 (Ref 19) stating that grey seals are estimated to forage up to 100 km from haul-out sites on the coast, whilst harbour seal take shorter trips up to 50 km (Ref 19).
Annex I bird species regularly occurring migratory species	Breeding birds based on & mean max foraging ranges for + one standard deviation for priority species (as identified in <b>Table 5-2</b> ) from the draft Order Limits. Where the foraging range is less than the largest Zol for ornithology (8.8 km) receptors, but the SPA / Ramsar is within range for this impact, these species will be considered. Transboundary European Sites Based on mean max foraging ranges for priority species (as identified in <b>Table 5-2</b> ) from the draft Order Limits.	There is the possibility that species from distant SPAs may be foraging within or passing through the draft Order Limits. (Ref 20) and (Ref 21) reported on representative foraging ranges for a range of species from a breeding colony to a foraging area. Whilst applying mean maximum foraging + one standard deviation radius would encompass the majority of a population's home-range area, the overall size of the predicted foraging areas around the colony would potentially make it too large to be a useful management tool (Ref 22). Similarly, the assumption that seabirds are uniformly distributed out to some threshold distance from their colonies, such as their putative maximum foraging range, is unrealistic (Ref 23). Therefore, given the scale of the English Offshore Scheme, it was considered disproportionate to identify relevant SPAs on the basis of maximum foraging ranges of their protected features, as there is no evidence to support an impact pathway given the scale and nature of the English Offshore Scheme. As such a refined list of seabird SPAs has been included. This is based on the advice from MIG-Birds (Ref 13) which identifies that the priority species for assessment of displacement effects are typically diver and sea duck species, common guillemot ( <i>Uria aalge</i> ), razorbill ( <i>Alca torda</i> ), Atlantic puffin ( <i>Fratercula arctica</i> ) and

Interest Feature	Search Area	Justification
		<p>gannet (<i>Morus bassanus</i>). It is noted that this guidance relates specifically to offshore wind farm (OWF) developments (in relation to the wind farm arrays). However, it is recognised that these species are also likely to be sensitive to vessel presence and noise, leading to disturbance and displacement. For example, it is advised by Natural England that there is potential for red-throated divers (<i>Gavia stellata</i>) to be displaced from up to 2 km from vessels. Razorbill and Atlantic puffin are also identified as being susceptible to displacement due to vessel traffic (Ref 24).</p> <p>SPAs have been considered relevant if designated for priority seabird (guillemot, razorbill and Atlantic puffin), diver and sea duck species identified as being sensitive to disturbance / displacement (Ref 13; Ref 24), or a species which is identified as having a high habitat specialisation, which could potentially be present within the draft Order Limits based on their mean-maximum foraging ranges + one standard deviation (Ref 21). Disturbance susceptibility and habitat specialisation are vulnerability factors assessed using a scale of 1 to 5, where 5 anticipated a strong negative impact. The exception is gannet, which scores 2 (low sensitivity) under 'Disturbance Susceptibility' and 'Habitat Specialisation' scores from (Ref 25) (expanded from Ref 26) but have had scores revised by Wade <i>et al.</i>, (Ref 24) based on empirical studies demonstrating they are sensitive to displacement and barrier effects from OWFs (Ref 27; Ref 28). However, sensitivity to displacement from vessels remains low (score 2). Gannet therefore have been discounted from the Screening.</p> <p>However, where the foraging range is less than the largest Zol for ornithology receptors, but the SPA / Ramsar is within range for this impact, these species will be considered in the Screening report. As identified in <b>Table 6-1</b> the largest Zol is 8.8 km from the draft Order Limits for the impact of a temporary increase and deposition of suspended sediments. Therefore, where a species such as little tern (<i>Sterna albifrons</i>) has a breeding foraging range of 5 km, it will still be considered if the European site is within 8.8 km.</p>

Interest Feature	Search Area	Justification
		<p>As the maximum foraging range of priority bird species (as listed in <b>Table 5-2</b>) is 250.8 km, this distance has been used to screen for ornithology transboundary European Sites. There are no transboundary sites designated for priority species. There are no source-pathway-receptor links which may have implications for the conservation objectives of the transboundary sites beyond this range.</p>
	<p>For non-breeding birds, this is based on the maximum Zol for ornithology receptors which is 8.8 km from the draft Order Limits</p>	<p>As the foraging ranges provided by Woodward <i>et al.</i>, (Ref 21) are based on breeding colonies, this is not considered an appropriate method to screen for non-breeding bird features. SPAs and Ramsar sites have been considered relevant if designated for non-breeding species identified as being sensitive to disturbance / displacement (Ref 13) or a species which is identified as having a high habitat specialisation if the site is within the largest Zol which could impact ornithology receptors. The largest Zol is 8.8 km from the draft Order Limits for the impact of a temporary increase and deposition of suspended sediments. Therefore, non-breeding bird features within 8.8 km of the draft Order Limits will be considered.</p>
	<p>South of and along the adjacent coastline at the Anderby Creek Landfall into the Wash</p>	<p>Sediment is transported southwards along the coast from the Humber into the Wash. Coastal habitats in the Wash rely on a continuous supply of sediment to maintain their extent. If external cable protection including infrastructure crossings is required in the nearshore as the English Offshore Scheme approaches the Anderby Creek Landfall, this may introduce changes to the local hydrodynamic and wave regime, this could affect habitats. Subsequently, this could result in changes to the sediment transport pathways of which the supporting habitats of birds rely. Specifically, the Wash SPA and the Wash Ramsar.</p>

5.1.4 As described in **Table 5-1** above, the mean-maximum foraging ranges for a number of priority bird species, including those which are particularly sensitive to disturbance, or which are habitat specialists has been used to identify the SPAs and Ramsar sites which have the potential to interact with the English Offshore Scheme. The English Offshore Scheme considered as part of this Screening report is a grid reinforcement cable project, and as such is unlikely to adversely affect bird populations at the same scale as an Offshore Wind Farm (OWF). If no data has been provided for a species' foraging range, the maximum for the functional group has been assumed. Note that the breeding foraging

ranges for common guillemot, razorbill and Atlantic puffin are those within Appendix 1 of Woodward *et al.* (Ref 21), which excludes data from Fair Isle where the foraging range may have been unusually high as a result of reduced prey availability during the study year.

5.1.5 Disturbance susceptibility and habitat specialisation are vulnerability factors assessed using a scale of 1 to 5, where species with higher scores (5) are considered more sensitive to displacement (Ref 13).

5.1.6 **Table 5-2** below describes the foraging ranges used to screen in the relevant bird species. The following definitions are used to define confidence in the foraging ranges:

- Highest - Exhibited in more than 5 direct studies where graphs and standard deviation suggest relatively low variability between sites and hence higher confidence that estimates are likely to be representative for unsampled sites.
- Good - Exhibited in more than 5 direct studies where graphs and standard deviation show wider variability between sites, hence lower confidence that estimates will be representative for all sites
- Moderate – Exhibited in between 2-5 direct studies and poor confidence shows very few survey estimates or speculative only.
- Low data exhibits indirect measures or only 1 direct study.
- Uncertain data represents survey-based estimates.

Table 5-2 Foraging Ranges used to Screen Relevant SPAs (Offshore)

Species Name	Disturbance Susceptibility *	Habitat Specialisation *	Foraging Ranges (km) ± 1Standard Deviation ^	Confidence ^
<b>Priority Species</b>				
Common guillemot ( <i>Uria aalge</i> )	3	3	55.5 ± 39.7 (95.2)	Highest
Razorbill ( <i>Alca torda</i> )	3	3	73.8 ± 48.4 (122.2)	Good
Atlantic puffin ( <i>Fratercula arctica</i> )	2	3	119.6 ± 131.2 (250.8)	Good
<b>Divers, Grebes and Mergansers</b>				
Black-throated diver ( <i>Gavia arctica</i> )	5	4	No data	No data

Species Name	Disturbance Susceptibility *	Habitat Specialisation *	Foraging Ranges (km) $\pm$ 1Standard Deviation ^	Confidence ^
Red-throated diver ( <i>Gavia stellata</i> )	5	4	9.0	Low
Great northern diver ( <i>Gavia immer</i> )	5	3	No data	No data
White-billed diver ( <i>Gavia adamsii</i> )	5	4	No data	No data
European shag ( <i>Gulosus aristotelis</i> )	3	3	13.2 $\pm$ 10.5 (23.7)	Highest
Great cormorant ( <i>Phalacrocorax carbo</i> )	4	3	25.6 $\pm$ 8.3 (33.9)	Moderate
Red-breasted merganser ( <i>Mergus serrator</i> )	3	4	No data	No data
Goosander ( <i>Mergus merganser</i> )	4	4	No data	No data
Great-crested grebe ( <i>Podiceps cristatus</i> )	3	4	No data	No data
Slavonian grebe ( <i>Podiceps auritus</i> )	3	4	No data	No data
<b>Seaducks</b>				
Common scoter ( <i>Melanitta nigra</i> )	5	4	No data	Uncertain
Common goldeneye ( <i>Bucephala clangula</i> )	4	4	No data	No data

Species Name	Disturbance Susceptibility *	Habitat Specialisation *	Foraging Ranges (km) $\pm$ 1Standard Deviation ^	Confidence ^
Velvet scoter ( <i>Melanitta fusca</i> )	5	3	No data	Moderate
Common eider ( <i>Somateria mollissima</i> )	3	4	21.5	Poor
Greater scaup ( <i>Aythya marila</i> )	4	4	No data	No data
Long-tailed duck ( <i>Clangula hyemalis</i> )	3	4	No data	Uncertain
<b>Auks</b>				
Black guillemot ( <i>Cepphus grylle</i> )	3	4	4.8 $\pm$ 4.3 (9.1)	Moderate
<b>Terns and Gulls</b>				
Little tern ( <i>Sterna albifrons</i> )	2	4	5.0	Moderate
Arctic tern ( <i>Sterna paradisaea</i> )	2	3	25.7 $\pm$ 14.8 (40.5)	Good
Sabine's gull ( <i>Xema sabini</i> )	2	3	No data	No data
Black tern ( <i>Chlidonias niger</i> )	2	3	No data	No data
Roseate tern ( <i>Sterna dougallii</i> )	2	3	12.6 $\pm$ 10.6 (23.2)	Moderate
Sandwich tern ( <i>Thalasseus sandvicensis</i> )	2	3	34.3 $\pm$ 23.2 (57.5)	Moderate
Common tern ( <i>Sterna hirundo</i> )	No data	No data	18.0 $\pm$ 8.9 (26.9)	Good

Species Name	Disturbance Susceptibility *	Habitat Specialisation *	Foraging Ranges (km) $\pm$ 1Standard Deviation ^	Confidence ^
Black-headed gull ( <i>Chroicocephalus ridibundus</i> )	1	3	18.5	Uncertain

\*MIG-Birds, (Ref 13)

^ Woodward *et al.*, (Ref 21)

Note: where a foraging range has not been prescribed for a species it is assumed the highest foraging range for the relevant group applies.

## English Onshore Scheme

5.1.7 **Table 5-3** presents the search areas used in the assessment of the English Onshore Scheme.

Table 5-3 Initial Search Areas for Relevant European Sites for Onshore Works

Interest Feature	Search Area	Justification
Annex I Habitat	5 km from draft Order Limits	<p>All direct impacts will be spatially limited and confined to the draft Order Limits. There is the potential for alteration of downstream habitats due to the potential spread of Invasive Non-Native Plant Species (INNPS) as a result of the proposed works. To account for this, a 5 km downstream search area has been applied to ensure that any changes affecting habitat conditions and associated ecological processes are fully considered.</p> <p>The primary mechanism for INNPS dispersal in this context is the transport of seeds, plant fragments or propagules through watercourses, which could facilitate the establishment of INNPS in downstream habitats. This approach follows the precautionary principle, ensuring that potential impacts are assessed properly.</p> <p>Additionally, a 500 m buffer from the edge of the draft Order Limits has been applied to represent the maximum hydrological Zol for water quality impacts, based on the nature of works and the best practice measures, which are in place regardless of the connectivity with any European Sites downstream. This is a separate consideration from the 5 km Zol applied for INNPS pathways. This 500 m Zol reflects the potential extent to which sediment, pollutants or changes in hydrology could be transported downstream and influence sensitive habitats.</p>

Interest Feature	Search Area	Justification
Annex I bird species & Annex II Otter using inland areas as Functionally Linked Land (FLL)	10 km from draft Order Limits	<p>A search area covering terrestrial land within the draft Order Limits and extending up to 10 km beyond draft Order Limits has been applied for Annex I bird species, and Annex II otter. This buffer ensures that functionally linked habitat is considered for these mobile species.</p> <p>For Annex I bird species, the 10 km buffer ensures that potential important FLL is considered for bird species associated with SPAs that may rely on terrestrial habitats outside designated site boundaries. Many SPA bird species use surrounding terrestrial areas for foraging, roosting, loafing, and commuting between key habitats, making these areas ecologically important despite being outside the SPA itself.</p> <p>For otter, although individuals can have large home ranges (32 km for males, 20 km for females), they tend to establish core activity areas rather than using their entire range at once. Since potential prey availability and habitat alterations due to waterborne pollution are assessed within 500 m as discussed in the above search area, the 10 km buffer is precautionary enough to capture potential impacts on otters that may use terrestrial areas within or near the draft Order Limits or travel upstream from the estuary.</p>
Annex II Harbour / Common Seal & Annex II Grey Seal	20 km from draft Order Limits	<p>For harbour seals and grey seals, the 20 km buffer accounts for their known inland movements, particularly within estuaries and river systems. Seals frequently use these areas for foraging, resting, and potential haul-out locations. Given their mobility and use of freshwater environments, this buffer ensures that any connectivity between the Projectand designated sites supporting harbour seal populations is appropriately assessed.</p>
Annex II Fish	30 km from draft Order Limits	<p>A search area for qualifying interest fish species within the draft Order Limits and extending up to 30 km has been applied, but only where downstream and upstream hydrological connectivity exists. This buffer ensures that FLL is considered for fish species that may rely on watercourses that cross or are near the draft Order Limits. Migratory fish species, such as sea lamprey (<i>Petromyzon marinus</i>), and river lamprey (<i>Lampetra fluviatilis</i>), travel between freshwater and marine environments over significant distances during key life stages, including spawning, juvenile development, and migration. Additionally, a review of designated sites within 30 km of the draft Order Limits has confirmed that no Special Areas of Conservation (SACs) designated for spined loach (<i>Cobitis taenia</i>), or where spined loach is a qualifying (primary or non-primary) feature, occur</p>

Interest Feature	Search Area	Justification
		<p>upstream of any watercourses crossed by the Project. The nearest SACs supporting spined loach (e.g., Baston Fen, Nene Washes, Ouse Washes, River Mease, and Fenland SAC) fall outside the hydrological catchments intersected by the Project, with no upstream pathways linking these sites to the proposed works. To ensure a proportionate and evidence-led approach, Environment Agency Ecology &amp; Fish Data Explorer records from the last 10 years were assessed within an approximate 30 km radius of the draft Order Limits. This identified four historical records of spined loach (2015–2016): three located within the East &amp; West Fen Drains water body (c. 20 km southwest) and one within the Rase (Market Rasen to Bishopbridge) water body (c. 30 km). None of these locations have direct hydrological connectivity to the watercourses crossed by the Project. Given the absence of SACs designated for, or supporting, spined loach upstream of any Project watercourse crossings, the lack of hydrological pathways between the Project and known records of the species; and the species' highly localised habitat requirements and restricted distribution, the potential for the Project to give rise to effects on spined loach is unlikely. Accordingly, while spined loach was initially considered under the precautionary principle, it is appropriate and justified to scope the species out of further HRA assessment on the basis of no realistic impact pathway.</p>

## 5.2 Relevant European Sites

### English Offshore Scheme

- 5.2.1 A Geographical Information System (GIS) using publicly available shapefiles from Natural England, (Ref 29 ), NatureScot, (Ref 30) and the Scottish Government (Ref 31) was used to identify European Sites within the relevant search areas.
- 5.2.2 There are five transboundary European Sites which meet the Stage 1 Screening criteria. These are listed in **Annex A** of this document along with the relevant qualifying species.
- 5.2.3 **Volume 3, Part 1, Figure 5-1: Relevant Special Areas of Conservation and Transboundary European Sites within Annex II Harbour Porpoise Search Area** presents the relevant SACs and marine mammal transboundary European Sites within the Search Areas defined in **Table 5-1**. **Volume 3, Part 1, Figure 5-2: Relevant Special Areas of Conservation and Ramsar's within Annex II Migratory Fish Search Area** presents migratory fish sites within 40 km of the draft Order Limits and **Volume 3, Part 1, Figure 5-3: Relevant Special Areas of Conservation and Ramsar's within Annex II Grey Seal and Harbour Seal Search Area** presents grey seal and harbour seal sites within 100 and 50 km, respectively. **Volume 3, Part 1, Figure 5-4: Relevant Special Areas of Conservation and Ramsar's within Annex I Habitat Search Area** presents

Annex I habitats within 8.8 km of the draft Order Limits and / or South of and along the adjacent coastline at Anderby Creek Landfall into the Wash.

- 5.2.4 SPAs and Ramsar sites (only including bird components) in the vicinity of the offshore works were screened in using the search areas mentioned in **Table 5-1** and **Table 5-2**. **Volume 3, Part 1, Figure 5-5: Relevant Special Protection Areas and Ramsar's within Ornithology Search Areas (Part 1)** and **Volume 3, Part 1, Figure 5-6: Relevant Special Protection Areas and Ramsar's within Ornithology Search Areas (Part 2)** present the relevant SPAs and Ramsar's within the maximum foraging range for the priority species, as defined in **Table 5-2**. It should be noted that there were no relevant SPAs identified with black guillemot as a designated feature and as this was the only species included under 'auks', this functional group has not been included in **Volume 3, Part 1, Figure 5-2**.
- 5.2.5 **Table 5-4** lists the European Sites selected for consideration in the Stage 1 Screening, the relevant Designated Features, distance to the draft Order Limits and the overarching conservation objectives.

Table 5-4 Relevant Sites selected for consideration in the Stage 1 Screening (offshore)

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
Southern North Sea SAC [UK0030395]	England	Harbour porpoise.	To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for harbour porpoise in UK waters. In the context of natural change, this will be achieved by ensuring that: <ul style="list-style-type: none"> <li>▪ Harbour porpoise is a viable component of the site;</li> <li>▪ There is no significant disturbance of the species; and</li> <li>▪ The condition of supporting habitats and processes, and the availability of prey is maintained.</li> </ul>	0.0	Harbour porpoise
Greater Wash SPA [UK9020329]	England	<p><b>Breeding</b></p> <ul style="list-style-type: none"> <li>▪ Sandwich tern</li> <li>▪ Little tern</li> <li>▪ Common tern (<i>Sterna hirundo</i>)</li> </ul> <p><b>Non-breeding</b></p> <ul style="list-style-type: none"> <li>▪ Red-throated diver</li> <li>▪ Common scoter</li> <li>▪ Little gull (<i>Hydrocoloeus minutus</i>)</li> </ul>	To ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring; <ul style="list-style-type: none"> <li>▪ The extent and distribution of the habitats of the qualifying features;</li> <li>▪ The structure and function of the habitats of the qualifying features;</li> </ul>	0.0	All designated features

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
			<ul style="list-style-type: none"> <li>The supporting processes on which the habitats of the qualifying features rely;</li> <li>The population of each of the qualifying features; and</li> <li>The distribution of the qualifying features within the site.</li> </ul>		
Inner Dowsing, Race Bank and North Ridge SAC [UK0030370]	England	<ul style="list-style-type: none"> <li>Sandbanks which are slightly covered by sea water all the time; and</li> <li>Reefs.</li> </ul>	<p>To ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the FCS of its qualifying features, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>The extent and distribution of qualifying natural habitats and habitats of the qualifying species;</li> <li>The structure and function (including typical species) of qualifying natural habitats;</li> <li>The structure and function of the habitats of the qualifying species;</li> <li>The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;</li> <li>The populations of each of the qualifying species; and</li> <li>The distribution of qualifying species within the site.</li> </ul>	6.8	All designated features

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
Humber Estuary SPA [UK9006111]	England	<p><b>Breeding</b></p> <ul style="list-style-type: none"> <li>▪ Pied avocet (<i>Recurvirostra avosetta</i>);</li> <li>▪ Eurasian bittern (<i>Botaurus stellaris</i>)</li> <li>▪ Little tern; and</li> <li>▪ Marsh harrier (<i>Circus aeruginosus</i>)</li> </ul> <p><b>Non-breeding</b></p> <ul style="list-style-type: none"> <li>▪ Pied avocet^;</li> <li>▪ Bar-tailed godwit^;</li> <li>▪ Eurasian bittern^;</li> <li>▪ Black-tailed godwit^;</li> <li>▪ Dunlin (<i>Calidris alpina</i>)^;</li> <li>▪ Golden Plover (<i>Pluvialis apricaria</i>)^;</li> <li>▪ Hen Harrier (<i>Circus cyaneus</i>);</li> <li>▪ Red knot (<i>Calidris canutus</i>)^;</li> <li>▪ Common redshank^;</li> <li>▪ Ruff (<i>Calidris pugnax</i>)^;</li> <li>▪ Common shelduck (<i>Tadorna tadorna</i>)^;</li> <li>▪ Common goldeneye^;</li> <li>▪ Dark-bellied brent goose^;</li> <li>▪ Eurasian wigeon (<i>Mareca penelope</i>)^;</li> </ul>	<p>To ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>▪ The extent and distribution of the habitats of the qualifying features;</li> <li>▪ The structure and function of the habitats of the qualifying features;</li> <li>▪ The supporting processes on which the habitats of the qualifying features rely;</li> <li>▪ The populations of each of the qualifying features; and</li> <li>▪ The distribution of qualifying features within the site.</li> </ul>	7.3	All designated features

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>▪ Eurasian teal (<i>Anas crecca</i>)^;</li> <li>▪ Mallard (<i>Anas platyrhynchos</i>)^;</li> <li>▪ Common pochard (<i>Aythya farina</i>)^;</li> <li>▪ Greater scaup^;</li> <li>▪ Oystercatcher (<i>Haematopus ostralegus</i>)^;</li> <li>▪ Ringed plover (<i>Charadrius hiaticula</i>)^;</li> <li>▪ Grey plover^;</li> <li>▪ Lapwing (<i>Vanellus vanellus</i>)^;</li> <li>▪ Sanderling^;</li> <li>▪ Eurasian curlew (<i>Numenius arquata</i>)^;</li> <li>▪ Greenshank (<i>Tringa nebularia</i>)^;</li> <li>▪ Ruddy turnstone (<i>Arenaria interpres</i>)^; and</li> <li>▪ Waterbird assemblage.</li> </ul>			
Humber Estuary Ramsar [UK11031]	England	<p>A set of nine criteria is used to identify Ramsar's, these highlight the different ecological, biological or conservation value of a site. Each site may be designated under all or specific criterion.</p> <p><b>Criterion 1</b> The site is a representative example of a near-natural estuary with the</p>	<p>There are currently no conservation objectives for the Humber Estuary Ramsar. The Humber Estuary SAC and the Humber Estuary SPA (as outlined within this table) will be used for the appropriate designated features.</p> <p>The conservation objectives for the Humber Estuary SAC are directly applicable to Criterion 1, 3 and 8. Whereas, the conservation objectives for the Humber</p>	7.3	All designated features except for natterjack toad which were scoped out in the EGL 5 Scoping

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<p>following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons.</p> <p><b>Criterion 3</b> The Humber Estuary Ramsar site supports a breeding colony of grey seals at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad (<i>Bufo calamita</i>)</p> <p><b>Criterion 5</b> Waterbird assemblages of international importance</p> <p><b>Criterion 6</b> Species / populations occurring at levels of international importance such as:</p> <ul style="list-style-type: none"> <li>Bar-tailed godwit;</li> </ul>	Estuary SPA are directly applicable to Criterion 5 and 6.		Report (Ref 29)

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>Black-tailed godwit;</li> <li>Dunlin;</li> <li>Golden plover;</li> <li>Red knot;</li> <li>Common redshank; and</li> <li>Common shelduck</li> </ul> <p><b>Criterion 8</b> The Humber Estuary acts as an important migration route for both river lamprey and sea lamprey between coastal waters and their spawning areas.</p>			
Humber Estuary SAC [UK0030170]	England	<ul style="list-style-type: none"> <li>Sea lamprey;</li> <li>River lamprey;</li> <li>Grey seal;</li> <li>Sandbanks which are slightly covered by sea water all the time;</li> <li>Estuaries;</li> <li>Mudflats and sandflats not covered by seawater at low tide;</li> <li>Coastal lagoons;</li> <li><i>Salicornia</i> and other annuals colonising mud and sand;</li> <li>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>);</li> <li>Embryonic shifting dunes;</li> </ul>	<p>To ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its Qualifying Features, by maintaining or restoring;</p> <ul style="list-style-type: none"> <li>The extent and distribution of qualifying natural habitats and habitats of qualifying species;</li> <li>The structure and function (including typical species) of qualifying natural habitats;</li> <li>The structure and function of the habitats of qualifying species;</li> </ul>	7.7	All designated features

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ('White dunes');</li> <li>Fixed dunes with herbaceous vegetation ('Grey dunes'); and</li> <li>Dunes with <i>Hippophae rhamnoides</i>.</li> </ul>	<ul style="list-style-type: none"> <li>The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;</li> <li>The populations of qualifying species; and</li> <li>The distribution of qualifying species within the site.</li> </ul>		
Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC [UK0030270]	England	<ul style="list-style-type: none"> <li>Embryonic shifting dunes;</li> <li>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes"); Shifting dunes with marram;</li> <li>Fixed dunes with herbaceous vegetation ("grey dunes");</li> <li>Dune grassland;</li> <li>Dunes with <i>Hippophae rhamnoides</i>; Dunes with sea-buckthorn; and</li> <li>Humid dune slacks.</li> </ul>	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its Qualifying Features, by maintaining or restoring;</p> <ul style="list-style-type: none"> <li>The extent and distribution of the qualifying natural habitats;</li> <li>The structure and function (including typical species) of the qualifying natural habitats; and</li> <li>The supporting processes on which the qualifying natural habitats rely.</li> </ul>	7.8	All designated features
Gibraltar Point SPA [UK9008022]	England	<ul style="list-style-type: none"> <li>Bar-tailed godwit;</li> <li>Grey plover;</li> <li>Little Tern; and</li> <li>Sanderling.</li> </ul>	<p>To ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>the extent and distribution of the habitats of the qualifying features;</li> <li>the structure and function of the habitats of the qualifying features;</li> </ul>	16.1	All designated features

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
			<ul style="list-style-type: none"> <li>the supporting processes on which the habitats of the qualifying features rely;</li> <li>the populations of each of the qualifying features; and</li> <li>the distribution of qualifying features within the site</li> </ul>		
Gibraltar Point [UK11027] Ramsar	England	<p><b>Criterion 1</b> The dune and saltmarsh habitats present on the site are representative of all the stages of colonisation and stabilisation.</p> <p><b>Criterion 2</b> Supports an assemblage of wetland invertebrate species of which eight species are listed as rare in the British Red Data Book and a further four species listed as vulnerable.</p> <p><b>Criterion 5</b> Waterbird assemblages of international importance</p> <p><b>Criterion 6</b> Species / populations occurring at levels of international importance such as:</p>	<p>There are currently no conservation objectives for Gibraltar Point Ramsar. The conservation objectives for Gibraltar Point SPA and Saltfleetby-Theddlethorpe Dunes &amp; Gibraltar Point SAC (as outlined within this table) will be used for the appropriate designated features.</p> <p>The conservation objectives for Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC are directly applicable to Criterion 1 whereas, the conservation objectives for Gibraltar Point SPA are directly applicable to Criterion 5 and 6.</p> <p>There are no conservation objectives applicable to Criterion 2</p>	16.1	All designated features

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>Bar-tailed godwit;</li> <li>Dark-bellied brent goose;</li> <li>Sanderling;</li> </ul>			
The Wash and North Norfolk Coast SAC [UK0017075]	England	<ul style="list-style-type: none"> <li>Otter;</li> <li>Harbour seal;</li> <li>Sandbanks which are slightly covered by sea water all the time;</li> <li>Mudflats and sandflats not covered by seawater at low tide;</li> <li>Coastal lagoons;</li> <li>Large shallow inlets and bays;</li> <li>Reefs;</li> <li>Salicornia and other annuals colonising mud and sand;</li> <li>Atlantic salt meadows; and</li> <li>Mediterranean and thermo-Atlantic <i>halophilous</i> scrubs (<i>Sarcocornetea fruticosi</i>)</li> </ul>	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its Qualifying Features, by maintaining or restoring;</p> <ul style="list-style-type: none"> <li>The extent and distribution of qualifying natural habitats and habitats of qualifying species;</li> <li>The structure and function (including typical species) of qualifying natural habitats;</li> <li>The structure and function of the habitats of qualifying species;</li> <li>The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;</li> <li>The populations of qualifying species; and</li> <li>The distribution of qualifying species within the site.</li> </ul>	16.2	All designated features except otter as this site is outside of the search area defined in <b>Table 5-1</b>
The Wash SPA [UK9008021]	England	<p><b>Breeding</b></p> <ul style="list-style-type: none"> <li>Common tern; and</li> <li>Little tern.</li> </ul>	To ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring;	19.0	All designated features

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<p><b>Non-breeding</b></p> <ul style="list-style-type: none"> <li>▪ Bar-tailed godwit;</li> <li>▪ Bewick's swan (<i>Cygnus columbianus bewickii</i>);</li> <li>▪ Black-tailed godwit (<i>Limosa limosa islandica</i>);</li> <li>▪ Common scoter;</li> <li>▪ Eurasian Curlew (<i>Numenius arquata</i>);</li> <li>▪ Dark-bellied brent goose (<i>Branta bernicla bernicla</i>);</li> <li>▪ Dunlin;</li> <li>▪ Gadwall (<i>Anas strepera</i>);</li> <li>▪ Common goldeneye;</li> <li>▪ Grey plover;</li> <li>▪ Red Knot (<i>Calidris canutus</i>);</li> <li>▪ Oystercatcher (<i>Haematopus ostralegus</i>);</li> <li>▪ Pink-footed goose (<i>Anser brachyrhynchus</i>);</li> <li>▪ Northern Pintail (<i>Anas acuta</i>);</li> <li>▪ Common Redshank;</li> <li>▪ Sanderling;</li> <li>▪ Common Shelduck;</li> <li>▪ Ruddy Turnstone (<i>Arenaria interpres</i>);</li> </ul>	<ul style="list-style-type: none"> <li>▪ The extent and distribution of the habitats of the qualifying features;</li> <li>▪ The structure and function of the habitats of the qualifying features;</li> <li>▪ The supporting processes on which the habitats of the qualifying features rely;</li> <li>▪ The population of each of the qualifying features; and</li> <li>▪ The distribution of the qualifying features within the site.</li> </ul>		

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>Waterbird assemblage [lapwing, black-headed gull, golden plover, Eurasian teal, common eider, Sandwich tern, ringed plover, pied avocet, shoveler (<i>Spatula clypeata</i>), whooper swan (<i>Cygnus cygnus</i>), little egret (<i>Egretta garzetta</i>), Mediterranean gull (<i>Ichthyaetus melanocephalus</i>), greenshank, ruff, and tundra bean goose (<i>Anser serrirostris</i>)]; and</li> <li>Eurasian Wigeon</li> </ul>			
The Wash Ramsar [UK11072]	England	<p><b>Criterion 1</b></p> <ul style="list-style-type: none"> <li>The Wash is a large shallow bay comprising very extensive saltmarshes, major intertidal banks of sand and mud, shallow water and deep channels. It is the largest estuarine system in Britain.</li> </ul> <p><b>Criterion 3</b></p> <ul style="list-style-type: none"> <li>Qualifies because of the inter-relationship between its various components including saltmarshes, intertidal sand and mud flats and the estuarine waters. The saltmarshes and the plankton in the estuarine water provide a primary source of</li> </ul>	<p>There are currently no conservation objectives for The Wash Ramsar. The conservation objectives for The Wash and North Norfolk Coast SAC and The Wash SPA (as outlined within this table) will be used for the appropriate designated features.</p> <p>The conservation objectives for The Wash and North Norfolk Coast SAC are directly applicable to Criterion 1 and Criterion 3 whereas, the conservation objectives for The Wash SPA are directly applicable to Criterion 5 and 6.</p>	19	All designated features

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<p>organic material which, together with other organic matter, forms the basis for the high productivity of the estuary.</p> <p><b>Criterion 5</b></p> <ul style="list-style-type: none"> <li>Waterbird assemblages of international importance</li> </ul> <p><b>Criterion 6</b></p> <p>Species / populations occurring at levels of international importance such as:</p> <ul style="list-style-type: none"> <li>Bar-tailed godwit;</li> <li>Eurasian curlew;</li> <li>Dark-bellied brent goose;</li> <li>Dunlin;</li> <li>Grey plover;</li> <li>Red knot;</li> <li>Oystercatcher;</li> <li>Pink-footed goose;</li> <li>Northern pintail;</li> <li>Common redshank;</li> <li>Sanderling;</li> <li>Common shelduck; and</li> <li>Ruddy turnstone.</li> </ul>			

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
Flamborough and Filey Coast SPA [UK9006101]	England	<b>Breeding</b> <ul style="list-style-type: none"> <li>Common guillemot;</li> <li>Razorbill;</li> <li>Atlantic puffin*;</li> <li>Great cormorant*;</li> <li>Gannet;</li> <li>Kittiwake;</li> <li>Herring gull*;</li> <li>European shag*; and</li> <li>Fulmar (<i>Fulmarus glacialis</i>)*.</li> </ul>	<p>To ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring;</p> <ul style="list-style-type: none"> <li>The extent and distribution of the habitats of the qualifying features;</li> <li>The structure and function of the habitats of the qualifying features;</li> <li>The supporting processes on which the habitats of the qualifying features rely;</li> <li>The population of each of the qualifying features; and</li> <li>The distribution of the qualifying features within the site.</li> </ul>	24.7	<b>Breeding</b> Common guillemot Razorbill Atlantic puffin* Great cormorant* All other designated features were screened out as they do not meet the search area criteria defined in <b>Table 5-1</b> .
North Norfolk Coast SPA [UK9009031]	England	<b>Breeding</b> <ul style="list-style-type: none"> <li>Sandwich tern;</li> <li>Pied avocet;</li> <li>Eurasian bittern;</li> <li>Common tern;</li> <li>Little tern;</li> <li>Marsh Harrier; and</li> <li>Montagus harrier (<i>Circus pygargus</i>).</li> </ul>	<p>To ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>The extent and distribution of the habitats of the qualifying features;</li> <li>The structure and function of the habitats of the qualifying features;</li> </ul>	35.1	<b>Breeding</b> Sandwich tern All other designated features were screened out as they do not meet the search area

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<p><b>Non-breeding</b></p> <ul style="list-style-type: none"> <li>▪ Dark-bellied brent goose^;</li> <li>▪ Red knot^;</li> <li>▪ Pink-footed goose^;</li> <li>▪ Eurasian wigeon^;</li> <li>▪ White-fronted Goose^;</li> <li>▪ Common shelduck^;</li> <li>▪ Northern pintail^;</li> <li>▪ Oystercatcher^;</li> <li>▪ Ringed Plover^;</li> <li>▪ Grey Plover^; and</li> <li>▪ Common redshank^</li> </ul>	<ul style="list-style-type: none"> <li>▪ The supporting processes on which the habitats of the qualifying features rely;</li> <li>▪ The populations of each of the qualifying features; and</li> <li>▪ The distribution of qualifying features within the site.</li> </ul>		criteria defined in <b>Table 5-1</b> .
Northumberland Marine SPA [UK9020325]	England	<p><b>Breeding</b></p> <ul style="list-style-type: none"> <li>▪ Arctic tern;</li> <li>▪ Common guillemot;</li> <li>▪ Atlantic puffin;</li> <li>▪ Sandwich tern;</li> <li>▪ Great cormorant*;</li> <li>▪ Razorbill*;</li> <li>▪ Common tern;</li> <li>▪ Little tern;</li> <li>▪ Roseate tern;</li> <li>▪ European shag*;</li> <li>▪ Black-headed gull*;</li> <li>▪ Kittiwake*;</li> </ul>	<p>To ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>▪ The extent and distribution of the habitats of the qualifying features;</li> <li>▪ The structure and function of the habitats of the qualifying features;</li> <li>▪ The supporting processes on which the habitats of the qualifying features rely;</li> <li>▪ The populations of each of the qualifying features; and</li> <li>▪ The distribution of qualifying features within the site.</li> </ul>	74.9	<p><b>Breeding</b></p> <p>Common guillemot Atlantic puffin All other designated features were screened out as they do not meet the search area criteria defined in <b>Table 5-1</b>.</p>

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>Great black-backed gull (<i>Larus marinus</i>)*;</li> <li>Lesser black-backed gull (<i>Larus fuscus</i>)*;</li> <li>Herring gull*;</li> <li>Fulmar*.</li> </ul>			
Berwickshire and North Northumberland and Coast SAC [UK0017072]	England & Scotland	<ul style="list-style-type: none"> <li>Grey seal;</li> <li>Mudflats and sandflats not covered by seawater at low tide;</li> <li>Large shallow inlets and bays;</li> <li>Reefs; and</li> <li>Submerged or partially submerged sea caves.</li> </ul>	<p>To ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its Qualifying Features, by maintaining or restoring;</p> <ul style="list-style-type: none"> <li>The extent and distribution of qualifying natural habitats and habitats of qualifying species;</li> <li>The structure and function (including typical species) of qualifying natural habitats;</li> <li>The structure and function of the habitats of qualifying species;</li> <li>The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;</li> <li>The populations of qualifying species; and</li> <li>The distribution of qualifying species within the site.</li> </ul>	78.1	Grey seal All other designated features were screened out as they do not meet the search area criteria defined in <b>Table 5-1</b> .
Outer Firth of Forth and St	Scotland	<p><b>Breeding</b></p> <ul style="list-style-type: none"> <li>Arctic tern;</li> </ul>	Until the updated conservation objectives are available, the following preliminary	84.8	<b>Breeding</b> Atlantic puffin*

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
Andrews Bay Complex SPA [UK9020316]		<ul style="list-style-type: none"> <li>Razorbill;</li> <li>Atlantic puffin*;</li> <li>Common guillemot*;</li> <li>Common tern;</li> <li>European shag;</li> <li>Gannet;</li> <li>Kittiwake (<i>Rissa tridactyla</i>)*;</li> <li>Manx shearwater (<i>Puffinus puffinus</i>)*; and</li> <li>Herring gull (<i>Larus argentatus</i>)*.</li> </ul> <p><b>Non-breeding</b></p> <ul style="list-style-type: none"> <li>Slavonian grebe;</li> <li>Common eider;</li> <li>Razorbill;</li> <li>Common guillemot*;</li> <li>Black-headed gull*;</li> <li>Long-tailed duck^;</li> <li>Common goldeneye^;</li> <li>Red-breasted merganser^;</li> <li>European shag*;</li> <li>Kittiwake*;</li> <li>Herring gull*;</li> <li>Little gull*;</li> <li>Common gull (<i>Larus canus</i>)*;</li> <li>Red-throated diver;</li> </ul>	<p>conservation objectives have been drafted by NatureScot:</p> <p>To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, subject to natural change, thus ensuring that the integrity of the site is maintained in the long-term and it continues to make an appropriate contribution to achieving the aims of the Birds Directive for each of the qualifying species.</p> <p>This contribution would be achieved through delivering the following objectives for each of the site's qualifying features:</p> <ul style="list-style-type: none"> <li>Avoid significant mortality, injury and disturbance of the qualifying features, so that the distribution of the species and ability to use the site are maintained in the long-term; and</li> <li>To maintain the habitats and food resources of the qualifying features in favourable condition.</li> </ul>		<p>Common guillemot*</p> <p>All other designated features were screened out as they do not meet the search area criteria defined in <b>Table 5-1</b>.</p>

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>Common scoter<sup>^</sup>; and</li> <li>Velvet scoter<sup>^</sup>.</li> </ul>			
Coquet Island SPA	England	<b>Breeding</b> <ul style="list-style-type: none"> <li>Atlantic puffin*;</li> <li>Arctic tern*;</li> <li>Common tern*;</li> <li>Roseate tern*;</li> <li>Sandwich tern*;</li> <li>Black-headed gull*;</li> <li>Northern fulmar*;</li> <li>Herring gull*;</li> <li>Lesser black-backed gull*;</li> <li>Black-legged kittiwake*.</li> </ul>	<p>To ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>The extent and distribution of the habitats of the qualifying features;</li> <li>The structure and function of the habitats of the qualifying features;</li> <li>The supporting processes on which the habitats of the qualifying features rely</li> <li>The populations of each of the qualifying features; and</li> <li>The distribution of qualifying features within the site.</li> </ul>	87.5	<b>Breeding</b> Atlantic puffin*  All other designated features were screened out as they do not meet the search area criteria defined in <b>Table 5-1</b> .
Farne Islands SPA [UK9006021]	England	<b>Breeding</b> <ul style="list-style-type: none"> <li>Sandwich tern;</li> <li>Common guillemot*;</li> <li>Atlantic puffin*;</li> <li>Roseate tern;</li> <li>Common tern;</li> <li>Arctic tern;</li> <li>Kittiwake*;</li> <li>European shag*;</li> </ul>	<p>To ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>The extent and distribution of the habitats of the qualifying features;</li> <li>The structure and function of the habitats of the qualifying features;</li> </ul>	87.7	<b>Breeding</b> Atlantic puffin*; and Common guillemot*  All other designated

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>Great cormorant*.</li> </ul>	<ul style="list-style-type: none"> <li>The supporting processes on which the habitats of the qualifying features rely; and</li> <li>The population of each of the qualifying features.</li> </ul> <p>The distribution of the qualifying features within the site.</p>		features were screened out as they do not meet the search area criteria as defined in <b>Table 5-1</b> .
St Abb's Head to Fast Castle SPA [UK9004271]	Scotland	<b>Breeding</b> <ul style="list-style-type: none"> <li>Razorbill*;</li> <li>Common guillemot*;</li> <li>Herring gull*;</li> <li>Kittiwake*;</li> <li>and</li> <li>European shag*.</li> </ul>	<p>To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and ensure for the qualifying species that the following are maintained in the long term:</p> <ul style="list-style-type: none"> <li>Population of the species as a viable component of the site;</li> <li>Distribution of the species within site;</li> <li>Distribution and extent of habitats supporting the species;</li> <li>Structure, function and supporting processes of habitats;</li> <li>supporting the species; and</li> <li>No significant disturbance of the species.</li> </ul>	113.0	<b>Breeding</b> Razorbill* <p>All other designated features were screened out as they do not meet the search area criteria as defined in <b>Table 5-1</b>.</p>
Fowlsheugh SPA	Scotland	<b>Breeding</b> <ul style="list-style-type: none"> <li>Northern fulmar*;</li> <li>Common guillemot*;</li> </ul>	<p>To ensure that the qualifying features of the Fowlsheugh SPA are in favourable condition and make an appropriate contribution to achieving FCS.</p>	116.2	<b>Breeding</b> Razorbill*

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>▪ Herring gull*;</li> <li>▪ Black-legged kittiwake*;</li> <li>▪ Razorbill*.</li> </ul>	<p>To ensure that the integrity of the Fowlsheugh SPA is restored in the context of environmental changes by meeting the following objectives:</p> <ul style="list-style-type: none"> <li>▪ The populations of the qualifying features are viable components of the Fowlsheugh SPA;</li> <li>▪ The distribution of the qualifying features is maintained, or where appropriate restored, throughout the site by avoiding significant disturbance of the species; and</li> <li>▪ The supporting habitats and processes relevant to qualifying features and their prey resources are maintained, or where appropriate restored, at the Fowlsheugh SPA.</li> </ul>		<p>All other designated features were screened out as they do not meet the search area criteria as defined in <b>Table 5-1</b>.</p>
Forth Islands SPA [UK9004171]	Scotland	<p><b>Breeding</b></p> <ul style="list-style-type: none"> <li>▪ Atlantic puffin*;</li> <li>▪ Razorbill*;</li> <li>▪ Common guillemot*;</li> <li>▪ Arctic tern;</li> <li>▪ Common tern;</li> <li>▪ Great Cormorant*;</li> <li>▪ Gannet;</li> <li>▪ Herring gull*;</li> <li>▪ Kittiwake*;</li> <li>▪ Lesser black-backed gull;</li> </ul>	<p>To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and ensure for the qualifying species that the following are maintained in the long term:</p> <ul style="list-style-type: none"> <li>▪ Population of the species as a viable component of the site;</li> <li>▪ Distribution of the species within site;</li> <li>▪ Distribution and extent of habitats supporting the species;</li> </ul>	132.5	<p><b>Breeding</b></p> <p>Atlantic puffin</p> <p>All other designated features were screened out as they do not meet the search area criteria as</p>

Designated Site	Country	Designated Features	Conservation Objectives	Offshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>▪ Roseate tern;</li> <li>▪ Sandwich tern; and</li> <li>▪ European shag.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Structure, function and supporting processes of habitats supporting the species; and</li> <li>▪ No significant disturbance of the species.</li> </ul>		defined in <b>Table 5-1.</b>

\* Seabird assemblage feature  
^ Waterbird assemblage feature

## English Onshore Scheme

- 5.2.6 **Volume 3, Part 1, Figure 5-7: Designated Sites within the Onshore works Search Areas** presents the SACs, SPAs and Ramsar sites in the vicinity of the English Onshore Scheme, as mentioned in **Table 5-3**.
- 5.2.7 A Geographical Information System (GIS) using publicly available shapefiles from NE, (Ref 29) was used to identify European Sites within the relevant search areas. **Table 5-5** lists the European Sites selected for consideration in the Stage 1 Screening, the relevant Designated Features, distance to the draft Order Limits and the conservation objectives.

Table 5-5: Relevant Sites selected for consideration in the Stage 1 Screening (onshore)

Designated Site	Country	Designated Features	Conservation Objectives	Onshore works	
				Distance to Project (km)	Relevant Designated Features
Greater Wash [UK9020329]	England inshore & England offshore	<p><b>Breeding</b></p> <ul style="list-style-type: none"> <li>Sandwich tern;</li> <li>Little tern; and</li> <li>Common tern (<i>Sterna hirundo</i>)</li> </ul> <p><b>Non-breeding</b></p> <ul style="list-style-type: none"> <li>Red-throated diver;</li> <li>Common scoter; and</li> <li>Little gull (<i>Hydrocoloeus minutus</i>)</li> </ul>	<p>To ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring;</p> <ul style="list-style-type: none"> <li>The extent and distribution of the habitats of the qualifying features;</li> <li>The structure and function of the habitats of the qualifying features;</li> <li>The supporting processes on which the habitats of the qualifying features rely;</li> <li>The population of each of the qualifying features; and</li> <li>The distribution of the qualifying features within the site.</li> </ul>	0.0	All designated features
Humber Estuary [UK9006111]	England	<p><b>Breeding</b></p>	<p>To ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site</p>	8.3	<ul style="list-style-type: none"> <li>Golden plover<sup>1</sup></li> <li>Lapwing</li> </ul>

<sup>1</sup> For the purpose of Habitats Regulation Assessment, Lincolnshire County Council (2022) used a maximum foraging distance of 2km for designated wintering waders (except European golden plover and northern lapwing), brent goose and Eurasian wigeon. For both European golden plover and northern lapwing, the maximum foraging distance was given as 15km to 20km and noted that: 'European golden plover can forage up to 15km from a roost site within a protected site. northern lapwing can also forage similar distances. Both species use lowland farmland in winter, and it is usually difficult to distinguish between designated populations and those present within

Designated Site	Country	Designated Features	Conservation Objectives	Onshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>▪ Pied avocet (<i>Recurvirostra avosetta</i>);</li> <li>▪ Eurasian bittern (<i>Botaurus stellaris</i>)</li> <li>▪ Little tern; and</li> <li>▪ Marsh harrier (<i>Circus aeruginosus</i>)</li> </ul> <p><b>Non-breeding</b></p> <ul style="list-style-type: none"> <li>▪ Pied avocet^;</li> <li>▪ Bar-tailed godwit^;</li> <li>▪ Eurasian bittern^;</li> <li>▪ Black-tailed godwit^;</li> <li>▪ Dunlin (<i>Calidris alpina</i>)^;</li> <li>▪ Golden plover (<i>Pluvialis apricaria</i>)^;</li> <li>▪ Hen harrier (<i>Circus cyaneus</i>);</li> <li>▪ Red knot (<i>Calidris canutus</i>)^;</li> <li>▪ Common redshank^;</li> <li>▪ Ruff (<i>Calidris pugnax</i>)^;</li> <li>▪ Common shelduck (<i>Tadorna tadorna</i>)^;</li> <li>▪ Common goldeneye^;</li> <li>▪ Dark-bellied brent goose^;</li> </ul>	<p>contributes to achieving the aims of the Birds Directive, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>▪ The extent and distribution of the habitats of the qualifying features;</li> <li>▪ The structure and function of the habitats of the qualifying features;</li> <li>▪ The supporting processes on which the habitats of the qualifying features rely;</li> <li>▪ The populations of each of the qualifying features; and</li> <li>▪ The distribution of qualifying features within the site.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Brent goose</li> <li>▪ Wigeon</li> </ul>

the wider environment. Developments affecting functionally linked land more than 10 km from the site are unlikely to impact significantly on designated populations. As such, only golden plover, lapwing, brent goose and wigeon are taken forward for consideration.

Designated Site	Country	Designated Features	Conservation Objectives	Onshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>▪ Eurasian wigeon (<i>Mareca penelope</i>)^;</li> <li>▪ Eurasian teal (<i>Anas crecca</i>)^;</li> <li>▪ Mallard (<i>Anas platyrhynchos</i>)^;</li> <li>▪ Common pochard (<i>Aythya farina</i>)^;</li> <li>▪ Greater scaup^;</li> <li>▪ Oystercatcher (<i>Haematopus ostralegus</i>)^;</li> <li>▪ Ringed plover (<i>Charadrius hiaticula</i>)^;</li> <li>▪ Grey plover^;</li> <li>▪ Lapwing (<i>Vanellus vanellus</i>)^;</li> <li>▪ Sanderling^;</li> <li>▪ Eurasian curlew (<i>Numenius arquata</i>)^;</li> <li>▪ Greenshank (<i>Tringa nebularia</i>)^;</li> <li>▪ Ruddy turnstone (<i>Arenaria interpres</i>)^; and</li> <li>▪ Waterbird assemblage.</li> </ul>			
Humber Estuary Ramsar [UK11031]	England	<p><b>Criterion 1</b></p> <p>The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks,</p>	There are currently no conservation objectives. The Humber Estuary SAC and SPA conservation objectives (as outlined within this table) will be used when the qualifying features are the same.	8.3	<ul style="list-style-type: none"> <li>▪ Grey seal</li> <li>▪ Sea lamprey</li> <li>▪ River lamprey</li> </ul>

Designated Site	Country	Designated Features	Conservation Objectives	Onshore works	
				Distance to Project (km)	Relevant Designated Features
		<p>estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish / saline lagoons.</p> <p><b>Criterion 3</b></p> <p>The Humber Estuary Ramsar site supports a breeding colony of grey seals at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad (<i>Bufo calamita</i>)<sup>2</sup></p>			<ul style="list-style-type: none"> <li>Golden plover<sup>3</sup></li> </ul>

<sup>2</sup> Shallow pools of water on dune slack are the typical breeding habitat of natterjack toads. The adults of this species will forage on sand dunes and grasslands within coastal grazing marshes which adjoin dune systems. The coastal dune systems within the English Onshore Scheme do not provide breeding habitats for natterjack toads and the closest waterbodies which could support breeding amphibians are approximately 600 m from the dunes and are separated by a local road. Given the distance to the designated site and the lack of suitable breeding habitat near to the dunes indicates a lack of impact pathways for this species and therefore natterjack toad have been screened out of this assessment.

<sup>3</sup> For the purpose of Habitats Regulation Assessment, Lincolnshire County Council (2022) used a maximum foraging distance of 2km for designated wintering waders (except European golden plover and northern lapwing), brent goose and Eurasian wigeon. For both European golden plover and northern lapwing, the maximum foraging distance was given as 15km to 20km and noted that: 'European golden plover can forage up to 15km from a roost site within a protected site. northern lapwing can also forage similar distances. Both species use

Designated Site	Country	Designated Features	Conservation Objectives	Onshore works	
				Distance to Project (km)	Relevant Designated Features
		<p><b>Criterion 5</b> Waterbird assemblages of international importance</p> <p><b>Criterion 6</b></p> <ul style="list-style-type: none"> <li>▪ Bar-tailed godwit;</li> <li>▪ Black-tailed godwit;</li> <li>▪ Dunlin;</li> <li>▪ Golden plover;</li> <li>▪ Red knot;</li> <li>▪ Common redshank; and</li> <li>▪ Common shelduck.</li> </ul> <p><b>Criterion 8</b> The Humber Estuary acts as an important migration route for both river lamprey and sea lamprey between coastal waters and their spawning areas.</p>			
Humber Estuary SAC [UK0030170]	England	<ul style="list-style-type: none"> <li>▪ Sea lamprey;</li> <li>▪ River lamprey;</li> <li>▪ Grey seal;</li> </ul>	To ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving	11.8	<ul style="list-style-type: none"> <li>▪ Sea lamprey;</li> <li>▪ River lamprey; and</li> </ul>

lowland farmland in winter, and it is usually difficult to distinguish between designated populations and those present within the wider environment. Developments affecting functionally linked land more than 10km from the site are unlikely to impact significantly on designated populations. As such, only golden plover are taken forward for consideration.

Designated Site	Country	Designated Features	Conservation Objectives	Onshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>Sandbanks which are slightly covered by sea water all the time;</li> <li>Estuaries;</li> <li>Mudflats and sandflats not covered by seawater at low tide;</li> <li>Coastal lagoons;</li> <li><i>Salicornia</i> and other annuals colonising mud and sand;</li> <li>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>);</li> <li>Embryonic shifting dunes;</li> <li>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ('White dunes');</li> <li>Fixed dunes with herbaceous vegetation ('Grey dunes'); and</li> <li>Dunes with <i>Hippophae rhamnoides</i>.</li> </ul>	<ul style="list-style-type: none"> <li>the FCS of its Qualifying Features, by maintaining or restoring;</li> <li>The extent and distribution of qualifying natural habitats and habitats of qualifying species;</li> <li>The structure and function (including typical species) of qualifying natural habitats;</li> <li>The structure and function of the habitats of qualifying species;</li> <li>The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;</li> <li>The populations of qualifying species; and</li> <li>The distribution of qualifying species within the site.</li> </ul>		<ul style="list-style-type: none"> <li>Grey seal</li> </ul>
The Wash and Norfolk Coast SAC [UK0017075]	England	<ul style="list-style-type: none"> <li>Otter;</li> <li>Harbour seal;</li> <li>Sandbanks which are slightly covered by sea water all the time;</li> </ul>	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its Qualifying Features, by maintaining or restoring;	16	<ul style="list-style-type: none"> <li>Harbour Seal</li> </ul>

Designated Site	Country	Designated Features	Conservation Objectives	Onshore works	
				Distance to Project (km)	Relevant Designated Features
		<ul style="list-style-type: none"> <li>▪ Mudflats and sandflats not covered by seawater at low tide;</li> <li>▪ Coastal lagoons;</li> <li>▪ Large shallow inlets and bays;</li> <li>▪ Reefs;</li> <li>▪ Salicornia and other annuals colonising mud and sand;</li> <li>▪ Atlantic salt meadows; and</li> <li>▪ Mediterranean and thermo-Atlantic <i>halophilous</i> scrubs (<i>Sarcocornetea fruticosi</i>).</li> </ul>	<ul style="list-style-type: none"> <li>▪ The extent and distribution of qualifying natural habitats and habitats of qualifying species;</li> <li>▪ The structure and function (including typical species) of qualifying natural habitats;</li> <li>▪ The structure and function of the habitats of qualifying species;</li> <li>▪ The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;</li> <li>▪ The populations of qualifying species; and</li> <li>▪ The distribution of qualifying species within the site.</li> </ul>		

# 6. Potential Impact Pathways

## 6.1 Identification of Potential Impact Pathways

### English Offshore Scheme

- 6.1.1 For works during the English Offshore Scheme, impacts have been established based on industry experience and with reference to the list of marine pressures established by the JNCC Marine Pressures-Activities Database v1.5, (Ref 33), Oslo and Paris Convention (OSPAR) Intercessional Correspondence Group on Cumulative Effects (ICG-C) (Ref 34) and Natural England, JNCC and NatureScot advice on operations for relevant designated sites. The impacts (pressures) considered relevant for the construction, operation and maintenance, and decommissioning of subsea cables are presented in **Table 6-1**. Note that impacts are given in dark grey, bold text, while any corresponding JNCC pressures are provided underneath marked with ‘\*’ in the first column of **Table 6-1**.
- 6.1.2 The Zol for each of the impacts will be used during the Screening assessment to determine whether there is likely to be a source-receptor pathway between the English Offshore Scheme’s licensable activities and the relevant designated feature of a European Site. Rationale for establishing the Zol is provided in **Table 6-1** for the English Offshore Scheme. Conservative estimates have been used when calculating the final Zol for each impact to ensure that all potentially sensitive receptors are accounted for in the HRA process and that the ‘worst-case scenario’ is taken into consideration.

Table 6-1: Potential Impact Pathways between Source and Receptors for Offshore Works

\*Key: C = construction, O&M = operation & maintenance, D = decommissioning

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum Zol
<p><b>1. Temporary habitat loss / seabed disturbance</b></p> <p>Abrasion / disturbance of the substrate on the surface of the seabed*</p> <p>Penetration and / or disturbance of the substratum below the surface of the seabed, including abrasion*</p>	<ul style="list-style-type: none"> <li>Trenchless construction technique</li> <li>Anchoring</li> <li>Pre-sweeping</li> <li>PLGR</li> <li>Boulder clearance</li> <li>UXO Identification</li> <li>Cable lay and burial</li> <li>Cable repair</li> <li>Cable removal</li> </ul>	<p>✓</p>	<p>✓</p>	<p>✓</p>	<p>The laying of cables will lead to seabed abrasion and disturbance of the substrate on the surface of the seabed (Ref 35). Ploughing, trenching, the placement of temporary seabed deposits, anchor placement, seabed preparation and pre-sweeping of sand waves will all result in abrasion and disturbance. Depending on the installation method used, the footprint of the cable installation machinery could be up to 15 m wide per trench. Where sandwave clearance is required, the footprint of activity could be up to 60 m wide per trench as presented in <b>Volume 1, Part 1, Chapter 4: Description of the Project</b>. Beyond this direct footprint, low intensity physical disturbance may also occur due to anchor handling inside the anchor corridor which may be up to 0.5 to 1 km from the vessel but within the draft Order Limits. Most activities associated with the English Offshore Scheme that penetrate the seabed will present a temporary impact i.e.,</p>	YES	YES	YES	YES	Within draft Order Limits

Potential Impact	Relevant Activities	*Phase			Potential impact pathway identified					
		C	O&M	D	Pathway Description	Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum ZoI
	<ul style="list-style-type: none"> <li>Temporary seabed deposits</li> </ul>				<p>will only be undertaken once and the seabed will be able to recover after the activity. Some activities will occur in the same footprint and will be separated by a couple of months e.g., PLGR followed by trenching.</p> <p>Abrasion and penetration of the substrate could result in the localised loss or damage to seabed habitats which support birds, marine mammals and fish. Due to the minimal seabed footprint for the English Offshore Scheme, the impact pathway is restricted to within designated sites the English Offshore Scheme crosses. Therefore, temporary habitat loss is screened in for all receptors where the English Offshore Scheme crosses a designated site. This is specifically relevant to the Southern North Sea SAC, Greater Wash SPA and the Humber Estuary SPA.</p> <p>The potential indirect impacts of temporary habitat loss on prey availability are considered under changes in distribution of prey species below.</p> <p>The activities described above may also occur at the operation and maintenance phase. However, the potential impact would be of a</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified					
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum ZOI	
					lower magnitude than the construction and decommissioning phases.						
<b>2. Permanent habitat loss</b>  Physical change (to another seabed or sediment type)*	<ul style="list-style-type: none"> <li>Deposit of external cable protection</li> </ul>	✓	✓	✓	<p>This impact relates to the permanent change of one marine habitat type to another marine habitat type, through the change in substratum, including to artificial material (e.g., concrete). This involves the permanent loss of one marine habitat type but the creation of another.</p> <p>Associated activities include the installation and decommissioning of infrastructure (e.g., surface laid cables) and the placement of external cable protection where soft sediment habitats are replaced by hard / coarse substratum habitats. The materials used for external protection of cables such as concrete mattresses, rock placement, grout or rock bags and fronded concrete mattresses. will result in a change of habitat type within the footprint of this activity.</p> <p>The change of the seabed to another substrate will result in a permanent loss of habitat in locations where external cable protection is required i.e., at cable crossings</p>	YES	YES	YES	YES	Within draft Order Limits	

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum ZoI
					<p>and in areas of insufficient burial or cable exposure.</p> <p>Due to the minimal seabed footprint for the English Offshore Scheme, the impact pathway is restricted to within designated sites the English Offshore Scheme crosses. Therefore, permanent habitat loss is screened in for all receptors where the English Offshore Scheme crosses a designated site. Including the Southern North Sea SAC, Greater Wash SPA and the Humber Estuary SPA.</p> <p>The potential indirect impacts of permanent habitat loss on prey availability are considered under changes in distribution of prey species below.</p> <p>The activities described above may also occur at the operation and maintenance phase. However, the potential impact would be of a lower magnitude than the construction and decommissioning phases.</p>					
<b>3. Changes in distribution of prey species</b>	<ul style="list-style-type: none"> <li>Activities that lead to Impact 1.</li> </ul>	✓	✓	✓	Changes in prey availability is a potential indirect impact which could arise during any phase of the Project life cycles. Activities that lead to temporary or permanent habitat loss	YES	YES	NO	YES	Within draft Order Limits

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum Zol
	<ul style="list-style-type: none"> <li>Activities that lead to Impact 2.</li> </ul>				<p>(as outlined under Impact 1 and Impact 2) affect seabed habitats which could affect the availability of prey. Disturbance of the seabed during the spawning season for species with a demersal life stage (such as sandeel and herring), temporary or permanent habitat loss for such species could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species for birds, marine mammals and migratory fish.</p> <p>The indirect effects of Electromagnetic Field (EMF) changes (as described in Impact 7) could also reduce affect the distribution and availability of prey for ornithology, marine mammal and migratory fish receptors. There is not considered to be a source-receptor pathway for Annex I habitat receptors.</p> <p>Relevant sites include the Southern North Sea SAC, Greater Wash SPA, Humber Estuary SPA, Humber Estuary Ramsar, Humber Estuary SAC, Wash and North Norfolk Coast SAC, Wash SPA, Wash Ramsar, Flamborough and Filey Coast SPA, North Norfolk Coast SPA, Northumberland Marine SPA, Berwickshire and North Northumberland</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				Maximum Zol
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	
					Coast SAC, Outer Firth of Forth and St Andrews Bay Complex SPA, Coquet Island SPA, Farne Island SPA, St Abb's Head to Fast Castle SPA and Fowlsheugh SPA. The activities described above may also occur at the operation and maintenance phase. However, the potential impact would be of a lower magnitude than the construction and decommissioning phases.					
<b>4. Temporary increase and deposition of suspended sediments</b>  Changes in suspended solids (water clarity)*	<ul style="list-style-type: none"> <li>Trenchless construction</li> <li>Anchoring</li> <li>Pre-sweeping</li> <li>PLGR</li> <li>Boulder clearance</li> <li>UXO identification</li> <li>Cable lay and burial</li> </ul>	✓	✓	✓	This impact relates to changes in water clarity (or turbidity) due to changes in Suspended Sediment Concentrations (SSCs) and smothering of seabed habitats as a result of settled-out suspended sediments. During cable installation sediment re-suspension will occur followed by subsequent re-deposition on the seabed. The siltation rates will depend on the hydrological conditions and the sediment particle size distribution. A greater sediment dispersion distance means the sediment will be more thinly dispersed over a wider area, whilst a smaller sediment dispersion distance gives a	YES	NO	YES	NO	8.8 km from draft Order Limits (taken from <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> )

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum Zol
Smothering and siltation rate changes*	<ul style="list-style-type: none"> <li>Cable repair</li> <li>Cable removal</li> <li>Deposit of external cable protection</li> <li>Temporary seabed deposits</li> </ul>				<p>high deposition depth over a smaller distance (Ref 35).</p> <p><b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> used a study area of 19.8 km which was based on the maximum spring tidal excursion in the English Offshore Scheme which was used to identify relevant designated sites. However, <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> outlined the greatest plume extent above 10 mg / l was associated with trenching in the area where there was the highest percentage of fines and fast peak flows, with peak SSC of more than 10 mg / l occurring up to 8.8 km from the point of release. Any exceedances of more than 10 mg / l will be of short duration beyond the draft Order Limits due to the relatively fast tidal flows. Therefore, a Zol of 8.8 km has been applied. Increased sedimentation following construction, Operation and Maintenance and decommissioning activities may impact benthic communities which are often sessile and unable to avoid the effects of increased</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum ZoI
					<p>sediment load. Therefore, Annex I habitat receptors are screened in for this impact.</p> <p>Some bird species are visual foraging birds, which depend on clear water to identify and catch potential prey (Ref 36). Although anthropogenic activities from construction, maintenance and decommissioning of cables are usually short lived and occur over relatively short spatial extents, there is the potential species could still be affected that rely on underwater vision for hunting. Therefore, ornithology receptors are screened in for this impact.</p> <p>A temporary increase and deposition of suspended sediments can impede foraging success and navigation throughout the water column. As migratory fish are adapted to highly turbid estuarine environments, there is not considered to be a source-receptor pathway for this impact.</p> <p>An increase and deposition of suspended sediment may negatively affect egg survival rates of spawning migratory fish by decreasing intra-gravel flow velocities and oxygen concentrations (Ref 37). However, the</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum Zol
					<p>migratory fish species included in this Screening (river and sea lamprey) do not spawn in the sea. The closest SAC with migratory fish as designated features is the Humber Estuary SAC (7.7 km away) and is within the Zol for this impact, however, lamprey use the estuary to migrate to rivers for spawning. As a result, there is not considered to be a source-receptor pathway.</p> <p>Marine mammals typically inhabit turbid environments and don't rely solely on vision for detecting prey and navigation through the water column (i.e., echolocation in cetaceans and sensitive vibrissae in seal and otters). As a result, there is not considered to be a source-receptor pathway.</p> <p>The relevant sites include the Greater Wash SPA, Inner Dowsing, Race Bank and North Ridge SAC, Humber Estuary SPA, Humber Estuary Ramsar, Humber Estuary SAC, Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC, Gibraltar Point SPA, Gibraltar Point Ramsar, Wash and North Norfolk Coast SAC, Wash SPA, Wash Ramsar, Flamborough and Filey Coast SPA,</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				Maximum ZoI
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	
					North Norfolk Coast SPA, Northumberland Marine SPA, Berwickshire and North Northumberland Coast SAC, Outer Firth of Forth and St Andrews Bay Complex SPA, Coquet Island SPA, Farne Island SPA, St Abb's Head to Fast Castle SPA, Fowlsheugh SPA and Forth Islands SPA.					
<b>5. Water flow (tidal current) changes, including sediment transport considerations</b>	Deposit of external cable protection	✓	✓	✓	Structures placed in the marine environment during construction, operation and maintenance and decommissioning, immediately interact with the local current regime. The use of external cable protection which is elevated above the seabed can potentially result in localised changes in water flow resulting in turbulence (especially at peak flow), changes in sediment transport and the possible formation of scour pits around the structure. Along the Lincolnshire coast, sediment transport is in a southwards direction that is close to the shore (driven by tidal asymmetry). Therefore, the presence of external cable protection in the nearshore environment could impact sediment transport to the south of and along the adjacent coastline at the Anderby Creek Landfall, which	YES	NO	YES	NO	Within draft Order Limits or South of and along the adjacent coastline at Anderby Creek Landfall into the Wash

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum Zol
					<p>may impact Annex I habitats and the supporting habitats of ornithology receptors. There is not considered to be a source-receptor pathway for marine mammals and migratory fish.</p> <p>The relevant sites include the Greater Wash SPA, Inner Dowsing, Race Bank and North Ridge SAC, Humber Estuary SPA, Humber Estuary Ramsar, Humber Estuary SAC, Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC, Gibraltar Point SPA, Gibraltar Point Ramsar, Wash and North Norfolk Coast SAC, Wash SPA, Wash Ramsar, Flamborough and Filey Coast SPA, North Norfolk Coast SPA, Northumberland Marine SPA, Berwickshire and North Northumberland Coast SAC, Outer Firth of Forth and St Andrews Bay Complex SPA, Assessment of LSE on the Coquet Island SPA, Farne Island SPA, St Abb's Head to Fast Castle SPA, Fowlsheugh SPA and Forth Islands SPA.</p>					
<b>6. Temperature changes – local</b>	Operational cables	x	✓	x	During the operation of an HVDC cable heat losses occur because of the resistance in the	NO	NO	NO	NO	Within draft Order Limits

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum ZoI
					<p>cable / conductor. This can cause localised heating of the surrounding environment (i.e., sediment for buried cables, or water in the interstitial spaces of external cable protection). There are no specific regulatory limits applied to temperature changes in the seabed, although a 2°C change between seabed surface and 0.2 m depth is used as a guideline in Germany (Ref 38).</p> <p>A number of scenarios were modelled to evaluate the thermal performance of the cables, including directly buried in a bundle to differing depths and contained within a duct at the Anderby Creek Landfall at various depths. The results presented in <b>Volume 2, Part 1, Appendix 4.B: EGL 5 Heat Calculations Technical Report</b> show that for cables operating at full power, temperature would be raised in the immediate vicinity of cables but reduces within increasing distance. The heat would be highly dependent on the depth of burial and the thermal resistance of the surrounding seabed. Temperature is likely to fluctuate as the cables would be unlikely to be</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum Zol
					operating at maximum capacity all the time or for extended periods of time (months / years). As the temperature changes will be localised to the immediate environment surrounding the cables and restricted to below the seabed, they will be within the fluctuations associated with natural temperature fluctuations. There will be no warming of the water column. Therefore, there is not considered to be a source-receptor pathway for all receptors and no indirect impacts on prey species are anticipated.					
7. EMF	Operational cables	x	✓	x	The burial and bundling of cables help to reduce the strength of EMF when compared to surface laid cables. The Earth's geomagnetic field in the area is 49.6 µT. An EMF study was undertaken for the English Offshore Scheme ( <b>Volume 2, Part 1, Appendix 4.A: Electromagnetic Field Study</b> ). The study calculated that EMF fields on the seabed immediately above the cables will reach 124.3 µT combined with the Earth's geomagnetic field but will attenuate to background levels within 20 m of the bundled cables (when	NO	YES	YES	YES	Within draft Order Limits

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum ZoI
					<p>cables are buried at 1 m depth). However, it is anticipated that the maximum cable burial depth is 3.5 m with an indicative target burial of 1.5 m.</p> <p>Although some bird species may use the earth's magnetic field for navigation during migration, this will not be impacted by EMF from subsea cables due to the range of impact being localised to the surrounding area of the cable underwater. There is not considered to be a source-receptor pathway for ornithology receptors, and they are not assessed further for this impact.</p> <p>It is acknowledged that cetaceans use magnetic cues, such as the earth's geomagnetic field, to navigate. The mechanism for how this is achieved is still unknown (Ref 39). This localised change in the magnetic field may temporarily affect sensitive species as they cross the cables or pass alongside their length and may temporarily reduce their navigational ability within the zone of effect. Therefore, cetaceans are screened in for this impact.</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum ZoI
					<p>No evidence of magnetic sensitivity has been reported for seal or otters (Ref 39) therefore, there is not considered to be a source-receptor pathway, and they are not assessed further for this impact.</p> <p>Some migratory fish species (such as Atlantic salmon) can use the earth's magnetic field for navigation and movements over subsea cables may result in a temporary change swimming direction or avoidance behaviour possibly leading to a delay to migration (Ref 40; Ref 41). Therefore, migratory fish are screened in for this impact.</p> <p>Annex I habitats are not thought to be sensitive to EMF changes, however, the benthic species that inhabit these habitats may be. As benthic invertebrates are typically slow moving or sessile organisms that live on or within the seabed, they are exposed to the highest levels of EMF. However, the effects of EMF on invertebrates have not been well studied (Ref 42). Therefore, Annex I habitat receptors are screened in for this impact. As benthic invertebrates are prey items for some fish species, which in turn are predated on by</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified					
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum Zol	
					<p>other fish, marine mammals and birds, Indirect effects of EMF may impact on the availability and distribution of prey species, which is considered under impact 3.</p> <p>EMF is considered to be a potential impact to sites, including the Southern North Sea SAC, Humber Estuary SAC and Humber Estuary Ramsar. This is based on sites that have marine mammal, migratory fish or benthic features. With the additional point that fish and marine mammals are migratory and can therefore travel within the Zol.</p>						
<b>8. Introduction or spread of Marine Invasive Non-Native Species (MINNS)</b>	<ul style="list-style-type: none"> <li>Deposit of external cable protection</li> <li>Presence of Project vessels</li> </ul>	✓	✓	x	<p>This impact refers to the direct or indirect introduction of non-native species, e.g., Chinese mitten crabs (<i>Eriocheir sinensis</i>), slipper limpets (<i>Crepidula fornicate</i>), Pacific oyster (<i>Crassostrea gigas</i>), and their subsequent spreading and out-competing of native species. Ballast water discharge, hull fouling and stepping stone effects from offshore structures may facilitate the spread of such species.</p> <p>The introduction of MINNS (e.g., through discharge of ballast water from Project</p>	NO	NO	NO	NO	Within the draft Order Limits	

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum ZOI
					vessels) will be managed under the International Convention for the Control and Management of Ship's Ballast Water and Sediments. Vessel contractors will complete a biosecurity risk assessment prior to mobilisation. Best biosecurity practice for marine commercial operations will be followed by all vessels associated with the English Offshore Scheme to minimise the risk of MINNS spread. All materials used for external cable protection will be sufficiently sterilised prior to use and seabed deposits will be inert with no biologically active material. All materials used for remedial works will be procured from reputable sources. Nonetheless, there is potential for any external cable protection placed at cable crossings or during Operation and Maintenance in areas of soft substrate to act as a stepping stone for MINNS that favour hard substrates. The placement of hard materials (such as rock protection) could introduce a new niche that increases connectivity with other natural or artificial hard habitats within the dispersal range of benthic species. MINNS may					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				Maximum ZOI
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	
					compete with native benthos for resources including food and space. However, taking into account the implementation of the control measures which are inherently part of the English Offshore Scheme design required to ensure legal compliance, the introduction or spread of MINNS is not anticipated. Therefore, there is not considered to be a source-receptor pathway for all receptors.					
<b>9. Barriers to species movement</b>	<ul style="list-style-type: none"> <li>Trenchless construction</li> <li>Anchoring</li> <li>Pre-sweeping</li> <li>PLGR</li> <li>Boulder clearance</li> <li>Geophysical surveys</li> <li>UXO Identification</li> </ul>	✓	×	✓	This impact pathway relates to the physical obstruction of species movements and including local movements (within and between roosting, breeding, feeding areas) and regional / global migrations (e.g., birds, migrating fish and marine mammals). This includes barriers to movement across open water caused by offshore wind farms, wave or tidal array devices, mariculture infrastructure or fixed fishing gears. The species affected are mostly birds, fish, and mammals (Ref 43). There is not considered to be a source-receptor pathway for Annex I habitat receptors.	NO	YES	NO	YES	3 km for geophysical surveys (JNCC, 2025 Ref 12)

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum Zol
	<ul style="list-style-type: none"> <li>Cable lay and burial</li> <li>Cable repair</li> <li>Cable removal</li> <li>Temporary seabed deposits</li> </ul>				<p>Waders and seabirds can be directly impacted by artificial structures causing an alteration of migration flyways or local flight passes, e.g., between roosting and feeding habitat. Barrier effects to migratory movements are mainly discussed in relation to offshore wind farm development (Ref 44). The English Offshore Scheme is the construction and operation of subsea power cables. There will be no physical permanent structures above sea level, that will impact the movement of birds. Use of vessels will be transient. No pathway has been identified for ornithology receptors.</p> <p>As cables will be buried there will be no permanent structures obstructing migratory fish or marine mammal movements within the water column. Even if external cable protection is required, this will be placed on the seabed and animals will be able to move over it. However, the physical presence of vessels and the associated continuous underwater noise may act as a temporary barrier to migratory fish and marine mammals. A precautionary 3 km Zol has been used when</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				Maximum ZoI
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	
					<p>considering geophysical surveys as recommended by JNCC, (2025, Ref 12) for harbour porpoise. This has been used as a proxy for all marine mammals and migratory fish.</p> <p>Relevant sites include the Southern North Sea SAC, Humber Estuary Ramsar, Humber Estuary SAC and Berwickshire to North Northumberland Coast SAC.</p>					
<p><b>10. Underwater noise changes</b></p>	<ul style="list-style-type: none"> <li>Presence of Project vessels</li> <li>Geophysical surveys</li> </ul>	✓	✓	✓	<p>Vessels and equipment associated with the English Offshore Scheme during construction, operation and maintenance and decommissioning, will generate continuous underwater noise. This may result in the temporary behavioural disturbance and displacement of marine mammals, migratory fish, and diving bird species such as seaducks, grebes and divers including red-throated diver.</p> <p>With regards to underwater noise changes, it is assumed that UXO clearance is undertaken under a separate Marine Licence application, subject to its own environmental assessments. A high-level overview of the noise modelling</p>	YES	YES	NO	YES	<p>3 km for geophysical surveys</p> <p>20 km for high-order UXO clearance (Ref 12)</p>

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum ZoI
					<p>for clearance is provided in the Screening report and will be included in the RIAA, to provide a holistic overview of everything that may be needed during construction.</p> <p>Marine mammals are sensitive to underwater noise changes. With respect to ornithological receptors, underwater noise directly influences water column feeders as these species are submerged for longer periods when diving in search for prey on the seabed, in comparison to other bird function groups that feed on the surface (Ref 45). Fish can also detect underwater noise changes, with species that have a swim bladder or other air bubble that is close to the ear more likely to be affected by an increase in underwater noise (Ref 46).</p> <p>A precautionary 3 km ZoI has been used when considering geophysical surveys as recommended by JNCC, (Ref 12) for harbour porpoise. To ensure a high-level assessment, underwater noise from UXO clearance has also been considered. High-order UXO clearance has a recommended EDR of 20 km. Therefore, 3 km for survey vessel and 20 km</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum ZOI
					<p>for UXO clearance has been used as a proxy for marine mammals, migratory fish and birds as it is deemed a worse case range. The effects from continuous underwater noise will be lower than what is detailed in <b>Volume 2, Part 3, Appendix 21.A: Underwater Noise Assessment.</b></p> <p>No pathway has been identified for Annex I habitat receptors.</p> <p>The relevant sites include the Southern North Sea SAC, Greater Wash SPA, Humber Estuary SPA, Humber Estuary Ramsar, Humber Estuary SAC, Gibraltar Point SPA, Gibraltar Point Ramsar, Wash and North Norfolk Coast SAC, Wash SPA, Wash Ramsar, Flamborough and Filey Coast SPA, North Norfolk Coast SPA, Northumberland Marine SPA, Berwickshire and North Northumberland Coast SAC, Outer Firth of Forth and St Andrews Bay Complex SPA, Assessment of LSE on the Coquet Island SPA, Farne Island SPA, St Abb's Head to Fast Castle SPA, Fowlsheugh SPA, Forth Islands SPA and Transboundary sites.</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				Maximum Zol
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	
<p><b>11. Visual / physical disturbance or displacement</b></p> <p>Above water noise*</p>	Presence of project vessels and equipment.	✓	✓	✓	<p>Vessels, vehicles and people movement can create visual stimuli which can evoke a disturbance response in mobile species such as seabirds. The magnitude of the impact will depend on the nature and scale / intensity of the activity (e.g., location and timing of operation). Diving species such as red-throated divers, and seaducks, geese and swans such as shelduck and Northern pintail, and waders are recognised as being highly sensitive to noise and visual disturbance, such as that caused by vessel traffic (Ref 47). Once flushed, they may not rapidly resettle. JNCC advised in Annex A of the Scoping Opinion for EGL 3 and EGL 4 (an analogous project) that 2.5 km would be a suitable buffer for common scoter (the most sensitive seaduck species) for vessel disturbance (Ref 48). Therefore, a maximum Zol of 2.5 km is used here.</p> <p>The physical presence of the vessels and equipment during all phases of the English Offshore Scheme have the potential to disturb marine mammals. Of the species present seals are the most sensitive to visual disturbance and are therefore used as the</p>	YES	YES	NO	YES	2.5 km (birds) 200 m (marine mammals)

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum ZoI
					<p>proxy for other species. Seals are most sensitive to anthropogenic disturbance when hauled out. (Wilson, 2014, Ref 49) presents a review of such studies, and concludes that as an overall generalisation, unless habituation has been established by frequent non-intrusive visits, a safe boat distance for hauled out harbour and grey seal (i.e., one at which there is a low risk of significant numbers of seal flushing) is about 200 m.</p> <p>Migratory fish may also be temporarily disturbed or displaced by the presence of project vessels and equipment.</p> <p>No pathway has been identified for Annex I habitat receptors. This is because Annex I habitats are non-mobile receptors and cannot be disturbed or displaced by the visual presence of vessels associated with the English Offshore Scheme. Therefore, no source-pathway-receptor has been identified. Disturbance to benthic receptors have been considered under temporary habitat loss / seabed disturbance, permanent habitat loss, temporary increase and deposition of</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum Zol
					<p>suspended sediments, water flow (tidal current) changes and EMF.</p> <p>The relevant sites include the Southern North Sea SAC, Greater Wash SPA, Humber Estuary SPA, Humber Estuary Ramsar, Humber Estuary SAC, Wash and North Norfolk Coast SAC, Wash SPA, Wash Ramsar, Flamborough and Filey Coast SPA, North Norfolk Coast SPA, Northumberland Marine SPA, Berwickshire and North Northumberland Coast SAC, Outer Firth of Forth and St Andrews Bay Complex SPA, Assessment of LSE on the Coquet Island SPA, Farne Island SPA, St Abb's Head to Fast Castle SPA, Fowlsheugh SPA, Forth Islands SPA and Transboundary sites.</p>					
12. Collision with project vessels	<ul style="list-style-type: none"> <li>Presence of project vessels and equipment</li> </ul>	✓	✓	✓	<p>There are known incidents of marine mammals colliding with fast moving vessels. Injuries to marine mammals from vessel strikes are species-dependent but generally are more severe at higher impact speeds (Ref 50).</p> <p>Given that project vessels during construction operation and maintenance, and</p>	NO	YES	NO	NO	Within draft Order Limits

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum ZoI
					<p>decommissioning will be travelling at slow speeds within established shipping lanes, and that birds and migratory fish are highly mobile and more manoeuvrable than marine mammals, no pathway for effect is considered.</p> <p>No pathway has been identified for Annex I habitat receptors. This is because Annex I habitats are non-mobile receptors occupying the seabed. Therefore, due to receptors being sessile and the physical separation (between the seabed and water surface) Annex I habitats cannot be disturbed or displaced by collision with project vessels. Therefore, no source-receptor pathway has been identified. Disturbance to benthic receptors have been considered under temporary habitat loss / seabed disturbance, permeant habitat loss, temporary increase and deposition of suspended sediments, water flow (tidal current) changes and EMF.</p> <p>The relevant sites include the Southern North Sea SAC, Humber Estuary Ramsar, Humber Estuary SAC, Wash and North Norfolk Coast SAC and Berwickshire and North Northumberland Coast SAC.</p>					

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum Zol
<b>13. Accidental Spills</b>  Hydrocarbon & Polycyclic Aromatic Hydrocarbons (PAHs) contamination*	Presence of Project vessels	✓	✓	✓	During construction, operation and maintenance and decommissioning accidental spillage may occur directly into the water column. Materials spilled may disperse as a plume on the water surface, within the water column or fall directly to the seabed. The primary chemicals of environmental concern in vessel oil and fuel are PAHs. Deliberate discharges of oil or oil / water mixtures from ships are prohibited within the Northwest European Waters Special Area, established by the International Maritime Organization under the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex I in 1999. This includes all waters around the UK and its approaches. However, accidental discharges still occur.  Project vessels will comply with MARPOL 73 / 78 which relate to pollution from oil from equipment, fuel tanks and release of sewage (black and grey waters). Compliance with International and National Regulations will be sufficient to minimise the risk to the environment and therefore, this impact has	NO	NO	NO	NO	Within draft Order Limits

Potential Impact	Relevant Activities	*Phase			Pathway Description	Potential impact pathway identified				
		C	O&M	D		Ornithology	Marine Mammals	Annex I Habitats	Migratory Fish	Maximum Zol
					been screened out of the assessment for all receptors.					
<b>14. In-combination effects</b>	All activities	✓	✓	✓	In-combination effects are likely to result where localised disturbance from more than one activity either occurs simultaneously resulting in a wider Zol or consecutively within a restricted area resulting in an extension of the impact pathway. There is the possibility that the English offshore Scheme could overlap, temporally and spatially with other projects in the region or will occur within short succession of another project. All sites are relevant for in-combination effects.	YES	YES	YES	YES	Within relevant Zol

\* Pressures corresponding with JNCC advice

## English Onshore Scheme

- 6.1.3 For onshore works, impacts have been established based on industry experience and with reference to the list of pressures and activities identified in bird disturbance threshold work (Goodship & Furness, 2022, Ref 51), Natural England's list of 'Operations Requiring Natural England's Consent', Natural England's conservation objective packages, and TIDE guidance (EU, n.d., Ref 52) on waterbird disturbance mitigation. Additional species-specific guidance has also been considered, including otter guidance (CIEEM, 2021, Ref 53) and Life in EU Rivers guidance on lampreys for relevant freshwater SACs (Maitland, 2003, Ref 54).
- 6.1.4 The following assumptions and notes relating to impact pathways have been applied to the English Onshore Scheme:
- The English Onshore Scheme will not give rise to direct physical damage or habitat loss within any European Site. Any such impacts, where relevant, are assessed within the English Offshore section of this HRA Screening.
  - It is important to acknowledge that given the distance of the majority of designated sites from the draft Order Limits, there are no construction activities likely to occur within or directly adjacent to any European Sites, except for the Greater Wash SPA.
  - A 500 m hydrological Zol for terrestrial and freshwater environments has been considered sufficient, as even in a worst-case scenario of water quality changes (including sediment dispersion) and changes in water flows, effects beyond this distance are expected to be negligible. The Greater Wash SPA is the only European Site within 500 m of the English Onshore Scheme. Given that all other European Sites are at least 8.3 km downstream or more from the English Onshore Scheme, these potential impact pathways can be ruled out for qualifying interests within those designated sites. Fish and otter interest features using FLL within 500 m of the works could be potentially impacted by changes in water quality or flow.
  - The 500 m Zol is also appropriate due to best practice measures incorporated into the English Onshore Scheme that will prevent significant water quality impacts beyond this range.
  - These measures include responsible storage and handling of fuels, oils, and chemicals in line with the Control of Pollution (Oil Storage) (England) Regulations 2001, with storage kept at least 15 m from watercourses where practicable. Where this is not possible (e.g., refuelling a water pump adjacent to a watercourse), additional protective measures will be implemented. Spill prevention measures, such as drip trays, bunded storage, and readily available spill kits, will be in place, and vehicles and plant will not be left unattended during refuelling. Runoff will be managed through header drains, silt traps, bunding, and buffer zones (9 m for Internal Drainage Board watercourses, 8 m for main rivers, and 16 m for tidal main rivers). Daily watercourse inspections will monitor for siltation or pollution, and soil storage within floodplains will maintain a minimum 15 m buffer from rivers.
  - Inner Dowsing, Race Bank and North Ridge SAC is located 8.3 km from the draft Order Limits, while Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC is 9.4 km away. Neither SAC has any Annex II species as a designated feature. There are no plausible impact pathways by which the proposed works could affect these SACs, as they are outside the Zol for Annex I Habitats identified in **Table 5-3**. As a result, Inner Dowsing, Race Bank and North Ridge SAC, and Saltfleetby-Theddlethorpe

Dunes and Gibraltar Point SAC are not taken forward for further assessment in relation to the English Onshore Scheme.

- The Wash SPA and The Wash Ramsar are located 19 km from the draft Order Limits. This is beyond the 10 km search area for Annex I bird species and 5 km search area for Annex I habitats. The Wash Ramsar is not designated for any marine mammals. There are no plausible impacts pathways by which the proposed works could affect either site and therefore they are not taken forward for further assessment in relation to the English Onshore Scheme.
- The Wash and North Norfolk Coast SAC was considered solely because it contains grey seal qualifying features. Other qualifying features will not be taken forward for further assessment as the site is beyond the 10 km search area for Annex II otters and 5 km search area for Annex I Habitats.
- Humber Estuary SAC was considered solely because it contains migratory fish interest features and grey seal interest feature that may be connected to watercourses affected by the draft Order Limits. Therefore, in line with the Habitats Regulations 2017, only the migratory fish interest features, and grey seal interest feature will be taken forward for further assessment, with all other interest features excluded.
- The Humber Estuary Ramsar is considered because of the migratory fish interest features and grey seal interest feature, consistent with the basis for inclusion of the Humber Estuary SAC, and is also considered because golden plover is a qualifying feature of the Humber Estuary Ramsar, as per the logic set out above for the Humber Estuary SPA. Potential pathways for all bird qualifying features will be considered. Ramsar habitat features are not considered in this assessment, as none fall within a search area equivalent to that applied for Annex I habitats, and therefore are outside the applicable Zol.

6.1.5 It should be noted only receptors identified within the relevant search areas (as defined in Section 5.1) have been included in **Table 6-2**. As stated in paragraph 2.2.48 operation activities for the English Onshore Scheme have not been considered in this report given the very limited information available at the time of writing, and these will be considered in later version of the report that will accompany DCO application.

Table 6-2: Potential Impact Pathways between Source and Receptors for Onshore Works

Key: C = construction, D = Decommissioning

Potential Impact	Relevant Activities	Phase		Pathway Description	Potential impact pathway identified					Maximum ZOI from Order Limits
		C	D		Habitats	Ornithology	Marine Mammals	Fish	Terrestrial wildlife	
<b>1. Changes to water quality</b>	<ul style="list-style-type: none"> <li>· Soil-stripping</li> <li>· Excavation</li> <li>· HDD</li> <li>· Temporary culverts</li> <li>· Trenching</li> <li>· Watercourse diversion</li> </ul>	✓	✓	<p>As noted earlier in Section 6, this impact pathway is not predicted to affect areas inside any European Site other than the Greater Wash SPA and freshwater / wetland environments outside European Sites but which may provide habitats (FLL in relation to Humber Estuary SPA, Ramsar, SAC and The Wash and Norfolk Coast SAC) for fish, bird interest features and marine mammals within 500 m of the draft Order Limits.</p> <p>For the landfall, the potential pathway for water quality impact arises from construction activities occurring at least 155 m from the MLWS, which could lead to sediment runoff or accidental pollutant discharge reaching coastal waters.</p>	NO	YES	YES	YES	NO	500 m

Potential Impact	Relevant Activities	Phase		Pathway Description	Potential impact pathway identified				Maximum ZOI from Order Limits
		C	D		Habitats	Ornithology	Marine Mammals Fish	Terrestrial wildlife	
				<p>However, given the distance from the coastline and the absence of direct in-water works for the English Onshore Scheme, the risk of significant sediment-related impacts is minimal, as natural tidal currents and wave action would rapidly disperse any suspended material. As such, potential effects from increased turbidity can be screened out.</p> <p>The primary remaining risk is from accidental spills of pollutants such as hydrocarbons or cement-based materials, which could enter drainage pathways and be transported to the marine environment. If these contaminants reach intertidal areas, they could degrade water quality and impact bird habitats, particularly feeding and roosting sites as well as habitat supporting fish, and marine mammals.</p>					

Potential Impact	Relevant Activities	Phase		Pathway Description	Potential impact pathway identified					Maximum ZOI from Order Limits
		C	D		Habitats	Ornithology	Marine Mammals	Fish	Terrestrial wildlife	
<b>2. Changes to water levels/flow</b>	<ul style="list-style-type: none"> <li>· Temporary culverts</li> <li>· Trenching</li> <li>· Watercourse diversion</li> </ul>	✓	✓	Trenching, watercourse diversion, and temporary culverts can cause changes in water levels/flows within 500 m from the draft Order Limits. These changes can impact species using FLL (FLL in relation to Humber Estuary Ramsar, SAC and The Wash and Norfolk Coast SAC). Fish species using FLL (FLL in relation to Humber Estuary SAC and Ramsar) could also be impacted by changes in flow patterns as their migration routes and spawning grounds within FLL might be disrupted. No impact pathway exists for marine mammals due to changes in water levels / flows.	NO	NO	NO	YES	NO	500 m
<b>3. Introduction or spread of INNPS</b>	<ul style="list-style-type: none"> <li>· Vegetation clearance</li> <li>· Excavation</li> <li>· Watercourse diversion</li> <li>· Cable removal</li> </ul>	✓	✓	Construction works at water crossings can facilitate the spread of INNPS downstream, potentially impacting the habitat composition and ecosystem dynamics. This could occur due to vegetation clearance, excavation or water run-	YES	YES	YES	YES	YES	5 km

Potential Impact	Relevant Activities	Phase	Pathway Description	Potential impact pathway identified					Maximum ZOI from Order Limits	
			C	D	Habitats	Ornithology	Marine Mammals	Fish	Terrestrial wildlife	
			<p>off, transporting the seeds or parts of plants to the downstream habitats. Once established, these species can outcompete the local and native plant population, affecting biodiversity, reducing the food sources for plant dependent wildlife and hence impacting the whole food chain.</p> <p>Over time, INNPS can also alter the structure of wetlands, reducing the nesting and foraging opportunities for birds that rely on certain plant communities.</p> <p>This impact pathway is also relevant to inland foraging and roosting sites (FLL), where changes in vegetation composition could affect habitat suitability for species reliant on these areas. This impact pathway is possible for all designated sites screened in.</p>							

Potential Impact	Relevant Activities	Phase		Pathway Description	Potential impact pathway identified					Maximum ZOI from Order Limits
		C	D		Habitats	Ornithology	Marine Mammals	Fish	Terrestrial wildlife	
4. Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	<ul style="list-style-type: none"> <li>▪ Vegetation clearance</li> <li>▪ Excavation</li> <li>▪ Trenchless crossing</li> <li>▪ Trenching</li> <li>▪ Temporary culverts</li> <li>▪ Watercourse diversion</li> <li>▪ Cable removal</li> </ul>	✓	✓	<p>Except for the Greater Wash SPA, all other designations are located over 8.3 km from the draft Order Limits, which is considerably distant from any conceivable ZOI relating to changes to levels of noise, lighting, vibration, or visual baselines. As such disturbance of birds from the Onshore works is expected to be limited to species using land outside European site boundaries.</p> <p>With regard to impact pathways to populations of bird interest features potentially using FLL (FLL in relation to Humber Estuary SPA, Ramsar, SAC and The Wash and Norfolk Coast SAC) outside of the designated sites, as well as harbour seals, and fish species of interest using watercourses outside the designated sites, potential impact pathways exist. Birds using FLL (FLL associated with Greater Wash SPA and Humber Estuary</p>	NO	YES	YES	YES	NO	200 m

Potential Impact	Relevant Activities	Phase		Pathway Description	Potential impact pathway identified					Maximum ZOI from Order Limits
		C	D		Habitats	Ornithology	Marine Mammals	Fish	Terrestrial wildlife	
				SPA and Ramsar) may experience disturbance from changes in noise, lighting, vibration, or visual baseline, while harbour seals, and fish species of interest could be affected by alterations in noise or vibration propagation during the construction of watercourse crossings. Noise, vibration, and visual changes have the potential to disrupt feeding, foraging, roosting, and migration patterns.						
<b>5. Changes to air quality</b>	Construction vehicles and machinery	✓	✓	Air quality impacts from excavation, trenching, construction of temporary culverts and bridges, diesel generators, and emissions from vehicles using the Affected Road Network (ARN) could result in localised dust and pollutant deposition.	YES	YES	YES	YES	NO	Within 200 m of ARN <sup>4</sup>

<sup>4</sup> At the time of completing this initial HRA assessment, data on the ARN was not available. Consequently, potential changes to air quality and their implications for LSE on designated sites could not be fully assessed. Once ARN data, including relevant traffic forecasts and emission factors, becomes available, the air quality assessment will be revisited to determine whether any updates to the HRA are required.

Potential Impact	Relevant Activities	Phase		Pathway Description	Potential impact pathway identified				Maximum ZOI from Order Limits
		C	D		Habitats	Ornithology	Marine Mammals Fish	Terrestrial wildlife	
				<p>Given the proximity of Greater Wash SPA to the works (0 km), there is potential for temporary air quality effects, particularly through dust deposition on sensitive habitats. However, beyond this SPA, all other designated sites are located over 8 km away. There is potential for deposition of airborne pollutants into watercourses and hence impacting marine mammals and fish interest features which might be using FLL near the work areas. Considering the dispersion of emissions and the temporary nature of construction activities, significant air quality impacts on ecological receptors will need to be assessed within Greater Wash SPA and for the birds, fish and marine mammals using FLL (FLL in relation to Humber Estuary SPA, Ramsar, SAC and The Wash and Norfolk Coast SAC) within the draft Order Limits or nearby areas.</p>					

Potential Impact	Relevant Activities	Phase		Pathway Description	Potential impact pathway identified					Maximum ZOI from Order Limits
		C	D		Habitats	Ornithology	Marine Mammals	Fish	Terrestrial wildlife	
<b>6. Displacement and barrier effects</b>	<ul style="list-style-type: none"> <li>· Excavation – including stripping of top soil, and subsoil extraction</li> <li>· Temporary culverts</li> <li>· Watercourse diversion</li> <li>· Cable removal</li> </ul>	✓	✓	<p>Land clearance for cables trenching / installation and substation construction may impact key FLL habitats (FLL in relation to Greater Wash SPA and Humber Estuary SPA, Ramsar, SAC), reducing the availability of FLL used by SPA birds outside designated sites. Increased human activity along with increased vehicle movement could displace birds from areas of FLL.</p> <p>The construction of culverts within a watercourse used by sea lamprey or river lamprey can create a migratory barrier. Increased water velocity within the culvert may exceed lamprey swimming passage due to their need for suction attachment.</p> <p>The Project overlaps with one main river, the Trusthorpe Onsough Drain, which is not sufficiently hydrologically connected to allow the passage of marine mammals</p>	NO	YES	NO	YES	NO	Within draft Order Limits

Potential Impact	Relevant Activities	Phase		Pathway Description	Potential impact pathway identified					Maximum ZOI from Order Limits
		C	D		Habitats	Ornithology	Marine Mammals	Fish	Terrestrial wildlife	
				from intertidal and marine environments. As such, there is no pathway to impact marine mammals.						
<b>7. Direct injury / killing of fish</b>	Trenching Temporary culverts Watercourse diversion	✓	✓	Trenching and temporary culvert installation may directly result in injury or mortality to sea lamprey, river lamprey, and spined loach (FLL in relation to Humber Estuary Ramsar and SAC). Dewatering prior to these activities may strand larvae and adults, potentially leading to suffocation due to desiccation if they are not relocated in time. If pumps are used without appropriate Screening, entrainment of larvae and impingement of juveniles or adults could result in mortality.  Although this has the potential to affect otters and harbour seals, given their primary prey species are fish, they have a relatively high foraging range and can usually move to a different area in search	NO	NO	NO	YES	NO	Within draft Order Limits

Potential Impact	Relevant Activities	Phase		Pathway Description	Potential impact pathway identified					Maximum ZOI from Order Limits
		C	D		Habitats	Ornithology	Marine Mammals	Fish	Terrestrial wildlife	
				of food. Grey seal are highly mobile and aware of their surroundings, making the risk of direct killing or injury negligible and hence would not form a part of assessment for this potential impact pathway.						
<b>8. Changes in distribution of prey species</b>	Trenching Temporary culverts Watercourse diversion	✓	✓	Watercourse diversions and culvert works have the potential to cause short-term changes in local fish distribution and a knock-on effect of reducing prey availability for seals. For seals, this pathway is not realistic. Although individual seals may occasionally enter tidal sections of the major rivers, their foraging is concentrated almost entirely within the estuarine and coastal environment, where they rely on estuarine and marine fish. Fish present within 500 m of the draft Order Limits do not form a meaningful part of their diet, so changes in fish distribution within this area cannot affect seal foraging or their conservation	NO	NO	NO	NO	NO	500 m

Potential Impact	Relevant Activities	Phase		Pathway Description	Potential impact pathway identified					Maximum ZOI from Order Limits
		C	D		Habitats	Ornithology	Marine Mammals	Fish	Terrestrial wildlife	
				<p>status. As such, this impact pathway has been scoped out and will not be taken forward for further assessment.</p> <p>Embedded fish-protection measures, including screened over-pumping or fish-friendly pumps, supervised fish rescues and construction of diversion channels prior to stopping up existing ones, that are in place regardless of potential connectivity with designated sites, will further support there being no material change in local fish abundance occurs, further reinforcing that this pathway does not represent a plausible route of impact.</p>						
<b>9. combination effects</b>	In- All activities	✓	✓	In-combination effects are likely to result where localised disturbance from more than one activity either occurs simultaneously resulting in a wider Zol or consecutively within a restricted area resulting in an extension of the impact pathway.	YES	YES	YES	YES	YES	Applicable based on potential effect acting in-

Potential Impact	Relevant Activities	Phase		Pathway Description	Potential impact pathway identified				Maximum ZOI from Order Limits
		C	D		Habitats	Ornithology	Marine Mammals Fish	Terrestrial wildlife	
				There is the possibility that the Project could overlap, temporally and spatially with other projects in the region or will occur within short succession of another project. This impact pathway is possible for all designated sites screened in.					combination

## 6.2 Identifying In-combination Impacts

- 6.2.1 At Stage 1 screening, in-combination LSEs have not been considered where there is no source–receptor pathway between a designated feature and a potential impact. Where a LSE has been identified for the Project alone, in-combination effects have not been assessed at Stage 1, as the potential for combined effects will be considered at Stage 2 within the RIAA. Where no LSE has been identified for the Project alone, it is necessary at Stage 1 to consider whether there is potential for a detectable in-combination effect arising from other plans or projects.
- 6.2.2 The Project alone may have a non-significant effect on a European site. However, if this effect combines with other ongoing or planned proposals, a significant effect could arise, requiring an AA. On the basis of PINS (Ref 3) guidance, projects to be considered in-combination include:
- Projects under construction;
  - Permitted application or applications not yet developed (applications for a new permission);
  - Submitted application or applications not yet decided (applications to change an existing permission);
  - Refused plans or projects subject to an appeal but not yet decided;
  - Granted permissions that have not begun or been completed;
  - Projects on the Planning Inspectorate’s national infrastructure programme of projects; and
  - Projects identified in the relevant development plan (and emerging development plans).
- 6.2.3 In accordance with Natural England’s best practice advice<sup>5</sup>, projects to be considered for in-combination will also include built or consented developments and operational projects that were not operational when baseline surveys were undertaken. In addition to operational projects whose effects were not fully represented within the baseline conditions.
- 6.2.4 A long list of plans / projects can be seen in **Volume 1, Part 4, Chapter 27: Cumulative Effects**. The long list will be reviewed and will be updated, in the lead up to the Stage 2 RIAA, as the Project design further evolves and in response to any comments raised at statutory consultation. At this early stage, there is insufficient baseline information or information on the Project to make a meaningful assessment of in-combination effects on offshore biodiversity. In line with the precautionary principle, and given the current data limitations, it is not possible to determine whether in-combination LSE can be discounted. As such, there is considered to be potential for in-combination effects, with these to be subject to assessment at subsequent stages of the Project when more information is available.

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<sup>5</sup> Environmental Assessments: Best Practice Advice for Evidence and Data Standards Phase III: Expectations for data analysis and presentation at examination for offshore wind applications.

## English Offshore Scheme

- 6.2.5 The following types of activities are considered for their potential to contribute to in-combination impacts for the HRA process:
- Marine aggregate extraction sites;
  - Dredging sites;
  - Oil and gas structures and pipelines;
  - Offshore wind farms;
  - Cable projects;
  - Carbon capture and storage and natural gas storage;
  - Tidal energy; and
  - Wave energy.
- 6.2.6 Activities screened out include commercial fisheries, military practice areas and shipping and navigation, as these are already present, they have been incorporated as part of the offshore baseline.
- 6.2.7 To determine whether existing or future projects might interact with the English Offshore Scheme, common source-receptor pathways have been identified. For an interaction to exist, activities associated with the English Offshore Scheme must share a source-receptor pathway with other projects, that overlaps both spatially and temporally.
- 6.2.8 For offshore works, the search area for projects and plans that may contribute to in-combination effects from potential impacts to SAC / SPA features. This is taken from the Zol outlined in **Table 6-1** unless no source-receptor pathway exists. The Zol serves as the search area from the designated site to identify other plans or projects that may fall within that distance and spatially overlap. The exception to this is when considering underwater noise from offshore wind farm construction, which can propagate further than underwater noise from other types of plans / projects. In this case, the search area for underwater noise remains within the 3 km EDR, except for offshore wind farm construction, which follows the JNCC's recommended 20 km EDR for piling (Ref 12).
- 6.2.9 Plans and projects, with regards to offshore works, that have been identified using the following publicly available data sources are:
- The Crown Estate Open Data Portal (Ref 55);
  - The MMO Marine Licensing Portal (Ref 56);
  - North Sea Transition Authority (NSTA) Open Data (Ref 57);
  - EMODNet Human Activities, Main Ports, Goods-Passengers-Vessels Traffic (Ref 58);
  - Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) Oil and gas: environmental submissions and determinations (Ref 59); and
  - NE Site Search (where deemed appropriate Supplementary Advice on Conservation Objectives (SACOs) have been included in the LSE assessments) (Ref 60).
- 6.2.10 A long list of plans / projects can be seen in **Volume 2, Part 4, Appendix 27.A: Long List of other Developments**. The long list will be reviewed and will be updated, in the lead up to the Stage 2 RIAA, as the Project design further evolves and in response to any comments raised at statutory consultation.

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- 6.2.11 For onshore works, at this early stage, there is insufficient baseline information or information on the English Offshore Scheme to make a meaningful assessment of in-combination effects on onshore biodiversity. In line with the precautionary principle, and given the current data limitations, it is not possible to determine whether in-combination LSE can be discounted. As such, there is considered to be potential for in-combination effects, with these to be subject to assessment at subsequent stages of the Project when more information is available.

# 7. Screening for LSE

## 7.1 Assessment of LSE on Relevant European Sites

### English Offshore Scheme

7.1.1 The assessment for LSE on relevant European Sites for the English Offshore Scheme is presented in **Table 7-1** to **Table 7-23**. The assessment is based on the precautionary principle and has been undertaken in the absence of mitigation.

7.1.2 The following European Sites are included in the LSE assessment:

- Southern North Sea SAC (for offshore works) (**Table 7-1**);
- Greater Wash SPA (for offshore works) (**Table 7-2**);
- Inner Dowsing, Race Bank and North Ridge SAC (for offshore works) (**Table 7-3**);
- Humber Estuary SPA (for offshore works) (**Table 7-4**);
- Humber Estuary SAC (for offshore works) (**Table 7-5**);
- Humber Estuary Ramsar (for offshore works) (**Table 7-6**);
- Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC (for offshore works) (**Table 7-7**);
- Gibraltar Point SPA (for offshore works) (**Table 7-8**);
- Gibraltar Point Ramsar (for offshore works) (**Table 7-9**);
- The Wash and North Norfolk Coast SAC (for offshore works) (**Table 7-10**);
- The Wash SPA (for offshore works) (**Table 7-11**);
- The Wash Ramsar (for offshore works) (**Table 7-12**);
- Flamborough and Filey Coast SPA (for offshore works) (**Table 7-13**);
- North Norfolk Coast SPA (for offshore works) (**Table 7-14**);
- Northumberland Marine SPA (for offshore works) (**Table 7-15**);
- Berwickshire and North Northumberland Coast SAC (for offshore works) (**Table 7-16**);
- Outer Firth of Forth and St Andrews Bay Complex SPA (for offshore works) (**Table 7-17**);
- Coquet Island SPA (for offshore works) (**Table 7-18**);
- Farne Islands SPA (for offshore works) (**Table 7-19**);
- St Abb's Head to Fast Castle SPA (for offshore works) (**Table 7-20**);
- Fowlsheugh SPA (for offshore works) (**Table 7-21**);
- Forth Islands SPA (for offshore works) (**Table 7-22**); and
- Marine Mammal Transboundary European Sites (for offshore works) (**Table 7-23**).

Table 7-1 Assessment of LSE on the Southern North Sea SAC (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Harbour porpoise	Temporary habitat loss / seabed disturbance	As the draft Order Limits overlap with the Southern North Sea SAC, the possibility of an LSE cannot be ruled out. <b>Conclusion: Potential for an LSE for the impact of temporary habitat loss / seabed disturbance cannot be ruled out for harbour porpoise.</b>	LSE	LSE	LSE
	Permanent habitat loss	As the draft Order Limits overlap with the Southern North Sea SAC, the possibility of an LSE cannot be ruled out. <b>Conclusion: Potential for an LSE for the impact of Permanent habitat loss cannot be ruled out for harbour porpoise.</b>	LSE	LSE	LSE
	Changes in distribution of prey species	As the draft Order Limits overlap with the Southern North Sea SAC, the possibility of an LSE cannot be ruled out. <b>Conclusion: Potential for an LSE for the impact of Permanent habitat loss cannot be ruled out for harbour porpoise.</b>	LSE	LSE	LSE
	EMF	As the SAC overlaps with the draft Order Limits, it is within the Zol for EMF. However, evidence shows that there have been no impacts to the migration of cetaceans over existing interconnector cables (Ref 61). Additionally, harbour porpoise migration across the Basslink interconnector has been observed unhindered despite several crossings of operating subsea HVDC cables (Ref 62). Given the rapid attenuation of the magnetic field, lack of evidence highlighting impacts, and the predominantly pelagic existence resulting in separation with the change in field, cetaceans have a low likelihood of being affected by EMF.	NO LSE	No LSE	NO LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<b>Conclusion: No potential for an LSE for the impact of EMF for harbour porpoise.</b>			
Underwater changes	noise	As the draft Order Limits overlap with the Southern North Sea SAC, the possibility of an LSE cannot be ruled out. <b>Conclusion: Potential for an LSE for the impact of underwater noise changes cannot be ruled out for harbour porpoise.</b>	LSE	LSE	LSE
Barriers to movements	species	As the draft Order Limits overlap with the Southern North Sea SAC, the possibility of an LSE cannot be ruled out. <b>Conclusion: Potential for an LSE due for the impact of barriers to species movements cannot be ruled out during the construction and decommissioning phases only, for harbour porpoise.</b>	LSE	NO LSE	LSE
Visual disturbance or displacement	physical	As the draft Order Limits overlap with the Southern North Sea SAC, the possibility of an LSE cannot be ruled out. <b>Conclusion: Potential for an LSE for the impact of visual / physical disturbance or displacement cannot be ruled out for harbour porpoise.</b>	LSE	LSE	LSE
Collision with project vessels		As the draft Order Limits overlap with the Southern North Sea SAC, the possibility of an LSE cannot be ruled out. <b>Conclusion: Potential for an LSE for the impact of collision with project vessels cannot be ruled out.</b>	LSE	LSE	LSE
In-combination		Due to the target burial depth of the cables and the rapid attenuation of EMF to background levels, and that there is no evidence that the combined levels of offshore power cabling has affected cetacean behaviour, no LSE are predicted for the impact of EMF.	LSE	LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>For the impacts of temporary habitat loss / seabed disturbance, permanent habitat loss, changes in distribution of prey species, underwater noise changes, visual / physical disturbance or displacement and collision with project vessels, the possibility of an LSE cannot be ruled out for the English Offshore Scheme alone. Therefore, there is the potential for an LSE in-combination with other plans / projects.</p> <p><b>Conclusion: Potential for an LSE in-combination with other plans / projects for temporary habitat loss / seabed disturbance, permanent habitat loss, changes in distribution of prey species, underwater noise changes, visual / physical disturbance or displacement and collision with project vessels cannot be ruled out.</b></p>			

Table 7-2 Assessment of LSE on the Greater Wash SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<b>Breeding seabirds</b> Sandwich tern Little tern Common tern	Temporary habitat loss / seabed disturbance	<p>As the draft Order Limits overlap with the Greater Wash SPA, the possibility of an LSE cannot be ruled out.</p> <p><b>Conclusion: Potential for an LSE for the impact of temporary habitat loss / seabed disturbance cannot be ruled out for all relevant qualifying features.</b></p>	LSE	LSE	LSE
	Permanent habitat loss	As the draft Order Limits overlap with the Greater Wash SPA, the possibility of an LSE cannot be ruled out.	LSE	LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<b>Non-breeding seabirds</b> Little gull		<b>Conclusion: Potential for an LSE for the impact of permanent habitat loss cannot be ruled out for all relevant qualifying features.</b>			
<b>Non-breeding diver</b> Red-throated diver	Changes in distribution of prey species	<p>Tern species are often observed in small flocks using shallow coastal waters for foraging and plunge diving to feed upon small fish, crustaceans and insects (Ref 63). As generalist feeders they are less susceptible to changes in distribution of prey species. Little gull are also generalist feeders of a wide variety of marine prey including fish, squid, crustaceans, jellyfish and offal. The shallow waters and sandbanks in the Greater Wash SPA are important habitats for red-throated diver as they provide suitable depths for diving whilst hunting, and support many of their prey species. Red-throated divers are opportunistic feeders primarily preying on fish such as herring, sprat and sandeel (Ref 64). Being an opportunistic feeder makes them less susceptible to changes in distribution of prey species.</p> <p>Common scoter specialise in foraging on shellfish and crustaceans and have a high habitat specialisation score of 4 (Ref 13). This makes them more susceptible to changes in distribution of prey species than generalist feeders.</p> <p>The seabed habitat within the nearshore area is mix of circalittoral sand and sandy mud which may be able to recover from temporary habitat loss due to its resilience to disturbance (Ref 65) and will continue to support prey species within the short-term. Furthermore, pre-construction, construction and decommissioning activities would be temporary and transient, allowing sediment to re-distribute naturally and for species to re-colonise the affected area, with the exception of external cable protection.</p>	No LSE	No LSE	No LSE
<b>Non-breeding seabird</b> Common scoter					

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p><b>Volume 1, Part 3, Chapter 20: Intertidal and Offshore Ornithology</b> baseline establishes that the draft Order Limits are not in a preferred foraging area for five of the six designated species (little gull, common tern, little tern, sandwich tern and common scoter). Whilst the baseline indicates the use of the area by red-throated diver, it is marginal in comparison to hot spots around the mouth of The Wash and along the coastline of Norfolk.</p> <p><b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the English Offshore Scheme would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is predicted. Survival of the individuals and reproduction rates would not be affected. Therefore, no LSE are predicted.</p> <p><b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all relevant qualifying features.</b></p>			
	Temporary increase deposition suspended sediments	<p>As the English Offshore Scheme intersects with the Greater and Wash SPA for approximately 33.34 km, there may be a of direct impact on species within the Greater Wash SPA.</p> <p>Species which dive for their prey such as terns, little gull, red-throated diver and common scoter in general are visually foraging birds, which depend on clear water to identify and catch potential prey. Cook and Burton, (2010, Ref 66) assess little tern to be highly vulnerable to changes in turbidity as vision plays an important role in the species' foraging capability. Whilst these species have a high sensitivity to changes in water clarity, <b>Volume 1, Part 3, Chapter 20: Intertidal and Offshore Ornithology</b> baseline establishes that the draft Order Limits are not in a preferred</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>foraging area for five of the six designated species (little gull, common tern, little tern, sandwich tern and common scoter). Whilst the baseline indicates the use of the area by red-throated diver, it is marginal in comparison to hot spots around the mouth of The Wash and along the coastline of Norfolk.</p> <p>Natural England’s benchmark for the impact is “<i>a change in one Water Framework Directive (WFD) ecological status class for one year within the site.</i>” <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC &gt;10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits, and the impact benchmark would not be reached.</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant qualifying features.</b></p>			
	Water flow (tidal current) changes, including sediment transport considerations	<p>As the draft Order Limits overlaps with the Greater Wash SPA and is within the Zol for this impact. However, as no LSE was determined above for temporary increase and deposition of suspended sediments, there is also not considered to be an LSE for this impact.</p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant qualifying features.</b></p>	NO LSE	No LSE	NO LSE
<b>Breeding seabirds</b>	Underwater noise changes	<p>Little tern, sandwich tern, common tern and little gull are considered to have low to moderate sensitivity to noise</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Common tern Sandwich tern Little tern  <b>Non-breeding seabirds</b> Little gull		<p>disturbance (Ref 47). Little tern and Sandwich tern have a low disturbance sensitivity score of 2 (Ref 13). Common tern and little gull did not have a disturbance sensitivity; however, it can be presumed to be low such as the rest of the functional group. Therefore, these species are less susceptible to disturbance from an increase in underwater noise than other species such as common scoter and red-throated diver.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for little tern, Sandwich tern, common tern and little gull.</b></p>			
	Visual / physical disturbance	<p>Common tern, Sandwich tern, little tern and little gull are considered to have low to moderate sensitivity to visual disturbance. Little tern and sandwich tern have a low disturbance sensitivity score (where 1 is the lowest and 5 is the highest) of 2 (Ref 13). Common tern and little gull did not have a disturbance susceptibility score; however, it can be presumed to be low, such as the rest of the functional group. (Ref 67) scored the escape distance of bird species from 1-5 (where 1 is the lowest and 5 is the highest) and scored common tern, Sandwich tern, little tern and little gull a 1, meaning escape distances are between 0 to 200 m. Therefore, in comparison to other species, they are less susceptible to disturbance from an increase in vessel traffic.</p> <p><b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance for little tern, Sandwich tern, common tern and little gull.</b></p>	No LSE	No LSE	No LSE
	In-combination	<p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under</p>	LSE	LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>construction at the same time as the English Offshore Scheme or occurring consecutively, extending the duration of or widening the spatial extent of impacts.</p> <p><b>Conclusions: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for little tern, Sandwich tern, common tern and little gull.</b></p>			
<p><b>Non-breeding diver</b> Red-throated diver</p> <p><b>Non-breeding seaduck</b> Common scoter</p>	Underwater noise changes	<p>Red-throated diver and common scoter are recognised as being highly sensitive to noise and visual disturbance from vessels (Ref 47). They are directly influenced by underwater noise as these species are submerged for longer periods when diving in search for prey on the seabed (Ref 68).</p> <p>Whilst any underwater noise associated with the English Offshore Scheme during construction, operation and maintenance, and decommissioning will be minimal, there remains a potential need for UXO clearance during the pre-construction phase. As such, whilst red-throated diver and common scoter are unlikely to be significantly affected by underwater noise changes associated with all other works, the potential for an LSE arising as a result of the UXO clearance works during the construction phase cannot be excluded.</p> <p><b>Conclusion: Potential for an LSE for the impact of underwater noise changes during the construction phase for red-throated diver and common scoter cannot be excluded.</b></p>	LSE	No LSE	No LSE
	Visual / physical disturbance or displacement	<p>Red-throated diver and common scoter are highly sensitive to visual disturbance, such as from vessel traffic (Ref 45). Where species with a score of 1 are least sensitive to disturbance and a score of 5 are the most sensitive to</p>	LSE	LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>disturbance, red-throated diver and common scoter both have a score of 5 (Ref 13). Once flushed, they do not rapidly resettle as documented by (Ref 13) where divers (<i>Gavia</i> spp.) have shown clear avoidance of areas with high shipping intensity.</p> <p>As it is uncertain at this stage when licensable activities will take place, it cannot be ruled out that non-breeding winter populations of these species will not be present in the Greater Wash SPA at the same time as project vessels. Therefore, visual / physical disturbance or displacement may occur as a result of vessels associated with the English Offshore Scheme and the corresponding JNCC pressure “Above water noise”.</p> <p><b>Conclusion: Potential for an LSE for the impacts of visual / physical disturbance for red-throated diver and common scoter cannot be excluded.</b></p>			
In-combination		<p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the English Offshore Scheme or occurring consecutively, extending the duration of or widening the spatial extent of impacts.</p> <p>For all impacts except visual / physical disturbance or displacement there will be no detectable contribution to an in-combination effect.</p> <p><b>Conclusion: Potential for an LSE in-combination for the impacts of underwater noise changes and / or visual / physical disturbance or displacement for red-throated diver and common scoter.</b></p>	LSE	LSE	LSE

Table 7-3 Assessment of LSE on the Inner Dowsing, Race Bank and North Ridge SAC (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Sandbanks which are slightly covered by sea water all the time Reefs	Temporary increase and deposition of suspended sediment	<p>After reviewing the Supplementary Advice on Conservation Objectives (SACOs) for the Inner Dowsing, Race Bank and North Ridge SAC, natural levels of sediment deposition, turbidity, dissolved oxygen turbidity must be maintained to meet the objectives of the site, particularly the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely. As the Inner Dowsing, Race Bank and North Ridge SAC is 6.8 km away from the draft Order Limits, it is within the Zol for this impact.</p> <p><b>Conclusion: Potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant qualifying features cannot be excluded.</b></p>	LSE	LSE	LSE
	Water flow (tidal current) changes, including sediment transport considerations	<p>As the draft Order Limits are located 6.8 km away, the Inner Dowsing, Race Bank and North Ridge SAC is outside of the Zol for this impact. As a result, there is no source-pathway-receptor at any stage of the development.</p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant qualifying features.</b></p>	NO LSE	No LSE	NO LSE
	In-combination	<p>There is no pathway between the English Offshore Scheme and other projects and plans to interact with the Inner Dowsing, Race Bank and North Ridge SAC at any stage of the development for the impacts of water flow (tidal current) changes, including sediment transport considerations.</p>	LSE	LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		For the impact of temporary increase and deposition of suspended sediments the possibility of an LSE cannot be ruled out for the English Offshore Scheme alone. <b>Conclusion: Potential for an LSE in-combination for the impact of temporary increase and deposition of suspended sediments for all relevant qualifying features.</b>			

Table 7-4 Assessment of LSE on the Humber Estuary SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<b>Breeding</b> Pied avocet Eurasian bittern Little tern  <b>Non-breeding</b> Pied avocet Bar-tailed godwit Eurasian bittern Black-tailed godwit Dunlin Golden plover Hen harrier Red knot	Changes in distribution of prey species	The distance from the draft Order limits (7.3 km) is greater than the mean maximum foraging range of little tern (5 km) and therefore, they are unlikely to be impacted. The remaining species are either seaducks, waders or harriers which utilise onshore or coastal habitats (Ref 47) and therefore, won't travel to forage within the draft Order Limits.  Furthermore, <b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the English Offshore Scheme would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is predicted. Survival of the individuals and reproduction rates would not be affected.  <b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all relevant qualifying features.</b>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Common redshank Ruff Common shelduck Waterbird assemblage	Temporary increase and deposition of suspended sediments	<p>As the Humber Estuary SPA is 7.3 km away, it is within the Zol for this impact. Natural England's benchmark for the impact is "a change in one Water Framework Directive WFD ecological status class for one year within the site." <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC &gt;10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits, and the impact benchmark would not be reached.</p> <p>The distance from the draft Order limits (7.3 km) is greater than the mean maximum foraging range of little tern (5 km) and therefore, they are unlikely to be impacted. The remaining species are either seaducks, waders or harriers which utilise onshore or coastal habitats (Ref 47) and therefore, won't travel to forage within the draft Order Limits.</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE
	Water flow (tidal current) changes, including sediment transport considerations	<p>As the Humber Estuary SPA is 7.3 km away, it is not within the Zol for this impact. Therefore, there is no pathway for effect, no LSE are predicted.</p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant qualifying features.</b></p>	NO LSE	No LSE	NO LSE
	Underwater noise changes	As the Humber Estuary SPA is 7.3 km away, it is not within the Zol for this impact. Birds are mobile receptors and may	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		travel within the Zol however, the distance from the draft Order Limits (7.3 km) is greater than the mean maximum foraging range of little tern (5 km) and therefore, they are unlikely to be impacted. The remaining species are either seaducks, waders or harriers which utilise onshore or coastal habitats (Ref 47) and therefore, won't travel to forage within the draft Order Limits. <b>Conclusion: No potential for an LSE for the impact of underwater noise changes for all relevant qualifying features.</b>			
	Visual / physical disturbance or displacement	As the Humber Estuary SPA is 7.3 km away, it is not within the Zol for this impact. Birds are mobile receptors and may travel within the Zol however, the distance from the draft Order limits (7.3 km) is greater than the mean maximum foraging range of little tern (5 km) and therefore, they are unlikely to be impacted. The remaining species are either seaducks, waders or harriers which utilise onshore or coastal habitats (Ref 47) and therefore, won't travel to forage within the draft Order Limits. <b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance for all relevant qualifying features.</b>	No LSE	No LSE	No LSE
	In-combination	There is no pathway for effect for the impact of water flow (tidal current) changes, including sediment transport considerations, underwater noise changes or visual / physical disturbance or displacement. Therefore, there is no potential for an LSE in combination with other plans / projects.  There is a pathway for the impact of temporary increase and deposition of suspended sediments however, the temporary and short-term duration of the impact will not cause a detectable contribution to an in-combination effect. Similarly, for the impact of changes in distribution	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>of prey species it was determined that there would be no impact on stock recruitment.</p> <p><b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for all relevant qualifying features.</b></p>			

Table 7-5 Assessment of LSE on the Humber Estuary SAC (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<p>Sandbanks which are slightly covered by sea water all the time</p> <p>Estuaries</p> <p>Mudflats and sandflats not covered by seawater at low tide</p> <p>Coastal lagoons</p>	<p>Temporary increase and deposition of suspended sediments</p>	<p>After reviewing the SACOs for the Humber Estuary SAC, natural levels of turbidity must be maintained to meet the objectives of the site, particularly the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely. As the Humber Estuary SAC is 7.7 km away from the draft Order Limits, it is within the Zol for this impact.</p> <p><b>Conclusion: Potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant Annex I habitat features cannot be excluded.</b></p>	LSE	LSE	LSE
	<p>Water flow (tidal current) changes, including sediment transport considerations</p>	<p>The Humber Estuary SAC is upstream of the Order Limits and therefore, there is no source-pathway-receptor at any stage of the development. No LSE are predicted.</p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment</b></p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<b>transport considerations for all for all relevant Annex I habitat features.</b>			
	In-combination	<p>There is no pathway between the English Offshore Scheme and other projects and plans to interact with the SAC at any stage of the development for the impacts of:</p> <ul style="list-style-type: none"> <li>Temporary habitat loss / seabed disturbance;</li> <li>Permanent habitat loss; and</li> <li>Water flow (tidal current) changes, including sediment transport considerations.</li> </ul> <p>For the impact of temporary increase and deposition of suspended sediments the potential for an LSE cannot be excluded for the English Offshore Scheme alone.  <b>Conclusion: Potential for an LSE in-combination for the impact of temporary increase and deposition of suspended sediments for all relevant Annex I habitat features cannot be excluded.</b></p>	LSE	LSE	LSE
Grey seal	Changes in distribution of prey species	<p>As detailed within the SACOs for the Humber Estuary SAC, food availability must be maintained to meet the objectives of the site, particularly to maintain the population and distribution of the qualifying species supporting habitat. The draft Order Limits are located 7.7 km away and grey seal are estimated to forage up to up to 100 km away from haul out-sites. Therefore, grey seal may travel within the Zol.</p> <p><b>Conclusion: Potential for an LSE for the impact of changes in distribution of prey species for grey seal cannot be excluded.</b></p>	LSE	LSE	LSE
	Barriers to species movement	<p>The English Offshore Scheme boundary is 7.7 km from the boundary of the SAC and consequently further from any haul out sites. Therefore, this distance, combined with</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>the mobile nature of any works associated with the Project, allow sufficient room for a mobile species such as grey seal to avoid any works whilst still accessing key habitat.</p> <p><b>Conclusion: No potential for an LSE for the impact of barriers to species movement for grey seal.</b></p>			
Underwater changes	noise	<p>Whilst any underwater noise associated with the English Offshore Scheme during construction, operation and maintenance and decommissioning will be minimal, there remains a potential need for UXO clearance during the pre-construction phase. Grey seal are unlikely to be significantly affected by underwater noise changes associated with all other works.</p> <p><b>Conclusion: Potential for an LSE for the impact of underwater noise changes cannot be excluded as a result of UXO clearance during the pre-construction phase for grey seal.</b></p>	LSE	No LSE	No LSE
Visual / disturbance or displacement	physical	<p>As detailed within the SACOs for the Humber Estuary or SAC, the presence and distribution of grey seal and their ability to undertake key life cycle stages and behaviours must be maintained to meet the conservation objectives, particularly to maintain the population and distribution of qualifying species. The draft Order Limits are located 7.7 km away and grey seal are estimated to forage up to up to 100 km away from haul out-sites. Therefore, grey seal may travel within the Zol.</p> <p><b>Conclusion: Potential for an LSE for the impact of visual / physical disturbance or displacement cannot be excluded for grey seal.</b></p>	LSE	LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
	Collision with project vessels	<p>As detailed within the SACOs for the Humber Estuary SAC, the population size must be maintained to meet the conservation objectives, particularly to maintain the population of qualifying species. The draft Order Limits are located 7.7 km away and grey seal are estimated to forage up to up to 100 km away from haul out-sites. Therefore, grey seal may travel within the Zol.</p> <p><b>Conclusion: Potential for an LSE for the impact of collision with project vessels cannot be excluded for grey seal.</b></p>	LSE	LSE	LSE
	In-combination	<p>For the impact barriers to species movement, it is concluded that there will be no detectable contribution to an in-combination effect.</p> <p>For the remaining impacts, the possibility of an LSE cannot be ruled out for the English Offshore Scheme alone.</p> <p><b>Conclusion: Potential for an LSE in-combination for the impacts of changes in distribution of prey species, Underwater noise changes (construction only), visual / physical disturbance or displacement and collision with project vessels cannot excluded for grey seal.</b></p>	LSE	LSE	LSE
Sea lamprey River lamprey	Changes in distribution of prey species	<p>Disturbance of the seabed during the spawning season for species with a demersal life stage could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species. Other impacts which could impact prey availability include underwater noise changes which could result in injury or avoidance behaviours.</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>Sea and river lamprey migrate through the Humber Estuary to spawn in the rivers of the Humber catchment where they typically die after spawning (Ref 69). Once the larvae become juveniles, they will travel out to sea where they will feed until they return to the river for spawning. They are parasitic feeders, attaching themselves onto other fish.</p> <p><b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the Project would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is predicted. Survival of the individuals and reproduction rates would not be affected.</p> <p><b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for sea lamprey and river lamprey.</b></p>			
	EMF	<p>As this site is 7.7 km away from the Project, it is outside the Zol for direct impacts. However, migratory fish are highly mobile and could still travel through the Zol.</p> <p>Lampreys possess specialised ampullary electroreceptors that are able to detect weak, low frequency electric fields (Ref 70; Ref 71). It is uncertain how lamprey use their electroreceptors however, it is suggested that the receptors are used for prey-detection, predator detection and avoidance and the detection of conspecifics (Ref 72; Ref 73; Ref 74). Chung-Davidson et al. (Ref 73) found that weak electric fields may modulate the reproductive system of male of sea lampreys and that adults did not move when stimulated with electrical fields of intensities between 2.5 and 100 mV / m. This suggests that electrical fields may affect migration behaviours,</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>however, normal behaviour was observed at electrical field intensities higher and lower than this range. Although this research was specific to sea lamprey, it can be expected that other species may be similarly affected by EMF.</p> <p>The burial and bundling of cables help to reduce the strength of EMF when compared to surface laid cables. Changes in EMF would be highly localised and of a small magnitude.</p> <p><b>Conclusion: No potential for an LSE for the impact of EMF for sea lamprey and river lamprey.</b></p>			
Underwater changes	noise	<p>As this site is 7.7 km away from the draft Order Limits, it falls outside of the Zol for this impact. However, sea and river lamprey may still move within the EDR.</p> <p>There are no thresholds in Popper <i>et al.</i>, (Ref 46) in relation to noise from high frequency sonar-based surveys (&gt;10 kHz) (i.e., geophysical surveys). This is because the hearing range of fish species falls well below the frequency range of high frequency sonar systems.</p> <p>Popper <i>et al.</i>, (Ref 46) categorised fish species into four groups. Lamprey are a group 1 species, as they have no swim bladder or other gas chamber, meaning they are only sensitive to particle motion and a very narrow band of frequencies and therefore have low vulnerability to noise. Given the transient nature of activities associated with Project vessels, exposure to increased underwater noise would be temporary and transient at any one location. Any movements through the draft Order Limits would be temporary and considering the low sensitivity to noise and highly mobile nature of the species and their ability to avoid the EDR.</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<b>Conclusion: No potential for an LSE for the impact of underwater noise changes for sea lamprey and river lamprey.</b>			
Barriers to species movement		<p>There are no thresholds in Popper <i>et al.</i>, (Ref 46) in relation to noise from high frequency sonar-based surveys (&gt;10 kHz) (i.e., geophysical surveys). This is because the hearing range of fish species falls well below the frequency range of high frequency sonar systems. Therefore, geophysical surveys will not create a barrier to sea or river lamprey. As explained for the impact of underwater noise above, the lamprey have a low vulnerability to noise and the noise generated by vessels and equipment will not create a barrier.</p> <p><b>Conclusion: No potential for an LSE for the impact of barriers to species movement for sea lamprey and river lamprey.</b></p>	No LSE	No LSE	No LSE
Visual / physical disturbance or displacement		<p>As this site is 7.7 km away from the draft Order Limits, lamprey within the Humber Estuary Ramsar boundary will not be permanently or directly affected by the presence of project vessels. However, fish are highly mobile and may still move within the draft Order Limits.</p> <p>Any river lamprey or sea lamprey movements through the draft Order Limits would be temporary. Also, the Zol is restricted to a relatively small area and considering the highly mobile nature of the species, they will be able to avoid areas containing project vessels without impeding migration. Furthermore, the vessel density surrounding the mouth of the estuary as well as and further north and south of the coastline is high at 100+ hours / km<sup>2</sup> per month (Ref 75). Therefore, animals are habituated to a certain degree to the presence of vessels. The presence</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		of Project vessels will be temporary and transient, restricted to discreet activities and periods and will not increase the shipping baseline other than temporarily. <b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance or displacement for sea lamprey and river lamprey.</b>			
	In-combination	<p>Given the distance from the draft Order Limits (7.7 km) there will be no direct impacts to animals within the SAC boundary from the Project alone. It has been acknowledged that mobile species can travel to forage within the Zol of the potential impacts. However, for all potential impacts it was concluded that no LSE are predicted for the Project alone. It is important to note that due to the target burial depth of the cables and the rapid attenuation of EMF to background levels, there is no potential for an LSE on the features of the SAC for the Project alone. Therefore, there is no potential for an in-combination effect with other plans / projects.</p> <p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Project or occurring consecutively, extending the duration of or widening the spatial extent of impacts. Given the distance to the Humber Estuary SAC, the wider area available for foraging in the North Sea and the fact that the English Offshore Scheme on its own would not act as a barrier to species accessing the SAC, there will be no detectable contribution to an in-combination effect. <b>Conclusion: For all impacts it is concluded that there will be no</b></p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		detectable contribution to an in-combination effect for sea lamprey and river lamprey.			

Table 7-6 Assessment of LSE on the Humber Estuary Ramsar (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<b>Criterion 1</b> The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish / saline lagoons.	Temporary increase and deposition of suspended sediments	The effects of temporary increase and deposition of suspended sediments assessed in <b>Table 7-6</b> for The Humber Estuary SAC (for offshore works) is also relevant to The Humber Ramsar site. However, it was concluded that the Humber Estuary Ramsar is 7.3 km away from the draft order limits.  <b>Conclusion: Potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant Annex I habitat features cannot be excluded.</b>	LSE	LSE	LSE
	Water flow (tidal current) changes, including sediment transport considerations	As the draft Order Limits are located 7.3 km away, the Humber Estuary Ramsar is outside of the Zol for this impact. As a result, there is no source-pathway-receptor at any stage of the development. <b>No LSE are predicted.</b>  <b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all for all relevant Annex I habitat features.</b>	NO LSE	No LSE	NO LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
	In-combination	<p>In-combination effects assessed in <b>Table 7-5</b> for The Humber Estuary SAC (for offshore works) and is also relevant to The Humber Ramsar site. No LSE are predicted for the following impacts:</p> <ul style="list-style-type: none"> <li>Temporary habitat loss / seabed disturbance;</li> <li>Permanent habitat loss; and</li> <li>Water flow (tidal current) changes, including sediment transport considerations.</li> </ul> <p>For the impact of temporary increase and deposition of suspended sediments the potential for an LSE cannot be excluded for the English Offshore Scheme alone.  <b>Conclusion: Potential for an LSE in-combination for the impact of temporary increase and deposition of suspended sediments for all relevant Annex I habitat features cannot be excluded.</b></p>	LSE	LSE	LSE
<b>Criterion 3</b>	Changes in distribution of prey species	<p>The effects of changes in distribution of prey species assessed in <b>Table 7-5</b> for The Humber Estuary SAC (for offshore works) is also relevant to The Humber Ramsar site. It concluded that as the Humber Estuary Ramsar is located 7.3 km away and grey seal are estimated to forage up to 100 km away there is potential for an LSE.</p> <p><b>Conclusion: Potential for an LSE for the impact of changes in distribution of prey species for grey seal cannot be excluded.</b></p>	LSE	LSE	LSE
The Humber Estuary Ramsar site supports a breeding colony of grey seals at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast.	Barriers to species movements	<p>The effects of barriers to species movement assessed in <b>Table 7-6</b> for The Humber Estuary SAC (for offshore works) is also relevant to The Humber Ramsar site. The draft Order Limits are 7.3 km from the Humber Estuary Ramsar and consequently further from any haul out sites.</p>	No LSE	NO LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<b>Conclusion: No potential for an LSE for the impact of barriers to species movement for grey seal.</b>			
Underwater changes	noise	<p>The effects of underwater noise changes assessed in <b>Table 7-5</b> for The Humber Estuary SAC (for offshore works) is also relevant to The Humber Ramsar site. Whilst underwater noise associated with the English Offshore Scheme is minimal, there remains a potential need for UXO clearance during the pre-construction phase.</p> <p><b>Conclusion: Potential for an LSE for the impact of underwater noise changes cannot be excluded as a result of UXO clearance during the pre-construction phase for grey seal.</b></p>	LSE	No LSE	No LSE
Visual / disturbance or displacement	physical or displacement	<p>The effects of visual / physical disturbance or displacement assessed in <b>Table 7-5</b> for The Humber Estuary SAC (for offshore works) is also relevant to The Humber Ramsar site. The draft Order Limits are located 7.3 km away and grey seal are estimated to forage up to up to 100 km away from haul out-sites.</p> <p><b>Conclusion: Potential for an LSE for the impact of visual / physical disturbance or displacement cannot be excluded for grey seal.</b></p>	LSE	LSE	LSE
Collision with vessels	project vessels	<p>The effects of collision with project vessels assessed in <b>Table 7-5</b> for The Humber Estuary SAC (for offshore works) is also relevant to The Humber Ramsar site. The draft Order Limits are located 7.3 km away and grey seal are estimated to forage up to up to 100 km away from haul out-sites.</p>	LSE	LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<b>Conclusion: Potential for an LSE for the impact of collision with project vessels cannot be excluded for grey seal.</b>			
	In-combination	<p>There is no pathway between the English Offshore Scheme and other projects and plans to interact with the grey seal feature of the Humber Estuary Ramsar at any stage of the development for the impact of barriers to species movement.</p> <p>For the remaining impacts, the possibility of an LSE cannot be ruled out for the English Offshore Scheme alone.</p> <p><b>Conclusion: Potential for an LSE in-combination for the impacts of changes in distribution of prey species, Underwater noise changes (construction only), visual / physical disturbance or displacement and collision with project vessels cannot be excluded for grey seal.</b></p>	LSE	LSE	LSE
<p><b>Criterion 5</b> Waterbird assemblages of international importance</p> <p><b>Criterion 6</b> Bar-tailed godwit Black-tailed godwit Dunlin Golden plover Red knot</p>	Changes in distribution of prey species	<p>The effects of changes in distribution of prey species assessed in <b>Table 7-4</b> for The Humber Estuary SPA (for offshore works) is also relevant to The Humber Ramsar site. These species are either seaducks, waders or harriers which utilise onshore or coastal habitats (Ref 47) and therefore, won't travel to forage within the draft Order Limits.</p> <p><b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all relevant ornithology features.</b></p>	No LSE	No LSE	No LSE
	Temporary increase and deposition of	The effects of temporary increase and deposition of suspended sediments assessed in <b>Table 7-4</b> for the Humber Estuary SPA (for offshore works) is also relevant	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Common redshank Common shelduck	suspended sediments	<p>to The Humber Ramsar site. These species are either seaducks, waders or harriers which utilise onshore or coastal habitats (Ref 47) and therefore, won't travel to forage within the draft Order Limits.</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant ornithology features.</b></p>			
	Water flow (tidal current) changes, including sediment transport considerations	<p>The effects of water flow (tidal current) changes, including sediment transport considerations assessed in <b>Table 7-4</b> for The Humber Estuary SPA (for offshore works) is also relevant to The Humber Ramsar site. <b>No LSE are predicted.</b></p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant ornithology features.</b></p>	NO LSE	No LSE	NO LSE
	Underwater noise changes	<p>The effects of underwater noise changes assessed in <b>Table 7-4</b> for The Humber Estuary SPA (for offshore works) is also relevant to The Humber Ramsar site. Species designated for the Humber Estuary Ramsar are either seaducks, waders or harriers which utilise onshore or coastal habitats (Ref 47) and therefore, won't travel to forage within the draft Order Limits.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for all relevant ornithology features.</b></p>	No LSE	No LSE	No LSE
	Visual / physical disturbance or displacement	<p>The effects of visual / physical disturbance or displacement assessed in <b>Table 7-4</b> for The Humber Estuary SPA (for offshore works) is also relevant to The Humber Ramsar site. Species designated for the Humber</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>Estuary Ramsar are either seaducks, waders or harriers which utilise onshore or coastal habitats (Ref 47) and therefore, won't travel to forage within the draft Order Limits.</p> <p><b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance for all relevant ornithology features.</b></p>			
	In-combination	<p>All impacts for non-breeding birds assessed in <b>Table 7-4</b> for The Humber Estuary SPA (for offshore works) are also relevant to The Humber Ramsar site. No LSE was concluded for pathway for temporary increase and deposition of suspended sediments, changes in distribution of prey species, water flow (tidal current) changes, including sediment transport considerations, underwater noise changes or visual / physical disturbance or displacement. Therefore, there is no potential for an LSE in combination with other plans / projects.</p> <p><b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for all relevant ornithology features.</b></p>	No LSE	No LSE	No LSE
<b>Criterion 8</b> The Humber Estuary acts as an important migration route for both river lamprey and sea lamprey between coastal waters and their spawning areas.	Changes in distribution of prey species	<p>The effects of changes in distribution of prey species assessed in <b>Table 7-5</b> for The Humber Estuary SAC (for offshore works) is also relevant to The Humber Ramsar site. <b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the Project would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is predicted. Survival of the individuals and reproduction rates would not be affected.</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for sea lamprey and river lamprey.</b>			
	EMF	The effects of EMF assessed in <b>Table 7-5</b> for The Humber Estuary SAC (for offshore works) is also relevant to The Humber Ramsar site. No LSE are predicted. The burial and bundling of cables help to reduce the strength of EMF when compared to surface laid cables. Any EMF would be localised nature with a small magnitude of change. <b>Conclusion: No potential for an LSE for the impact of EMF for sea lamprey and river lamprey.</b>	NO LSE	No LSE	NO LSE
	Underwater changes	noise The effects of underwater noise changes assessed in <b>Table 7-5</b> for The Humber Estuary SAC (for offshore works) is also relevant to The Humber Ramsar site. Any movements through the draft Order Limits would be temporary and considering the low sensitivity to noise and highly mobile nature of the species. <b>Conclusion: No potential for an LSE for the impact of underwater noise changes for sea lamprey and river lamprey.</b>	No LSE	No LSE	No LSE
	Barriers to movement	species The effects of barriers to species movement assessed in <b>Table 7-5</b> for The Humber Estuary SAC (for offshore works) is also relevant to The Humber Ramsar site. Lamprey have a low vulnerability to noise and the noise generated by vessels and equipment will not create a barrier. <b>Conclusion: No potential for an LSE for the impact of barriers to species movement for sea lamprey and river lamprey.</b>	No LSE	NO LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Visual / physical disturbance or displacement	or	The effects of visual / physical disturbance or displacement assessed in <b>Table 7-5</b> for The Humber Estuary SAC (for offshore works) is also relevant to The Humber Ramsar site. <b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance or displacement for sea lamprey and river lamprey.</b>	No LSE	No LSE	No LSE
In-combination		All impacts for river lamprey and sea lamprey assessed in <b>Table 7-5</b> for The Humber Estuary SAC (for offshore works) are also relevant to The Humber Ramsar site. Given the distance to the Humber Estuary Ramsar, the wider area available for foraging in the North Sea and the fact that the English Offshore Scheme on its own would not act as a barrier to species accessing the SAC, there will be no detectable contribution to an in-combination effect. <b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for sea lamprey and river lamprey.</b>	No LSE	No LSE	No LSE

Table 7-7 Assessment of LSE on the Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Embryonic dunes Shifting dunes along the shoreline	shifting and deposition of suspended sediments with	Temporary increase of is within the Zol for this impact. However, the maintenance of the features within the SAC are depending on sediment transport from the Humber Estuary southwards along the Lincolnshire Coastline. Therefore, a temporary increase	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<i>Ammophila arenaria</i> ("white dunes"); Shifting dunes with marram Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland		and deposition of suspended sediments would not impact the conservation objectives of this SAC. <b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant qualifying features.</b>			
Dunes with <i>Hippophae rhamnoides</i> ; Dunes with sea-buckthorn Humid dune slacks	Water flow (tidal current) changes, including sediment transport considerations	The maintenance of the features within the SAC are depending on sediment transport from the Humber Estuary southwards along the Lincolnshire Coastline. Therefore, the potential introduction of external cable protection berms between this source and the SAC (specifically the Gibraltar Point dunes system) may interrupt (albeit temporarily) this natural sediment supply. <b>Conclusion: Potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant qualifying features cannot be excluded during the operation and maintenance phase.</b>	NO LSE	LSE	NO LSE
	In-combination	The impact of temporary increase and deposition of suspended sediments would not impact the conservation objectives of this SAC, therefore, there is no potential for an LSE in-combination with other plans / projects. However, for the impact of water flow (tidal current) changes, including sediment transport considerations, the potential for an LSE cannot be excluded for the English Offshore Scheme alone. <b>Conclusion: Potential for an LSE in-combination for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant qualifying features.</b>	No LSE	LSE	No LSE

Table 7-8 Assessment of LSE on Gibraltar Point SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<p><b>Breeding</b> Little tern</p> <p><b>Non-breeding</b> Bar-tailed godwit Grey plover Sanderling</p>	Temporary increase deposition suspended sediments	<p>As the Gibraltar Point SPA is 16.1 km away, it is within and the study area for this impact. However, <b>Volume 1, Part of 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC &gt;10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits and would not have a significant impact.</p> <p>The distance from the draft Order limits (16.1 km) is greater than the mean maximum foraging range of little tern (5 km) and therefore, they are unlikely to be impacted. The remaining species are waders which utilise onshore or coastal habitats (Ref 47) and therefore, won't travel to forage within the English Offshore Scheme draft Order Limits or within the Zol for sediment travel (8.8 km).</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE
	Water flow (tidal current) changes, including sediment transport considerations	<p>As the Gibraltar Point SPA is 16.1 km away, it is not within the Zol for this impact. <b>Therefore, there is no pathway for effect, no LSE are predicted.</b></p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant qualifying features.</b></p>	NO LSE	No LSE	NO LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
	Underwater noise changes	<p>As the Gibraltar Point SPA is 16.1 km away, it is not within the Zol for project vessels or geophysical surveys. The SPA is within the EDR for high-order UXO clearance. However, birds are not as sensitive to underwater noise as harbour porpoise and the Gibraltar Point SPA is a coastal site, which means that noise levels will attenuate rapidly in shallow water and birds are unlikely to be exposed to an increase in sound levels large enough to elicit a response. However, birds are highly mobile and may still move within the EDR for foraging.</p> <p>Little tern are considered to have low sensitivity to noise disturbance and have a low disturbance susceptibility score of 2 (Ref 13). Furthermore, the distance from the draft Order limits (16.1 km) is far greater than the mean maximum foraging range of little tern (5 km).</p> <p>All of the non-breeding species are waders which predominantly utilise saltmarsh and intertidal habitats for grazing and feeding (Ref 47). Therefore, these species will not travel within proximity of the vessels to be impacted by underwater noise.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE
	In-combination	<p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the English Offshore Scheme or occurring consecutively, extending the duration of or widening the spatial extent of impacts.</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>Given the distance from the draft Order Limits (16.1 km), and the wider available area for foraging in the North Sea there will be no direct impacts to birds within the SPA boundary from the English Offshore Scheme alone. There is no pathway for effect for temporary increase and deposition of suspended sediment, water flow changes and underwater noise changes. Therefore, there is no potential for a detectable contribution to an LSE in-combination with other plans / projects.</p> <p>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for all relevant qualifying features.</p>			

Table 7-9 Assessment of LSE on Gibraltar Point Ramsar (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<p><b>Criterion 1</b> The dune and saltmarsh habitats present on the site are representative of all the stages of colonisation and stabilisation.</p>	<p>Temporary increase in deposition of suspended sediments</p>	<p>As the Ramsar is 16.1 km away, it is within the study area for this impact. However, <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC &gt;10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits and would not have a significant impact.</p> <p>The distance from the draft Order limits (16.1 km) is significantly greater than the mean maximum foraging ranges of bar-tailed godwit, dark-bellied brent goose, sanderling. These waders and geese typically utilise intertidal or coastal habitats for grazing (Ref 47). Therefore, won't travel to forage within the draft Order Limits or within the Zol for sediment travel (8.8 km).</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE
<p><b>Criterion 2</b> Supports an assemblage of wetland invertebrate species of which eight species are listed as rare in the British Red Data Book and a further four species listed as vulnerable.</p>	<p>Water flow (tidal current) changes, including sediment transport considerations</p>	<p>As the Gibraltar Point Ramsar is 16.1 km away, it is not within the Zol for this impact.</p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE
<p><b>Criterion 5</b> Waterbird assemblages of international importance</p>	<p>Underwater noise changes</p>	<p>As the SPA is 16.1 km away, it is not within the Zol for project vessels or geophysical surveys. The SPA is within the EDR for high-order UXO clearance. However, birds are not as sensitive to underwater noise as harbour porpoise and the</p>	No LSE	No LSE	No LSE
<p><b>Criterion 6</b></p>					

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Species / populations occurring at levels of international importance such as:		<p>Gibraltar point SPA is a coastal site, which means that noise levels will attenuate rapidly in shallow water and birds are unlikely to be exposed to an increase in sound levels large enough to elicit a response. However, birds are highly mobile and may still move within the EDR for foraging.</p> <p>Waders and geese rarely submerge their head underwater for long periods of time, they also predominantly utilise saltmarsh and intertidal habitats for grazing and feeding (Ref 47). As a result, these species are not likely to be affected by UXO clearance.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for all relevant qualifying features.</b></p>			
	In-combination	<p>Given the distance from the draft Order Limits (16.1 km) there will be no direct impacts to birds within the SPA boundary from the English Offshore Scheme alone. There is no pathway for effect for temporary increase and deposition of suspended sediment and underwater noise changes. Therefore, there is no potential for an LSE in combination with other plans / projects.</p> <p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the English Offshore Scheme or occurring consecutively, extending the duration of or widening the spatial extent of impacts.</p> <p><b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE

Table 7-10 Assessment of LSE on the Wash and North Norfolk Coast SAC (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Harbour seal	Changes in distribution of prey species	<p>As detailed within the SACOs for the Wash and North Norfolk Coast SAC, food availability must be maintained to meet the objectives of the site, particularly to maintain the population and distribution of the qualifying species supporting habitat. The draft Order Limits are located 16.2 km away and harbour seal are estimated to forage up to 50 km away from haul out-sites. Therefore, harbour seal may travel within the ZoI.</p> <p><b>Conclusion: Potential for an LSE for the impact of changes in distribution of prey cannot be ruled out for harbour seal.</b></p>	LSE	LSE	LSE
	Barriers to species movement	<p>The English Offshore Scheme is 16.2 km from the boundary of the SAC and consequently further from any haul out sites. Therefore, this distance, combined with the mobile nature of any works associated with the English Offshore Scheme, allow sufficient room for a mobile species such as harbour seal to avoid any works whilst still accessing key habitat.</p> <p><b>Conclusion: No potential for an LSE due for the impact of barriers to species movements for harbour seal.</b></p>	No LSE	NO LSE	No LSE
	Underwater noise changes	<p>Whilst any underwater noise associated with the English Offshore Scheme during construction, operation and maintenance and decommissioning will be minimal, there remains a potential need for UXO clearance during the pre-construction phase. As such, whilst harbour seal are unlikely to be significantly affected by underwater noise changes associated with all other works.</p> <p><b>Conclusion: Potential for an LSE for the impact of underwater noise changes cannot be excluded as a result of UXO clearance during the pre-construction phase for harbour seal.</b></p>	LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
	Visual physical disturbance or displacement	<p>/ As detailed within the SACOs for the Wash and North Norfolk Coast SAC, the presence and distribution of harbour seal and their ability to undertake key life cycle stages and behaviours must be maintained to meet the conservation objectives, particularly to maintain the population and distribution of qualifying species. The draft Order Limits are located 16.2 km away and harbour seal are estimated to forage up to up to 50 km away from haul out-sites. Therefore, harbour seal may travel within the Zol.</p> <p><b>Conclusion: Potential for an LSE for the impact of visual / physical disturbance or displacement cannot be excluded for harbour seal.</b></p>	LSE	LSE	LSE
	Collision with project vessels	<p>As detailed within the SACOs for the Wash and North Norfolk Coast SAC, the population size must be restored to meet the conservation objectives, particularly to restore the population of qualifying species. The draft Order Limits are located 16.2 km away and harbour seal are estimated to forage up to up to 50 km away from haul out-sites. Therefore, harbour seal may travel within the Zol.</p> <p><b>Conclusion: Potential for an LSE for the impact of collision with project vessels cannot be excluded for harbour seal.</b></p>	LSE	LSE	LSE
	In-combination	<p>For the impact barriers to species movement, it is concluded that there will be no detectable contribution to an in-combination effect.</p> <p>For the remaining impacts, the possibility of an LSE cannot be ruled out for the English Offshore Scheme alone.</p> <p><b>Conclusion: Potential for an LSE in-combination for the impacts of changes in distribution of prey species, underwater noise changes (construction only), visual /</b></p>	LSE	LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<b>physical disturbance or displacement and collision with project vessels cannot be excluded for harbour seal.</b>			
Sandbanks which are slightly covered by sea water all the time	Temporary increase and deposition of suspended sediments	As the draft Order Limits are located 16.2 km away, the Wash and North Norfolk Coast SAC, is outside of the Zol for this impact. As a result, there is no source-pathway-receptor at any stage of the development.	No LSE	No LSE	No LSE
Mudflats and sandflats not covered by seawater at low tide		<b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant Annex I habitat features.</b>			
Coastal lagoons	Water flow (tidal current) changes, including sediment transport considerations	The maintenance of the features within the SAC are depending on sediment transport from the Humber Estuary southwards along the Lincolnshire Coastline. Therefore, the potential introduction of external cable protection berms between this source and the SAC may interrupt (albeit temporarily) this natural sediment supply. <b>Conclusion: Potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant Annex I habitat features cannot be excluded during the operation and maintenance phase.</b>	NO LSE	LSE	NO LSE
Large shallow inlets and bays					
Reefs					
Salicornia and other annuals colonising mud and sand	In-combination	There is no source-pathway-receptor at any stage of the development for temporary increase and deposition of suspended sediments, therefore, there is no potential for an LSE in-combination with other plans / projects. However, for the impact of water flow (tidal current) changes, including sediment transport considerations, the potential for an LSE cannot be excluded for the English Offshore Scheme alone.	No LSE	LSE	No LSE
Atlantic salt meadows					
Mediterranean and thermo-Atlantic <i>halophilous</i> scrubs		<b>Conclusion: Potential for an LSE in-combination for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant Annex I habitat features cannot be excluded.</b>			

Table 7-11 Assessment of LSE on the Wash SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<p><b>Breeding</b></p> <p>Common tern Little tern</p>	<p>Changes in distribution of prey species</p>	<p>in Common tern are surface feeders of a wide variety of marine prey including fish, squid, crustaceans, jellyfish and offal. Being a generalist feeder makes them less susceptible to changes in distribution of prey species.</p> <p>The distance from the draft Order limits (19 km) is far greater than the mean maximum foraging range of little tern (5 km) and therefore, they are unlikely to be impacted.</p> <p>All of the non-breeding species are either seaducks, geese or waders which are either surface feeders of intertidal habitats, as well as grazing on saltmarsh and coastal grazing marsh (Ref 47) or are predominantly coastal species. Therefore, they are also unlikely to be impacted.</p>	No LSE	No LSE	No LSE
<p><b>Non-breeding</b></p> <p>Bar-tailed godwit Bewick’s swan Black-tailed godwit Common scoter Eurasian curlew Dark-bellied brent goose Dunlin Gadwall Common goldeneye Grey plover Red knot Oystercatcher Pink-footed goose Northern pintail</p>					
<p>Common redshank Sanderling Common shelduck Ruddy turnstone Waterbird assemblage</p>	<p>Temporary increase and deposition of suspended sediments</p>	<p>As the draft Order Limits are located 19 km away, the Wash SPA, is outside of the Zol for this impact however, as birds are highly mobile, they may travel withing the Zol. Natural England’s benchmark for the impact is “<i>a change in one WFD ecological status class for one year within the site.</i>” <b>Volume 1, Part 3, Chapter 17: Coastal and</b></p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Eurasian wigeon		<p><b>Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC &gt;10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits, and the impact benchmark would not be reached.</p> <p>The distance from the draft Order limits (19 km) is far greater than the mean maximum foraging range of little tern (5 km) and therefore, they are unlikely to be impacted. Furthermore, the shallow coastal waters of the Wash support small fish preyed upon by common tern and little tern, therefore, they are unlikely to travel within the ZoI. All of the non-breeding species are either seaducks, geese or waders which are either surface feeders of intertidal habitats, as well as grazing on saltmarsh and coastal grazing marsh (Ref 47) or are predominantly coastal species. Therefore, they are also unlikely to be impacted.</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant qualifying features.</b></p>			
	Water flow (tidal current) changes, including sediment transport considerations	<p>The maintenance of the features within the SAC are depending on sediment transport from the Humber Estuary southwards along the Lincolnshire Coastline. Therefore, the potential introduction of external cable protection berms between this source and the SAC may interrupt (albeit temporarily) this natural sediment supply.</p> <p><b>Conclusion: Potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations cannot be excluded for all relevant qualifying features during the operation and maintenance phase.</b></p>	NO LSE	LSE	NO LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Underwater changes	noise	<p>As this SPA is 19 km from the draft Order Limits, the SPA will not be permanently or directly affected by underwater noise from project vessels or geophysical surveys. The SPA is within the EDR for high-order UXO clearance. However, birds are not as sensitive to underwater noise as harbour porpoise and the Wash SPA is a coastal site, which means that noise levels will attenuate rapidly in shallow water and birds are unlikely to be exposed to an increase in sound levels large enough to elicit a response. However, birds are highly mobile and may still move within the EDR for foraging.</p> <p>Arctic tern and little tern are considered to have low sensitivity to noise disturbance and have a low disturbance susceptibility score of 2 (Ref 13). Furthermore, the distance from the draft Order limits (19 km) is far greater than the mean maximum foraging range of little tern (5 km).</p> <p>All of the non-breeding species are either seaducks, geese or waders which are either surface feeders of intertidal habitats, as well as grazing on saltmarsh and coastal grazing marsh (Atterbury <i>et al.</i>, 2021, Ref 47) or are predominantly coastal species. Therefore, these species will not travel within proximity of the vessels to be impacted by underwater noise.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE
Visual / physical disturbance or displacement		<p>The distance from the draft Order limits (19 km) is far greater than the mean maximum foraging range of little tern (5 km). Furthermore, Arctic tern and little tern are</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>considered to have low sensitivity to disturbance and have a low disturbance susceptibility score of 2 (Ref 13).</p> <p>All of the non-breeding species are either seaducks, geese or waders which are either surface feeders of intertidal habitats, as well as grazing on saltmarsh and coastal grazing marsh (Ref 47) or are predominantly coastal species. Therefore, these species will not travel within proximity of the vessels within the draft Order Limits to be disturbed or displaced.</p> <p><b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance for all relevant qualifying features.</b></p>			
	In-combination	<p>There is no pathway between the English Offshore Scheme and other projects and plans to interact with the Wash SPA at any stage of the development for the impacts of changes in distribution of prey species, temporary increase and deposition of suspended sediment, underwater noise changes and visual / physical disturbance or displacement. Therefore, there is no potential for an LSE in-combination with other plans / projects for these impacts.</p> <p>However, for the impact of water flow (tidal current) changes, including sediment transport considerations, the potential for an LSE cannot be excluded for the English Offshore Scheme alone.</p> <p><b>Conclusion: Potential for an LSE in-combination for the impact of water flow (tidal current) changes, including sediment transport considerations cannot be excluded for all relevant qualifying features during the operation and maintenance phase.</b></p>	No LSE	LSE	No LSE

Table 7-12 Assessment of LSE on the Wash Ramsar (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<p><b>Criterion 1</b></p> <p>The Wash is a large shallow bay comprising very extensive saltmarshes, major intertidal banks of sand and mud, shallow water and deep channels. It is the largest estuarine system in Britain.</p> <p><b>Criterion 3</b></p> <p>Qualifies because of the inter-relationship between its various components including saltmarshes, intertidal sand and mud flats and the estuarine waters. The saltmarshes and the plankton in the estuarine water provide a primary source of organic material which, together with other organic matter, forms the basis for the high productivity of the estuary.</p>	<p>Temporary increase and deposition of suspended sediments</p>	<p>The effects of temporary increase and deposition of sediment are assessed in <b>Table 7-10</b> for The Wash and North Norfolk Coast SAC (for offshore works) is also relevant to The Wash Ramsar site.</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all for all relevant Annex I habitat features</b></p>	No LSE	No LSE	No LSE
	<p>Water flow (tidal current) changes, including sediment transport considerations</p>	<p>The effects of water flow (tidal current) changes, including sediment transport considerations are assessed in <b>Table 7-10</b> for The Wash and North Norfolk Coast SAC (for offshore works) is also relevant to The Wash Ramsar site.</p> <p><b>Conclusion: Potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant Annex I habitat features cannot be excluded during the operation and maintenance phase.</b></p>	NO LSE	LSE	NO LSE
	<p>In-combination</p>	<p>In-combination effects are assessed in <b>Table 7-10</b> for The Wash and North Norfolk Coast SAC (for offshore works) and is also relevant to The Wash Ramsar site.</p> <p>For the impact of water flow (tidal current) changes, including sediment transport considerations the potential for an LSE cannot be excluded for the English Offshore Scheme alone.</p> <p><b>Conclusion: Potential for an LSE in-combination for the impact of water flow (tidal current) changes, including sediment transport considerations for all</b></p>	No LSE	LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		relevant Annex I habitat features cannot be excluded during the operation and maintenance phase.			
<b>Criterion 5</b> Waterbird assemblages of international importance	Changes in distribution of prey species	The effects of changes in distribution of prey species are assessed in <b>Table 7-11</b> for The Wash SPA (for offshore works) is also relevant to The Wash Ramsar site. <b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all relevant ornithology features.</b>	No LSE	No LSE	No LSE
<b>Criterion 6</b> Bar-tailed godwit Eurasian curlew Dark-bellied goose Dunlin Grey plover Red knot	Temporary increase and deposition of suspended sediments	The effects of temporary increase and deposition of suspended sediments are assessed in <b>Table 7-11</b> for The Wash SPA (for offshore works) is also relevant to The Wash Ramsar site. <b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all relevant ornithology features.</b>	No LSE	No LSE	No LSE
Oystercatcher Pink-footed goose Northern pintail Common redshank Sanderling Common shelduck Ruddy turnstone	Water flow (tidal current) changes, including sediment transport considerations	The effects of temporary water flow (tidal current) changes, including increase and deposition of suspended sediments are assessed in <b>Table 7-11</b> for The Wash SPA (for offshore works) is also relevant to The Wash Ramsar site. <b>Conclusion: Potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant ornithology features cannot be excluded during the operation and maintenance phase.</b>	NO LSE	LSE	NO LSE
	Underwater noise changes	The effects of underwater noise changes are assessed in <b>Table 7-11</b> for The Wash SPA (for offshore works) is also relevant to The Wash Ramsar site.	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<b>Conclusion: No potential for an LSE for the impact of underwater noise changes for all relevant ornithology features.</b>			
	Visual / physical disturbance or displacement	The effects of visual / physical disturbance or displacement are assessed in <b>Table 7-11</b> for The Wash SPA (for offshore works) is also relevant to The Wash Ramsar site. <b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance or displacement for all relevant ornithology features.</b>	No LSE	No LSE	No LSE
	In-combination	In-combination effects are assessed in <b>Table 7-11</b> for The Wash SPA (for offshore works) and is also relevant to The Wash Ramsar site. The potential for an LSE cannot be excluded for the impact of water flow (tidal current) changes, including sediment transport considerations for the English Offshore Scheme alone. <b>Conclusion: Potential for an LSE in-combination for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant ornithology features cannot be excluded.</b>	No LSE	LSE	No LSE

Table 7-13 Assessment of LSE on the Flamborough and Filey Coast SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<b>Breeding seabirds</b> Razorbill Common guillemot Atlantic Puffin*	Changes in distribution of prey species	in Atlantic puffin, common guillemot and razorbill feed mostly on sandeel and herring. They have a moderate habitat specialisation score (where 1 is the lowest and 5 is the highest) of 3 (Ref 13). Therefore, a reduction in this prey species could negatively impact these bird species. Great cormorants are highly generalist hunters feeding on a variety of fish, however, (Ref 76) found that their diet mostly consisted of bottom-dwelling flatfish species such as plaice. They have a moderate habitat specialisation score of 3 (Ref 13). Therefore, a reduction of this prey species may negatively affect cormorants.	No LSE	No LSE	No LSE
<b>Breeding diver</b> Great cormorant*		<b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the English Offshore Scheme would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is predicted. Survival of the individuals and reproduction rates would not be affected. <b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all relevant qualifying features.</b>			
	Temporary increase and deposition of suspended sediments	As the SPA is 24.7 km away there will be no direct impacts within the SPA boundary. However, as birds are highly mobile with large foraging ranges therefore, they may travel to forage within the Zol.	No LSE	No LSE	No LSE
		Natural England's benchmark for the impact is "a change in one WFD ecological status class for one year within the site." <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC >10 mg / l occurring up to 8.8 km from the point of release.			

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits, and the impact benchmark would not be reached.</p> <p>Cook and Burton (Ref 66) reported that Atlantic puffin, razorbill and common guillemot are moderately sensitive to increased water turbidity. However, given that the impact of suspended sediment is restricted to a relatively small area and that Atlantic puffin, common guillemot and razorbill have large foraging ranges of 250.8 km, 95.2 km and 122.2 km respectively, there will be sufficient alternative foraging areas available. Great cormorant are not pursuit feeders and may be less sensitive to changes in turbidity (Ref 66).</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant qualifying features.</b></p>			
	Water flow (tidal current) changes, including sediment transport considerations	<p>As the SPA is 24.7 km away, it is not within the Zol for this impact. Therefore, there is no pathway for effect.</p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant qualifying features.</b></p>	NO LSE	No LSE	NO LSE
	Underwater changes noise	<p>As this site is 24.7 km from the draft Order Limits, the SPA will not be permanently or directly affected by underwater noise from the English Offshore Scheme. However, birds are highly mobile and may still move within the Zol.</p> <p>Razorbill, common guillemot and Atlantic puffin are identified as being sensitive to noise and visual disturbance (Ref 24). However, once flushed by visual disturbance of project vessels, they may not rapidly</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>resettle. As birds are less sensitive to underwater noise than very high frequency cetaceans, it is unlikely that underwater noise from vessels or geophysical surveys will displace them before the visual disturbance of the presence of project vessels. This means that they are likely to be flushed before they are within proximity of the Project vessels to be affected by underwater noise. Individuals may travel within the Zol for high order UXO clearance, however, an increase in underwater noise would be short term and will not impact individuals within the SPA boundary. Given that Razorbill, common guillemot and Atlantic puffin are highly mobile with large foraging ranges of 122.2, 95.2 and 250.8 km respectively (see <b>Table 5-2</b>), they will be able to avoid areas with increased underwater noise without significantly reducing their foraging grounds.</p> <p>Great cormorant typically forage in shallower coastal waters rather than further offshore therefore given the distance to the site from the SPA (24.7 km); it is not expected for this species to forage near vessels associated with the English Offshore Scheme. Furthermore, given that the maximum foraging range of great cormorant is 33.9 km, it is expected that preferred foraging grounds are likely to be closer to the SPA.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for all relevant qualifying features.</b></p>			
	Visual / physical disturbance or displacement	As this site is 24.7 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by the presence of project	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>vessels. However, birds are highly mobile and may still move within the draft Order Limits.</p> <p>Razorbill, common guillemot and Atlantic puffin are also identified as being sensitive to visual disturbance (Ref 24). Given that Razorbill, common guillemot and Atlantic puffin are highly mobile with large foraging ranges of 122.2, 95.2 and 250.8 km respectively (<b>see Table 5-2</b>), they will be able to avoid project vessels without significantly reducing their foraging grounds.</p> <p>Great cormorant typically forage in shallower coastal waters rather than further offshore. Therefore, given the distance to the site from the SPA (24.7 km), it is not expected for this species to forage near vessels associated with the English Offshore Scheme.</p> <p><b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance or displacement for all relevant qualifying features.</b></p>			
	In-combination	<p>Given the distance from the draft Order Limits (24.7 km) there will be no direct impacts to birds within the SPA boundary from the English Offshore Scheme alone. It has been acknowledged that mobile species can travel to forage within the Zol of the potential impacts. However, for all potential impacts it was concluded that no LSE are predicted for the English Offshore Scheme alone.</p> <p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the English Offshore Scheme or occurring consecutively, extending the duration of or widening the spatial extent of impacts.</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>Given the distance to the SPA, the wider area available for foraging in the North Sea and the fact that the English Offshore Scheme on its own would not act as a barrier to species accessing the SPA there will be no detectable contribution to an in-combination effect. Any significant impacts are more likely to arise from other plans / projects in isolation or in-combination with each other, rather than from a combined effect with the English Offshore Scheme.</p> <p><b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for all relevant qualifying features.</b></p>			

\*Seabird assemblage feature

Table 7-14 Assessment of LSE on the North Norfolk Coast SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<p><b>Breeding</b> Sandwich tern</p>	<p>Changes in distribution of prey species</p>	<p>in Terns use shallow coastal waters for foraging and plunge dive to feed upon small fish, such as sandeel, sprat and herring (Ref 63). Terns are considered generalist feeders making them less susceptible to changes in distribution of prey species.</p> <p><b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the English Offshore Scheme would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>predicted. Survival of the individuals and reproduction rates would not be affected.</p> <p><b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for Sandwich tern.</b></p>			
	Temporary increase and deposition of suspended sediment	<p>As the SPA is 35.1 km away, it is not within the Zol for this impact. However, Sandwich tern are highly mobile and may travel within the Zol to forage. Sandwich tern depend on clear water to identify and catch potential prey. A report by Brenninkmeijer <i>et al.</i> (2002, Ref 77) states that the food intake rate for Sandwich tern was lower in the most turbid waters compared to clearer waters at their study site in West Africa.</p> <p>Natural England’s benchmark for the impact is “<i>a change in one WFD ecological status class for one year within the site.</i>” <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC &gt;10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits, and the impact benchmark would not be reached. The impact of suspended sediment is restricted to a relatively small area and of short duration.</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for Sandwich tern.</b></p>	No LSE	No LSE	No LSE
	Water flow (tidal current) changes, including sediment	<p>As the SPA is 35.1 km away, it is not within the Zol for this impact. Therefore, there is no pathway for effect.</p>	NO LSE	No LSE	NO LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
transport considerations		<b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for Sandwich tern.</b>			
Underwater changes	noise	As this site is 35.1 km from the draft Order Limits, the SPA will not be permanently or directly affected by underwater noise from the English Offshore Scheme. However, birds are highly mobile and may still move within the Zol. However, Sandwich tern are considered to have low to moderate sensitivity to noise disturbance (Ref 47). They have a low disturbance sensitivity score of 2 (Ref 13) and therefore have a low susceptibility to be disturbed from an increase in underwater noise. <b>Conclusion: No potential for an LSE for the impact of underwater noise changes for Sandwich tern.</b>	No LSE	No LSE	No LSE
Visual disturbance / displacement	physical or	Birds identified as being sensitive to the English Offshore Scheme activities are breeding birds or those foraging within proximity to vessels associated with the English Offshore Scheme. Birds may take evasive action, but a single disturbance event does not have an immediate effect on the survival or productivity of an individual bird. However, repeated disturbance, or disturbance over an extended period of time can affect survival and productivity. As this site is 35.1 km from the English Offshore Scheme draft Order Limits, the SPA will not be permanently or directly affected by the presence of project vessels. However, birds are highly mobile and may still move within the draft Order Limits.  Sandwich tern are considered to have low to moderate sensitivity to visual disturbance, with a low disturbance sensitivity score (where 1 is the lowest and 5 is the highest) of 2 (Ref 13). Fließbach <i>et al.</i> , (Ref 67) scored	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>the escape distance of bird species from 1-5 (where 1 is the lowest and 5 is the highest) and scored Sandwich tern a 1, meaning escape distances are between 0-200m. Therefore, in comparison to other species, they are less susceptible to disturbance from an increase in vessel traffic.</p> <p><b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance or displacement for all Sandwich tern.</b></p>			
	In-combination	<p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the English Offshore Scheme or occurring consecutively, extending the duration of or widening the spatial extent of impacts.</p> <p><b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for Sandwich tern.</b></p>	No LSE	No LSE	No LSE

Table 7-15 Assessment of LSE on the Northumberland Marine SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<p><b>Breeding</b> Atlantic puffin Common guillemot Razorbill*</p>	Changes in distribution of prey species	<p>in Atlantic puffin, common guillemot and razorbill feed mostly on sandeel and herring. They have a moderate habitat specialisation score of 3 (Ref 13). Therefore, a reduction in this prey species could negatively impact these bird species.</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p><b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the English Offshore Scheme would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is predicted. Survival of the individuals and reproduction rates would not be affected.</p> <p><b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all relevant qualifying features.</b></p>			
	Temporary increase and deposition of suspended sediments	<p>As the SPA is 74.9 km away, there will be no direct impacts within the SPA boundary. However, as birds are highly mobile with large foraging ranges therefore, they may travel to forage within the Zol.</p> <p>Natural England’s benchmark for the impact is “<i>a change in one WFD ecological status class for one year within the site.</i>” <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC &gt;10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits, and the impact benchmark would not be reached.</p> <p>Cook and Burton (Ref 66) reported that Atlantic puffin, razorbill and common guillemot are moderately sensitive to increased water turbidity. However, given that the impact of suspended sediment is restricted to a relatively small area and that Atlantic puffin and common guillemot have large foraging ranges of 250.8 km, 122.2 km and 95.2 km respectively, there will be sufficient alternative foraging areas available. Furthermore, it is likely that</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>these species will forage closer to the SPA to conserve energy, particularly as the Northumberland Marine SPA is used as a foraging area by seabirds from neighbouring SPAs. Thus, individuals are not expected to travel within the Zol.</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant qualifying features.</b></p>			
	Water flow (tidal current) changes, including sediment transport considerations	<p>As the SPA is 74.9 km away, it is not within the Zol for this impact. Therefore, there is no pathway for effect.</p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant qualifying features.</b></p>	NO LSE	No LSE	NO LSE
	Underwater noise changes	<p>As this site is 74.9 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by underwater noise from project vessels. However, birds are highly mobile and may still travel within the Zol.</p> <p>Razorbill, common guillemot and Atlantic puffin are identified as being sensitive to noise and visual disturbance (Ref 24). However, once flushed by visual disturbance of project vessels, they may not rapidly resettle. As birds are less sensitive to underwater noise than very high frequency cetaceans, it is unlikely that underwater noise from vessels or geophysical surveys will displace them before the visual disturbance of the presence of project vessels. This means that they are likely to be flushed before they are within proximity of the Project vessels to be affected by underwater noise.</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>Individuals may travel within the Zol for high order UXO clearance however, an increase in underwater noise would be short term and will not impact individuals within the SPA boundary. Given that Razorbill, common guillemot and Atlantic puffin are highly mobile with large foraging ranges of 122.2, 95.2 and 250.8 km respectively (see <b>Table 5-2</b>), they will be able to avoid areas with increased underwater noise without significantly reducing their foraging grounds. Furthermore, it is likely that these species will forage closer to the SPA to conserve energy, particularly as the Northumberland Marine SPA is used as a foraging area by seabirds from neighbouring SPAs. Thus, individuals are not expected to travel within the Zol.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for all relevant qualifying features.</b></p>			
	Visual / physical disturbance or displacement	<p>As this SPA is 74.9 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by the presence of project vessels. However, birds are highly mobile and may still move within the draft Order Limits.</p> <p>Razorbill, Atlantic puffin and common guillemot are identified as being sensitive to visual disturbance (Ref 24). Given that Razorbill, common guillemot and Atlantic puffin are highly mobile with large foraging ranges of 122.2, 95.2 and 265.4 km respectively, they will be able to avoid project vessels without significantly reducing their foraging grounds. Furthermore, it is likely that these species will forage closer to the SPA to conserve energy, particularly as the Northumberland Marine SPA is used as</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>a foraging area by seabirds from neighbouring SPAs. Thus, individuals are not expected to travel within the Zol.</p> <p><b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance or displacement for all relevant qualifying features.</b></p>			
	In-combination	<p>Given the distance from the draft Order Limits (74.9 km) there will be no direct impacts to birds within the SPA boundary from the English Offshore Scheme alone. It has been acknowledged that mobile species can travel to forage within the Zol of the potential impacts. However, for all potential impacts it was concluded that no LSE are predicted for the English Offshore Scheme alone.</p> <p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the English Offshore Scheme or occurring consecutively, extending the duration of or widening the spatial extent of impacts. Given the distance to the SPA, the wider area available for foraging in the North Sea and the fact that the English Offshore Scheme on its own would not act as a barrier to species accessing the SPA there will be no detectable contribution to an in-combination effect.</p> <p><b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE

\*Seabird assemblage feature

Table 7-16 Assessment of LSE on Berwickshire and North Northumberland Coast SAC (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Grey seal	Changes in distribution of prey species	<p>As detailed within the SACOs for Berwickshire and North Northumberland Coast SAC, food availability must be maintained to meet the objectives of the site, particularly to maintain the population and distribution of the qualifying species supporting habitat. The draft Order Limits are located 78.1 km away and grey seal are estimated to forage up to up to 100 km away from haul out-sites. Therefore, grey seal may travel within the Zol.</p> <p><b>Conclusion: Potential for an LSE for the impact of changes in distribution of prey species for grey seal cannot be excluded.</b></p>	LSE	LSE	LSE
	Barriers to species movement	<p>The draft Order Limits is 78.1 km from the boundary of the SAC and consequently further from any haul out sites. Therefore, this distance, combined with the mobile nature of any works associated with the English Offshore Scheme, allow sufficient room for a mobile species such as grey seal to avoid any works whilst still accessing key habitat.</p> <p><b>Conclusion: No potential for an LSE for the impact of barriers to species movement for grey seal.</b></p>	No LSE	NO LSE	No LSE
	Underwater noise changes	<p>Whilst any underwater noise associated with the English Offshore Scheme during construction, operation and decommissioning will be minimal, there remains a potential need for UXO clearance during the pre-construction phase. As such, whilst grey seal are unlikely to be significantly affected by underwater noise changes associated with all other works.</p> <p><b>Conclusion: Potential for an LSE for the impact of underwater noise changes cannot be excluded as a</b></p>	LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<b>result of UXO clearance during the pre-construction phase for grey seal.</b>			
Visual / physical disturbance or displacement	As detailed within the SACOs for Berwickshire and North Northumberland Coast SAC, the presence and distribution of grey seal and their ability to undertake key life cycle stages and behaviours must be maintained to meet the conservation objectives, particularly to maintain the population and distribution of qualifying species. The draft Order Limits are located 78.1 km away and grey seal are estimated to forage up to up to 100 km away from haul out-sites. Therefore, grey seal may travel within the Zol.	<b>Conclusion: Potential for an LSE for the impact of visual / physical disturbance or displacement cannot be excluded for grey seal.</b>	LSE	LSE	LSE
Collision with project vessels	As detailed within the SACOs for Berwickshire and North Northumberland Coast SAC, the population size must be maintained to meet the conservation objectives, particularly to maintain the population of qualifying species. The draft Order Limits are located 78.1 km away and grey seal are estimated to forage up to up to 100 km away from haul out-sites. Therefore, grey seal may travel within the Zol.	<b>Conclusion: Potential for an LSE for the impact of collision with project vessels cannot be excluded for grey seal.</b>	LSE	LSE	LSE
In-combination	There is no pathway between the English Offshore Scheme and other projects and plans to interact with the grey seal feature of the Humber Estuary Ramsar at any stage of the development for the impact of barriers to species movement. For the remaining impacts, the		LSE	LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>possibility of an LSE cannot be ruled out for the English Offshore Scheme alone.</p> <p><b>Conclusion: Potential for an LSE in-combination for the impacts of changes in distribution of prey species, Underwater noise changes (construction only), visual / physical disturbance or displacement and collision with project vessels cannot excluded for grey seal.</b></p>			

Table 7-17 Assessment of LSE on the Outer Firth of Forth and St Andrews Bay Complex SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<p><b>Breeding</b> Atlantic puffin* Common guillemot*</p>	<p>Changes in distribution of prey species</p>	<p>in Atlantic puffin and common guillemot feed mostly on sandeel and herring and they have a moderate habitat specialisation score of 3 (MIG-Birds, 2022, Ref 13). Therefore, a reduction in this prey species could negatively impact these bird species.</p> <p><b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the English Offshore Scheme would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is predicted. Survival of the individuals and reproduction rates would not be affected.</p> <p><b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
	Temporary increase and deposition of suspended sediments	<p>As the SPA is 84.8 km away there will be no direct impacts of within the SPA boundary. However, as birds are highly mobile with large foraging ranges therefore, they may travel to forage within the Zol.</p> <p>Natural England’s benchmark for the impact is “<i>a change in one WFD ecological status class for one year within the site.</i>” <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC &gt;10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits, and the impact benchmark would not be reached.</p> <p>Cook and Burton (Ref 66) reported that Atlantic puffin and common guillemot are moderately sensitive to increased water turbidity. However, given that the impact of suspended sediment is restricted to a relatively small area and that Atlantic puffin and common guillemot have large foraging ranges of 250.8 km and 95.2 km respectively, there will be sufficient alternative foraging areas available.</p> <p>Furthermore, the Outer Firth of Forth and St Andrews Bay Complex SPA is considered to be functionally linked to surrounding breeding seabird colonies which primarily use the SPA for foraging. Therefore, it is highly unlikely that species within this SPA would travel 84.8 km to forage within the draft Order Limits. The English Offshore Scheme will not have a significant effect on individuals from this site during any phase of development from this impact pathway.</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant qualifying features.</b>			
Water flow (tidal current) changes, including sediment transport considerations		As the SPA is 84.8 km away, it is not within the Zol for this impact. Therefore, there is no pathway for effect. <b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for all relevant qualifying features.</b>	NO LSE	No LSE	NO LSE
Underwater changes	noise	As this site is 84.4 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by underwater noise from project vessels. However, birds are highly mobile and may still move within the Zol.  Atlantic puffin and common guillemot are identified as being sensitive to noise and visual disturbance (Ref 47). However, once flushed by visual disturbance of project vessels, they may not rapidly resettle. As birds are less sensitive to underwater noise than very high frequency cetaceans, it is unlikely that underwater noise from vessels or geophysical surveys will displace them before the visual disturbance of the presence of project vessels. This means that they are likely to be flushed before they are within proximity of the project vessels to be affected by underwater noise.  Individuals may travel within the Zol for high order UXO clearance, however, an increase in underwater noise would be short term and will not impact individuals within the SPA boundary. Given that common guillemot and Atlantic puffin are highly mobile with large foraging ranges of 95.2 km and 250.8 km respectively (see <b>Table 5-2</b> ) they	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>will be able to avoid areas with increased underwater noise without significantly reducing their foraging grounds. Furthermore, the Outer Firth of Forth and St Andrews Bay Complex SPA is considered to be functionally linked to surrounding breeding seabird colonies which primarily use the SPA for foraging. Therefore, it is highly unlikely that species within this SPA would travel 84.8 km to forage within the draft Order Limits. The English Offshore Scheme will not have a significant effect on individuals from this site during any phase of development from this impact pathway.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for all relevant qualifying features.</b></p>			
	Visual / physical disturbance or displacement	<p>Given that the SPA is 84.4 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by underwater noise from the English Offshore Scheme.</p> <p>Atlantic puffin and common guillemot are identified as being sensitive to visual disturbance (Ref 47). However, the Outer Firth of Forth and St Andrews Bay Complex SPA is considered to be functionally linked to surrounding breeding seabird colonies which primarily use the SPA for foraging. Therefore, it is unlikely that species within this SPA would travel 84.8 km to forage within the draft Order Limits. The English Offshore Scheme will not have a significant effect on individuals from this site during any phase of development from this impact pathway.</p> <p><b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance or displacement for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
	In-combination	<p>Given the distance from the draft Order Limits (84.8 km) there will be no direct impacts to animals within the SPA boundary from the English Offshore Scheme alone. It has been acknowledged that mobile species can travel to forage within the Zol of the potential impacts. However, for all potential impacts it was concluded that no LSE are predicted for the English Offshore Scheme alone.</p> <p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the English Offshore Scheme or occurring consecutively, extending the duration of or widening the spatial extent of impacts. Given the distance to the SPA, the wider area available for foraging in the North Sea and the fact that the English Offshore Scheme on its own would not act as a barrier to species accessing the SPA there will be no detectable contribution to an in-combination effect. Any significant impacts are more likely to arise from other plans / projects in isolation or in-combination with each other, rather than from a combined effect with the English Offshore Scheme.</p> <p><b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE

\* Seabird assemblage feature

Table 7-18 Assessment of LSE on the Coquet Island SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Breeding Atlantic puffin*	Changes in Atlantic puffin feed mostly on sandeel and herring and distribution of prey they have a moderate habitat specialisation score of 3 (Ref 13). Therefore, a reduction in this prey species could negatively impact Atlantic puffin.	<b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the English Offshore Scheme would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is predicted. Survival of the individuals and reproduction rates would not be affected.  <b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all Atlantic puffin.</b>	No LSE	No LSE	No LSE
	Temporary increase and deposition of suspended sediments	As the SPA is 87.5 km away, there will be no direct impacts within the SPA boundary. However, as Atlantic puffin are highly mobile with large foraging ranges therefore, they may travel to forage within the Zol.  Natural England’s benchmark for the impact is “ <i>a change in one WFD ecological status class for one year within the site.</i> ” <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC >10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of >10 mg / l will be of short duration beyond the draft Order Limits, and the impact benchmark would not be reached.  Cook and Burton (Ref 66) reported that Atlantic puffin are moderately sensitive to increased water turbidity in	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>response to dredging operations. However, given that the impact of suspended sediment is restricted to a relatively small area and that Atlantic puffin have a large foraging range of 250.8 km, there will be sufficient alternative foraging areas available. Additionally, Coquet SPA is surrounded by the Northumberland Marine SPA which protects the foraging areas for Atlantic puffin. Therefore, Atlantic puffin are likely to forage closer to Coquet Island SPA and within the surrounding waters of the Northumberland Marine SPA (74.9 km away from the draft Order Limits) to conserve energy. Thus, individuals from Coquet SPA are unlikely to travel 87.5 km to forage within the draft Order Limits.</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for Atlantic puffin.</b></p>			
	Water flow (tidal current) changes including sediment transport considerations	<p>As the SPA is 87.5 km away, it is not within the Zol for this impact. Therefore, there is no pathway for effect.</p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for Atlantic puffin.</b></p>	NO LSE	No LSE	NO LSE
	Underwater noise changes	<p>As this site is 87.5 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by underwater noise from project vessels. However, Atlantic puffin are highly mobile and may still travel within the Zol.</p> <p>Atlantic puffin are identified as being sensitive to noise and visual disturbance (Ref 24). However, once flushed by visual disturbance of project vessels, they may not rapidly resettle. As birds are less sensitive to underwater noise than very high frequency cetaceans, it is unlikely</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>that underwater noise from vessels or geophysical surveys will displace them before the visual disturbance of the presence of project vessels. This means that they are likely to be flushed before they are within proximity of the project vessels to be affected by underwater noise.</p> <p>Individuals may travel within the ZoI for high order UXO clearance, however, an increase in underwater noise would be short term and will not impact individuals within the SPA boundary. Atlantic puffin are highly mobile with a large foraging range of 250.8 km (see <b>Table 5-2</b>), they will be able to avoid areas with increased underwater noise without significantly reducing their foraging grounds. Furthermore, Coquet SPA is surrounded by the Northumberland Marine SPA which protects the foraging areas for Atlantic puffin. Therefore, Atlantic puffin are likely to forage closer to Coquet Island SPA and within the surrounding waters of the Northumberland Marine SPA (74.9 km away from the draft Order Limits) to conserve energy. Thus, individuals from Coquet SPA are unlikely to travel 87.5 km to forage within the draft Order Limits.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for Atlantic puffin.</b></p>			
	Visual / physical disturbance or displacement	<p>As the SPA is 87.5 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by underwater noise from the English Offshore Scheme. However, Atlantic puffin are highly mobile and may still move within the draft Order Limits.</p> <p>Atlantic puffin are also identified as being sensitive to visual disturbance (Ref 24). Given that Atlantic puffin are highly mobile with a large foraging range of 265.4 km</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>respectively, they will be able to avoid project vessels without significantly reducing their foraging grounds. Furthermore, Coquet SPA is surrounded by the Northumberland Marine SPA which protects the foraging areas for Atlantic puffin. Therefore, Atlantic puffin are likely to forage closer to Coquet Island SPA and within the surrounding waters of the Northumberland Marine SPA (74.9 km away from the draft Order Limits) to conserve energy. Thus, individuals from Coquet SPA are unlikely to travel 87.5 km to forage within the draft Order Limits.</p> <p><b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance or displacement for Atlantic puffin.</b></p>			
	In-combination	<p>Given the distance from the draft Order Limits (87.5 km) there will be no direct impacts to animals within the SPA boundary from the English Offshore Scheme alone. It has been acknowledged that mobile species can travel to forage within the ZoI of the potential impacts. However, for all potential impacts it was concluded that no LSE are predicted for the English Offshore Scheme alone.</p> <p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the English Offshore Scheme or occurring consecutively, extending the duration of or widening the spatial extent of impacts. Given the distance to the SPA, the wider area available for foraging in the North Sea and the fact that the English Offshore Scheme on its own would not act as a barrier to</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>species accessing the SPA there will be no detectable contribution to an in-combination effect.</p> <p><b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for Atlantic puffin.</b></p>			

\* Seabird assemblage feature

Table 7-19 Assessment of LSE on the Farne Island SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<p><b>Breeding</b></p> <p>Atlantic puffin*</p> <p>Common guillemot*</p>	<p>Changes in Atlantic puffin and common guillemot feed mostly on distribution of prey sandeel and herring and they have a moderate habitat specialisation score of 3 (Ref 11). Therefore, a reduction in this prey species could negatively impact these bird species.</p>	<p><b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the English Offshore Scheme would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is predicted. Survival of the individuals and reproduction rates would not be affected.</p> <p><b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE
	<p>Temporary increase and deposition of impacts within the SPA boundary. However, as birds are</p>	<p>As the SPA is 87.7 km away, there will be no direct</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
suspended sediments		<p>highly mobile with large foraging ranges therefore, they may travel to forage within the Zol.</p> <p>Natural England’s benchmark for the impact is “<i>a change in one WFD ecological status class for one year within the site.</i>” <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC &gt;10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits, and the impact benchmark would not be reached.</p> <p>Cook and Burton (Ref 66) reported that Atlantic puffin and common guillemot are moderately sensitive to increased water turbidity. However, given that the impact of suspended sediment is restricted to a relatively small area and that Atlantic puffin and common guillemot have large foraging ranges of 250.8 km and 95.2 km respectively, there will be sufficient alternative foraging areas available. Furthermore, breeding birds from the Farne Islands SPA use the waters surrounding the SPA to forage, which is protected by the Northumberland Marine SPA (74.9 km away from the draft Order Limits). Therefore, it is likely that these species will forage closer to the SPA to conserve energy.</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for all relevant qualifying features.</b></p>			
	Water flow (tidal current) changes, including sediment	<p>As the SPA is 87.7 km away, it is not within the Zol for this impact. Therefore, there is no pathway for effect.</p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment</b></p>	NO LSE	No LSE	NO LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
transport considerations		<b>transport considerations for all relevant qualifying features.</b>			
Underwater changes	noise	<p>As this site is 87.7 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by underwater noise from project vessels. However, birds are highly mobile and may still move within the Zol.</p> <p>Atlantic puffin and common guillemot are identified as being sensitive to noise and visual disturbance (Ref 47). However, once flushed by visual disturbance of project vessels, they may not rapidly resettle. As birds are less sensitive to underwater noise than very high frequency cetaceans, it is unlikely that underwater noise from vessels or geophysical surveys will displace them before the visual disturbance of the presence of project vessels. This means that they are likely to be flushed before they are within proximity of the project vessels to be affected by underwater noise.</p> <p>Individuals may travel within the Zol for high order UXO clearance however, an increase in underwater noise would be short term and will not impact individuals within the SPA boundary. Atlantic puffin and common guillemot are highly mobile with large foraging ranges of 250.8 km and 95.2 km respectively, (see <b>Table 5-2</b>), they will be able to avoid areas with increased underwater noise without significantly reducing their foraging grounds. Furthermore, breeding birds from the Farne Islands SPA use the waters surrounding the SPA to forage, which is protected by the Northumberland Marine SPA (74.9 km away from the draft Order Limits). Therefore, it is likely</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>that these species will forage closer to the SPA to conserve energy.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for all relevant qualifying features.</b></p>			
Visual / physical disturbance or displacement	or	<p>Given that the SPA is 87.7 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by underwater noise from the English Offshore Scheme.</p> <p>Atlantic puffin and common guillemot are identified as being sensitive visual disturbance (Atterbury <i>et al.</i>, 2021, Ref 47). Given that Atlantic puffin and common guillemot are highly mobile with large foraging ranges of 250.8 km and 95.2 km respectively, they will be able to avoid project vessels without significantly reducing their foraging grounds. Furthermore, breeding birds from the Farne Islands SPA use the waters surrounding the SPA to forage, which is protected by the Northumberland Marine SPA (74.9 km away from the draft Order Limits). Therefore, it is likely that these species will forage closer to the SPA to conserve energy.</p> <p><b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance or displacement for all relevant qualifying features.</b></p>	No LSE	No LSE	No LSE
In-combination		<p>Given the distance from the draft Order Limits (87.7 km) there will be no direct impacts to animals within the SPA from the English Offshore Scheme alone. It has been acknowledged that mobile species can travel to forage within the Zol of the potential impacts. However, for all</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>potential impacts it was concluded that no LSE are predicted for the English Offshore Scheme alone.</p> <p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the English Offshore Scheme or occurring consecutively, extending the duration of or widening the spatial extent of impacts. Given the distance to the SPA, the wider area available for foraging in the North Sea and the fact that the English Offshore Scheme on its own would not act as a barrier to species accessing the SPA there will be no detectable contribution to an in-combination effect.</p> <p><b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for all relevant qualifying features.</b></p>			

\*Seabird assemblage feature

Table 7-20 Assessment of LSE on St Abb's Head to Fast Castle SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
<b>Breeding</b> Razorbill*	Changes in distribution of prey species	in Razorbill feed mostly on sandeel and herring and they have a moderate habitat specialisation score (where 1 is the lowest and 5 is the highest) of 3 (Mig-Birds 2022, Ref 13). Therefore, a reduction in this prey species could negatively impact these bird species.	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p><b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the English Offshore Scheme would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is predicted. Survival of the individuals and reproduction rates would not be affected.</p> <p><b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all razorbill.</b></p>			
	Temporary increase and deposition of suspended sediments	<p>As the SPA is 113 km away, there will be no direct impacts within the SPA boundary. However, razorbill are highly mobile with large foraging ranges therefore, they may travel to forage within the draft Order Limits.</p> <p>Natural England’s benchmark for the impact is “<i>a change in one WFD ecological status class for one year within the site.</i>” <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC &gt;10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits, and the impact benchmark would not be reached.</p> <p>Razorbill are water column feeders and therefore potentially impacted by turbidity when they forage for prey. Additionally, Cook and Burton (Ref 66) reported that razorbill species are moderately sensitive to increased water turbidity. However, given that the impact of suspended sediment is restricted to a relatively small area and that razorbill have a large foraging range of 112.2 km, there will be sufficient alternative foraging areas available. Furthermore, as the distance to the draft Order Limits it</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>towards the limit of the species foraging range, razorbill are likely to forage closer to the SPA to conserve energy. Thus, it is unlikely that individuals will travel within the Zol.</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for razorbill.</b></p>			
	Water flow (tidal current) changes, including sediment transport considerations	<p>As St Abb's Head to Fast Castle SPA is 112.2 km away, it is not within the Zol for this impact. Therefore, there is no pathway for effect. No LSE are predicted.</p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for razorbill.</b></p>	NO LSE	No LSE	NO LSE
	Underwater noise changes	<p>As this site is 113 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by underwater noise from the English Offshore Scheme. However, birds are highly mobile and may still move within the Zol.</p> <p>Razorbill are identified as being sensitive to noise and visual disturbance (Ref 24). However, once flushed by visual disturbance of project vessels, they may not rapidly resettle. As birds are less sensitive to underwater noise than very high frequency cetaceans, it is unlikely that underwater noise from vessels or geophysical surveys will displace them before the visual disturbance of the presence of project vessels. This means that they are likely to be flushed before they are within proximity of the project vessels to be affected by underwater noise.</p> <p>Individuals may travel within the Zol for high order UXO clearance, however, an increase in underwater noise would be short term and will not impact individuals within</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>the SPA boundary. Given that Razorbill are highly mobile with a large foraging range of 122.2 km (see <b>Table 5-2</b>), they will be able to avoid areas with increased underwater noise without significantly reducing their foraging grounds. Furthermore, as the distance to the draft Order Limits it towards the limit of the species foraging range, razorbill are likely to forage closer to the SPA to conserve energy. Thus, it is unlikely that individuals will travel within the Zol.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for razorbill.</b></p>			
	Visual / physical disturbance or displacement	<p>As this site is 113 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by the presence of project vessels. However, razorbill are highly mobile and may still move within the draft Order Limits.</p> <p>Razorbill are identified as being sensitive to visual disturbance (Ref 24). However, given that Razorbill are highly mobile with a large foraging range of 122.2 km, they will be able to avoid project vessels without significantly reducing their foraging grounds. Furthermore, as the distance to the draft Order Limits it towards the limit of the species foraging range, razorbill are likely to forage closer to the SPA to conserve energy. Thus, it is unlikely that individuals will travel within the Zol.</p> <p><b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance or displacement for razorbill</b></p>	No LSE	No LSE	No LSE
	In-combination	<p>Given the distance from the draft Order Limits (113 km) there will be no direct impacts to animals within the SPA from the English Offshore Scheme alone. It has been</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>acknowledged that mobile species can travel to forage within the Zol of the potential impacts. However, for all potential impacts it was concluded that no LSE are predicted for the English Offshore Scheme alone.</p> <p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the English Offshore Scheme or occurring consecutively, extending the duration of or widening the spatial extent of impacts. Given the distance to the SPA, the wider area available for foraging in the North Sea and the fact that the English Offshore Scheme on its own would not act as a barrier to species accessing the SPA there will be no detectable contribution to an in-combination effect. Any significant impacts are more likely to arise from other plans / projects in isolation or in-combination with each other, rather than from a combined effect with the English Offshore Scheme.</p> <p><b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for razorbill.</b></p>			
*Seabird assemblage feature					

Table 7-21 Assessment of LSE on Fowlsheugh SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Breeding Razorbill	Changes in distribution of prey species	<p>in Razorbill feed mostly on sandeel and herring. They have a moderate habitat specialisation score (where 1 is the lowest and 5 is the highest) of 3 (Ref 13). Therefore, a reduction in this prey species could negatively impact these bird species.</p> <p><b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the English Offshore Scheme would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is predicted. Survival of the individuals and reproduction rates would not be affected.</p> <p><b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all razorbill.</b></p>	No LSE	No LSE	No LSE
	Temporary increase and deposition of suspended sediments	<p>As the SPA is 116.2 km away, there will be no direct impacts within the SPA boundary. However, razorbill are highly mobile with large foraging ranges therefore, they may travel to forage within the draft Order Limits.</p> <p>Natural England’s benchmark for the impact is “<i>a change in one WFD ecological status class for one year within the site.</i>” <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC &gt;10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits, and the impact benchmark would not be reached.</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>Razorbill are water column feeders and therefore potentially impacted by turbidity when they forage for prey. Additionally, Cook and Burton (Ref 66) reported that razorbill species are moderately sensitive to increased water turbidity. However, given that the impact of suspended sediment is restricted to a relatively small area and that the distance from the SPA to the draft Order Limits is beyond the foraging range of razorbill (112.2 km), razorbill are unlikely to travel within the Zol.</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for razorbill.</b></p>			
	Water flow (tidal current) changes, including sediment transport considerations	<p>As the SPA is 116.2 km away, it is not within the Zol for this impact. Therefore, there is no pathway for effect.</p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for razorbill.</b></p>	NO LSE	No LSE	NO LSE
	Underwater noise changes	<p>As this site is 116.2 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by underwater noise from vessels associated with the English Offshore Scheme. However, razorbill are highly mobile and may still move within the Zol.</p> <p>Razorbill are identified as being sensitive to noise and visual disturbance (Ref 24). However, once flushed by visual disturbance of project vessels, they may not rapidly resettle. As birds are less sensitive to underwater noise than very high frequency cetaceans, it is unlikely that underwater noise from vessels or geophysical surveys will displace them before the visual disturbance of the presence of project vessels. This means that they are</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>likely to be flushed before they are within proximity of the project vessels to be affected by underwater noise.</p> <p>Individuals may travel within the Zol for high order UXO clearance however, an increase in underwater noise would be short term and will not impact individuals within the SPA boundary. Given that Razorbill are highly mobile with a large foraging range of 122.2 km (see <b>Table 5-2</b>) they will be able to avoid areas with increased underwater noise without significantly reducing their foraging grounds. Furthermore, the distance from the SPA to the draft Order Limits is beyond the foraging range of razorbill (112.2 km) thus, razorbill are unlikely to travel within the Zol.</p> <p><b>Conclusion: No potential for an LSE for underwater noise changes for razorbill.</b></p>			
	Visual / physical disturbance or displacement	<p>As this site is 116.2 km from the draft Order Limits, or individuals within the SPA boundary will not be permanently or directly affected by the presence of project vessels. However, razorbill are highly mobile and may still move within the draft Order Limits.</p> <p>Razorbill are identified as being sensitive to visual disturbance (Ref 24). However, given that the distance from the SPA to the draft Order Limits is beyond the foraging range of razorbill (112.2 km), razorbill are unlikely to travel within the Zol.</p> <p><b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance or displacement for razorbill.</b></p>	No LSE	No LSE	No LSE
	In-combination	<p>Given the distance from the draft Order Limits (116.2 km) there will be no direct impacts to animals within the SPA from the English Offshore Scheme alone. It has been</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>acknowledged that mobile species can travel to forage within the Zol of the potential impacts. However, for all potential impacts it was concluded that no LSE are predicted for the English Offshore Scheme alone.</p> <p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the English Offshore Scheme or occurring consecutively, extending the duration of or widening the spatial extent of impacts. Given the distance to the SPA, the wider area available for foraging in the North Sea and the fact that the English Offshore Scheme on its own would not act as a barrier to species accessing the SPA, there will be no detectable contribution to an in-combination effect. Any significant impacts are more likely to arise from other plans / projects in isolation or in-combination with each other, rather than from a combined effect with the English Offshore Scheme.</p> <p><b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for razorbill.</b></p>			

Table 7-22 Assessment of LSE on the Forth Islands SPA (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Breeding Atlantic puffin	Changes in Atlantic puffin feed mostly on sandeel and herring and distribution of prey they have a moderate habitat specialisation score of 3 species (Ref 13). Therefore, a reduction in this prey species could negatively impact Atlantic puffin.	<b>Volume 1, Part 3, Chapter 19: Fish and Shellfish</b> considered the impact pathways of habitat loss and underwater noise, concluding that the English Offshore Scheme would not have a significant effect on fish and shellfish ecology. No impact on stock recruitment is predicted. Survival of the individuals and reproduction rates would not be affected.  <b>Conclusion: No potential for an LSE for the impact of changes in distribution of prey species for all Atlantic puffin.</b>	No LSE	No LSE	No LSE
	Temporary increase and deposition of moderately sensitive to increased water turbidity in suspended sediments	Cook and Burton (Ref 66) reported that Atlantic puffin are moderately sensitive to increased water turbidity in response to dredging operations. Although several project activities will create minor elevations in SSC, cable burial and pre-sweeping of sand waves will cause the largest temporary sediment plume.  As the SPA is 132.5 km away, there will be no direct impacts within the SPA boundary. However, as Atlantic puffin are highly mobile with large foraging ranges therefore, they may travel to forage within the Zol.  Natural England's benchmark for the impact is "a change in one WFD ecological status class for one year within the site." <b>Volume 1, Part 3, Chapter 17: Coastal and Marine Physical Processes</b> estimates that the greatest impact distance of SSC was associated with trenching with SSC	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>&gt;10 mg / l occurring up to 8.8 km from the point of release. However, any exceedances of &gt;10 mg / l will be of short duration beyond the draft Order Limits, and the impact benchmark would not be reached.</p> <p>Cook and Burton (2010, Ref 66) reported that Atlantic puffin are moderately sensitive to increased water turbidity in response to dredging operations. However, given that the impact of suspended sediment is restricted to a relatively small area and that Atlantic puffin have a large foraging range of 250.8 km, there will be sufficient alternative foraging areas available. Furthermore, the Forth Islands SPA is considered to be functionally linked to the Outer Firth of Forth and St Andrews Bay Complex SPA which seabirds commonly use for foraging and bathing. Therefore, Atlantic puffins are unlikely to travel 132.5 km to forage within the draft Order Limits.</p> <p><b>Conclusion: No potential for an LSE for the impact of temporary increase and deposition of suspended sediments for Atlantic puffin.</b></p>			
	Water flow (tidal current) changes including sediment transport considerations	<p>As the SPA is 132.5 km away, it is not within the ZoI for this impact. Therefore, there is no pathway for effect.</p> <p><b>Conclusion: No potential for an LSE for the impact of water flow (tidal current) changes, including sediment transport considerations for Atlantic puffin.</b></p>	NO LSE	No LSE	NO LSE
	Underwater noise changes	<p>As this site is 132.5 km from the draft Order Limits, individuals within the SPA boundary will not be permanently or directly affected by underwater noise from project vessels. However, Atlantic puffin are highly mobile and may still travel within the ZoI.</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>Atlantic puffin are identified as being sensitive to noise and visual disturbance (Ref 24). However, once flushed by visual disturbance of project vessels, they may not rapidly resettle. However, once flushed by visual disturbance of project vessels, they may not rapidly resettle. As birds are less sensitive to underwater noise than very high frequency cetaceans, it is unlikely that underwater noise from vessels or geophysical surveys will displace them before the visual disturbance of the presence of project vessels. This means that they are likely to be flushed before they are within proximity of the project vessels to be affected by underwater noise.</p> <p>Individuals may travel within the ZoI for high order UXO clearance, however, an increase in underwater noise would be short term and will not impact individuals within the SPA boundary. Atlantic puffin are highly mobile with a large foraging range of 250.8 km (see <b>Table 5-2</b>), they will be able to avoid areas with increased underwater noise without significantly reducing their foraging grounds. Furthermore, the Forth Islands SPA is considered to be functionally linked to the Outer Firth of Forth and St Andrews Bay Complex SPA which seabirds commonly use for foraging and bathing. Therefore, Atlantic puffins are unlikely to travel 132.5 km to forage within the draft Order Limits.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for Atlantic puffin.</b></p>			
	Visual / physical disturbance or displacement	As the SPA is 132.5 km from the draft Order Limits, or individuals within the SPA boundary will not be permanently or directly affected by visual / physical disturbance or displacement from the English Offshore	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>Scheme. However, Atlantic puffin are highly mobile and may still move within the draft Order Limits.</p> <p>Atlantic puffin are also identified as being sensitive to visual disturbance (Ref 24). Given that Atlantic puffin are highly mobile with a large foraging range of 265.4 km respectively, they will be able to avoid project vessels without significantly reducing their foraging grounds. Furthermore, the Forth Islands SPA is considered to be functionally linked to the Outer Firth of Forth and St Andrews Bay Complex SPA which seabirds commonly use for foraging and bathing. Therefore, Atlantic puffins are unlikely to travel 132.5 km to forage within the draft Order Limits.</p> <p><b>Conclusion: No potential for an LSE for the impact of visual / physical disturbance or displacement for Atlantic puffin.</b></p>			
	In-combination	<p>Given the distance from the draft Order Limits (132.5 km) there will be no direct impacts to animals within the SPA from the English Offshore Scheme alone. It has been acknowledged that mobile species can travel to forage within the Zol of the potential impacts. However, for all potential impacts it was concluded that no LSE are predicted for the English Offshore Scheme alone.</p> <p>A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the project or occurring consecutively, extending the duration of or widening the spatial extent of impacts. Given the distance to the SPA, the wider area available for foraging in the</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>North Sea and the fact that the English Offshore Scheme on its own would not act as a barrier to species accessing the SPA there will be no detectable contribution to an in-combination effect.</p> <p><b>Conclusion: For all impacts it is concluded that there will be no detectable contribution to an in-combination effect for Atlantic puffin.</b></p>			

Table 7-23 Assessment of LSE on Marine Mammal European Transboundary Sites (for offshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
Harbour Porpoise Grey seal Harbour Seal	Underwater noise changes	<p>Whilst any underwater noise associated with the English Offshore Scheme during construction, operation and decommissioning will be minimal, there remains a potential need for UXO clearance during the pre-construction phase. The effects of noise disturbance may be physical, physiological and / or behavioural. Disturbance is frequently a behavioural response to noise and may lead to animals being displaced from an affected area. The onset of a Temporary Threshold Shift (TTS) can be referred to as the fleeing response. This is therefore a behavioural response, and animals exposed to these noise levels are likely to actively avoid injury as a result of a PTS by moving away from the area.</p> <p>There are no transboundary European Sites within 20 km (the EDR for high-order UXO clearance) of the draft Order Limits and therefore there will be no direct impacts on harbour porpoise, grey or harbour seal within a transboundary European site. The nearest transboundary</p>	No LSE	No LSE	No LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE Conclusion		
			C	O&M	D
		<p>European site is Klaverbank which is 130.4 km away from the draft Order Limits. Indirect impacts have been considered including animals moving from the sites into the Zol. However, given the wide area available for foraging for harbour porpoise within the NS MU and the fact that works will take place against a high level of shipping activity in the Southern North Sea, the activities associated with the English Offshore Scheme will not have a LSE on foraging harbour porpoise from the relevant transboundary European Sites either alone or in-combination with other projects.</p> <p>The grey seal foraging range from haul-out sites on the coast are 100 km and the foraging range for harbour seal is 50 km. As the nearest transboundary European site is Klaverbank which is 130.4 km away from the draft Order Limits there is no resource-receptor pathway for seal even when considering the largest possible foraging range of 100 km.</p> <p><b>Conclusion: No potential for an LSE for the impact of underwater noise changes for harbour porpoise.</b></p>			
	In-combination	<p>There are many major infrastructure projects being developed within the waters of the Southern North Sea by different European countries. Though construction with one or more of these projects may overlap with the English Offshore Scheme, given the distance between the draft Order Limits and transboundary European designated sites this will not cause any significant effect.</p> <p><b>Conclusion: No potential for an LSE in-combination for the impact of underwater noise changes for harbour porpoise.</b></p>	No LSE	No LSE	No LSE

\* See **Annex A** for a list of marine mammal transboundary European Sites

## English Onshore Scheme

- 7.1.3 The assessment for LSE on relevant European Sites for the English Onshore Scheme is presented in **Table 7-24** to **Table 7-28**. The assessment is based on the precautionary principle and has been undertaken in the absence of mitigation.
- 7.1.4 The following European Sites are included in the LSE assessment:
- Greater Wash SPA (for onshore works) (**Table 7-24**);
  - Humber Estuary SPA (for onshore works) (**Table 7-25**);
  - Humber Estuary SAC (for onshore works) (**Table 7-26**);
  - Humber Estuary Ramsar (for onshore works) (**Table 7-27**); and
  - The Wash and North Norfolk Coast SAC (for onshore works) (**Table 7-28**)

Table 7-24 Assessment of LSE on the Greater Wash SPA (for onshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE conclusion	
			C	D
<p><b>Breeding</b></p> <p>Sandwich tern</p> <p>Little tern</p> <p>Common tern</p>	Changes to water quality	<p>Accidental spills from HDD operations or other construction processes, such as drilling fluids, fuels, or other hazardous chemicals, could impact water quality in the SPA. Such spills can contaminate both foraging areas and water bodies, thereby degrading water quality and compromising terrestrial habitats. High tide roosts are especially vulnerable, as contaminants may accumulate on the substrate or vegetation used by birds for shelter. The resulting pollution can reduce the abundance of invertebrate prey and impose long-term ecological damage that directly affects the health and survival of both breeding and non-breeding species. Even in the absence of a direct hydrological connection, excavation and related activities can disturb sediment and cause runoff that degrades water quality. The mobilisation of sediments may introduce fine particulates and contaminants into nearby aquatic environments, affecting water clarity and the health of benthic communities. These water quality changes can indirectly affect bird species by reducing the availability of prey and altering the conditions of adjacent foraging areas. Additionally, high tide roosts that rely on clean, undisturbed shorelines may also be compromised by sediment deposition, further eroding the overall habitat quality.</p> <p><b>Conclusion: LSE due to change in water quality cannot be ruled out for any bird species of interest.</b></p>	LSE	LSE
<p><b>Non-breeding</b></p> <p>Red-throated diver</p> <p>Common scoter</p> <p>Little gull</p>				
	Introduction or spread of INNPS	Vegetation clearance and construction activities could facilitate the spread of INNPS on the coast, which could lead to long-term degradation of functionally linked habitats. Construction vehicles, machinery and materials have the potential to introduce INNPS that could spread into nearby habitats, particularly if soil or vegetation is transported.	LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE conclusion	
			C	D
	Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	<p>Although vegetation clearance and construction activities (including HDD) will take place outside the SPA, the SPA boundary shares a common boundary with the draft Order Limits. and hence there is potential of disturbance to SPA bird species.</p> <p>Breeding birds such as sandwich tern, little tern and common tern are sensitive to visual, noise, lighting and vibration disturbance, especially during the nesting period when any disruption to adult birds can result in reduced incubation success, nest abandonment and increased exposure of chicks and eggs to predation. These species typically nest in colonies, meaning that disturbance could have a wider impact on breeding success at the population level, rather than just affecting individual birds. Noise from the vegetation clearance and construction activities could also potentially alter the breeding behaviour of these species within the SPA.</p> <p>For non-breeding birds such as red-throated diver, common scoter and little gull, increased human activity, construction noise &amp; vibration, and movements of vehicles has the potential to cause avoidance of high tide roosts as these species require safe, undisturbed locations for roosting. This could lead to higher energy expenditure as birds are forced to relocate.</p> <p><b>Conclusion: LSE due to disturbance to all qualifying species (changes to levels of noise, vibration, lighting and visual baseline) cannot be ruled out for any bird species of interest.</b></p>	LSE	LSE
	Changes to air quality	<p>Following Institute of Air Quality Management (IAQM) (2024, 87) guidance, dust and particulate matter from demolition and construction activities are expected to disperse over a 50 m zone. With works now occurring right next to the SPA, degraded air quality becomes a significant concern. Poor air quality may lead to respiratory stress in birds, affecting their overall health and behaviour.</p>	LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE conclusion	
			C	D
		<p>Additionally, the accumulation of dust can alter microhabitat conditions at high tide roosts, making them less suitable or safe for resting. This degradation can also impact the broader ecosystem by affecting prey species, ultimately reducing the quality of both terrestrial and aquatic habitats.</p> <p><b>Conclusion: LSE due to changes in air quality cannot be ruled out for any bird species of interest.</b></p>		
	Displacement and Barrier Effects	<p>The removal of vegetation and earthworks such as excavation directly cause a loss of FLL for all affected species. With vegetation clearance and excavation occurring right next to the SPA, the immediate loss of nesting cover and roosting substrates is predictable. Breeding terns may lose critical cover that helps protect nests from predators and environmental stress, while non-breeding birds that depend on high tide roosts may face that their essential resting sites have been degraded.</p>	LSE	LSE
	In-combination	<p>In line with the precautionary principle, and given the current data limitations, it is not possible to determine whether cumulative effects would be significant, or in-combination LSE can be discounted. Hence, based on the precautionary principle, there is considered to be potential for in-combination effects, with these to be subject to assessment at subsequent stages of the Project when more information is available.</p>	LSE	LSE

Table 7-25 Assessment of LSE on Humber Estuary SPA (for onshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE conclusion	
			C	D
<b>Non-breeding</b> Golden plover Lapwing Brent goose Wigeon	Changes in water quality	The assessment as described above for the Greater Wash SPA (for onshore works) ( <b>Table 7-24</b> ) is also relevant to the Humber Estuary SPA.	LSE	LSE
	Introduction or spread of INNPS	In addition, certain qualifying features of the Humber Estuary SPA are not exclusively coastal and may make use of terrestrial areas in proximity to the landfall.	LSE	LSE
	Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	Construction activities in terrestrial areas could give rise to changes in water quality through surface water runoff or accidental spills, with potential implications for prey availability or foraging conditions. Vegetation clearance and excavation could introduce or spread INNPS, affecting habitat suitability. Disturbance from increased noise, vibration, artificial lighting, and visual change in the baseline could result in temporary avoidance or altered habitat use. Changes in air quality could affect habitat suitability, and stripping of top-soil and subsoil for cable trenching could give rise to displacement or barrier effects, resulting in loss of FLL and influencing movement between FLL. In the absence of full baseline surveys at this stage and in accordance with the precautionary principle, LSEs are screened in.	LSE	LSE
	Changes in air quality		LSE	LSE
	Displacement and Barrier Effects		LSE	LSE
	In-combination		<b>Conclusion: LSE due to changes in water quality, introduction of INNPS, disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline), changes in air quality, displacement and barrier effects, and in-combination effects cannot be ruled out for any bird species of interest.</b>	LSE

Table 7-26 Assessment of LSE on the Humber Estuary SAC (for onshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE conclusion	
			C	D
Sea lamprey River lamprey	Changes in water quality	Soil-stripping, excavation, HDD, temporary culverts and watercourse diversion have the potential to impact water quality by introducing/increasing sediments, surface water run-off and/or accidental material, oil and fuel spillage.	LSE	LSE
	Changes in water levels/flows	Sea lampreys and river lampreys are sensitive to increased turbidity, sedimentation, and pollution. Vegetation clearance and excavation could introduce or spread INNPS, affecting habitat suitability. Elevated suspended sediments could smother spawning areas or reduce water quality, while accidental spills (fuels, chemicals) could be toxic. If spawning or juvenile habitats exist within the 500 m of the work areas, impacts could be significant due to their limited mobility during certain life stages (larvae remain burrowed for years).	LSE	LSE
	Introduction or spread of INNPS	Sea and river lampreys navigate using olfaction and water flow rather than sight, and they typically migrate and spawn in deep or shaded waters. As a result, they are less sensitive to changes in lighting and visual disturbance.	LSE	LSE
	Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	Underwater noise and vibration, particularly from piling or heavy machinery, could potentially affect lamprey behaviour, such as altering migration patterns, feeding, spawning or triggering other stress responses, if suitable habitats are present within the FLL in the ZOI for disturbance.	LSE	LSE
	Displacement and Barrier Effects	Field surveys and a desk-based assessment will be undertaken to determine the likely presence or absence of lamprey within the watercourses within 500m of the Project.	LSE	LSE
	Changes to air quality	River and Sea lamprey rely on habitat that may be sensitive to air quality impacts (APIS, 2026, Ref 78). Modelling will therefore be undertaken to determine nitrogen deposition	LSE	LSE
	Direct injury / killing of fish		LSE	LSE
	In-combination		LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE conclusion	
			C	D
		<p>levels from the Project. Impacts from dust and pollution deposition will also be assessed.</p> <p><b>Conclusion: LSE due to changes in water quality, changes in water levels/flows, Introduction or spread of INNPS, disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline), changes to air quality, displacement and barrier effects , direct injury / killing of fish and in-combination effects cannot be ruled out for sea lamprey and river lamprey.</b></p>		
Grey seal	Changes to water quality	Soil-stripping, excavation, HDD, temporary culverts and watercourse diversion have the potential to impact water quality by introducing/increasing sediments, surface water run-off and/or accidental material, oil and fuel spillage. This may impact water quality of habitat used by grey seal downstream of the Project.	LSE	LSE
	Introduction or spread of INNPS	Vegetation clearance and excavation could introduce or spread INNPS, affecting habitat suitability. However, these will be plant species associated with freshwater habitat that would not survive in saline habitat used by grey seal.	No LSE	No LSE
	Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	Grey seals are not highly sensitive to visual or lighting baseline changes, as they primarily rely on acoustic and olfactory cues for navigation and foraging. Given their habitat preferences and mobility, and along with the fact that the only main river that overlaps with the Project, the Trusthorpe Onsough Drain, is not sufficiently hydrologically connected to allow the passage of marine mammals from intertidal and marine environments, there is no pathway to impact marine mammals.	No LSE	No LSE
	Changes to air quality	As per APIS (APIS, 2026, Ref 78), impacts upon grey seal from changes to air quality can be ruled out as they are not sensitive	LSE	LSE
	In-combination			

Qualifying Features	Potential Impact	Assessment for LSE	LSE conclusion	
			C	D
		to nitrogen deposition impacts “No expected negative impact on species due to impacts on the species' broad habitat.” <b>Conclusion: LSE due to changes in water quality and in-combination effects cannot be ruled out for grey seal.</b>		

Table 7-27 Assessment of LSE on the Humber Estuary Ramsar (for onshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE conclusion	
			C	D
<b>Criterion 8</b>  The Humber Estuary acts as an important migration route for both river lamprey and sea lamprey between coastal waters and their spawning areas.	Changes in water quality	The assessment as described above for the Humber Estuary SAC ( <b>Table 7-26</b> ) is also relevant to the Humber Estuary Ramsar.	LSE	LSE
	Changes in water levels/flows	<b>Conclusion: LSE due to changes in water quality, changes in water levels/flows, Introduction or spread of INNPS, disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline), changes to air quality, displacement and barrier effects , direct injury / killing of fish and in-combination effects cannot be ruled out for sea lamprey and river lamprey.</b>	LSE	LSE
	Introduction or spread of INNPS		LSE	LSE
	Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)		LSE	LSE
	Displacement and Barrier Effects		LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE conclusion	
			C	D
	Changes to air quality		LSE	LSE
	Direct injury / killing of fish		LSE	LSE
	In-combination		LSE	LSE
<b>Criterion 3</b> The Humber Estuary Ramsar site supports a breeding colony of grey seals at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast.	Changes to water quality	Soil-stripping, excavation, HDD, temporary culverts and watercourse diversion have the potential to impact water quality by introducing / increasing sediments, surface water run-off and / or accidental material, oil and fuel spillage. This may impact water quality of habitat used by grey seal downstream of the Project.	LSE	LSE
	Introduction or spread of INNPS		No LSE	No LSE
	Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	Grey seals are not highly sensitive to visual or lighting baseline changes, as they primarily rely on acoustic and olfactory cues for navigation and foraging. Given their habitat preferences and mobility, and along with the fact that the only main river that overlaps with the Project, the Trusthorpe Onsough Drain, is not sufficiently hydrologically connected to allow the passage of marine mammals from intertidal and marine environments, there is no pathway to impact marine mammals.	No LSE	No LSE
	Changes to air quality	As per APIS (APIS, 2026, Ref 78), impacts upon grey seal from changes to air quality can be ruled out as they are not sensitive to nitrogen deposition impacts “No expected negative impact on species due to impacts on the species' broad habitat.”	No LSE	No LSE
	In-combination	<b>Conclusion: LSE due to changes in water quality and in-combination effects cannot be ruled out for grey seal.</b>	LSE	LSE
<b>Criterion 6</b>	Changes in water quality		LSE	LSE

Qualifying Features	Potential Impact	Assessment for LSE	LSE conclusion	
			C	D
Golden plover	Introduction or spread of INNPS	The assessment as described above for the Greater Wash SPA (for onshore works) ( <b>Table 7-24</b> ) and the Humber Estuary SPA ( <b>Table 7-25</b> ) is also relevant to the Humber Estuary SPA.	LSE	LSE
	Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	Construction activities in terrestrial areas could give rise to changes in water quality through surface water runoff or accidental spills, with potential implications for prey availability or foraging conditions. Vegetation clearance and excavation could introduce or spread INNPS, affecting habitat suitability. Disturbance from increased noise, vibration, artificial lighting, and visual change in the baseline could result in temporary avoidance or altered habitat use. Changes in air quality could affect habitat suitability, and stripping of top-soil and subsoil for cable trenching could give rise to displacement or barrier effects, resulting in loss of FLL and influencing movement between FLL. In the absence of full baseline surveys at this stage and in accordance with the precautionary principle, LSEs are screened in.	LSE	LSE
	Changes in air quality		LSE	LSE
	Displacement and Barrier Effects		LSE	LSE
	In-combination	<b>Conclusion: LSE due to changes in water quality, introduction of INNPS, disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline), changes in air quality, displacement and barrier effects, and in-combination effects cannot be ruled out for any bird species of interest.</b>	LSE	LSE

Table 7-28 Assessment of LSE on The Wash and North Norfolk Coast SAC (for onshore works)

Qualifying Features	Potential Impact	Assessment for LSE	LSE conclusion	
			C	D
Harbour Seal	Changes to water quality	Soil-stripping, excavation, HDD, temporary culverts and watercourse diversion have the potential to impact water quality by introducing/increasing sediments, surface water run-off and/or accidental material, oil and fuel spillage. This may impact water quality of habitat used by grey seal downstream of the Project.	LSE	LSE
	Introduction or spread of INNPS		No LSE	No LSE
	Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	Harbour seals are not highly sensitive to visual or lighting baseline changes, as they primarily rely on acoustic and olfactory cues for navigation and foraging. Given their habitat preferences and mobility, and along with the fact that the only main river that overlaps with the Project, the Trusthorpe Onsough Drain, is not sufficiently hydrologically connected to allow the passage of marine mammals from intertidal and marine environments, there is no pathway to impact marine mammals.	No LSE	No LSE
	Changes in air quality	Vegetation clearance and excavation could introduce or spread INNPS, affecting habitat suitability. However, these will be plant species associated with freshwater habitat that would not survive in saline habitat used by grey seal.  As per APIS (APIS, 2026, Ref 78), impacts upon grey seal from changes to air quality can be ruled out as they are not sensitive to nitrogen deposition impacts “No expected negative impact on species due to impacts on the species' broad habitat.  <b>Conclusion: LSE due to changes in water quality and in-combination effects cannot be ruled out for harbour seal.</b>	No LSE	No LSE
	In-combination		LSE	LSE

## 8. Screening Statement

- 8.1.1 Having regard to the relevant legislation and the methodology followed, a Stage 1 Screening for AA was undertaken to ascertain whether the Project could have a LSE on any European site.
- 8.1.2 The Screening approach identified 22 UK European Sites, either because they were in the direct ZoI of the Project, or they contained mobile species that could potentially travel into the ZoI. These included Annex I bird species from the Birds Directive and Annex II species from the Habitats Directive, where these are qualifying interests of the relevant UK European Sites.

### English Offshore Scheme

- 8.1.3 A review of **Section 2** within this report identified 14 potential impact pathways during construction, operation and maintenance and decommissioning, listed in **Table 8-1** below.

Table 8-1 Potential Impact Pathway Summary (offshore works)

Potential Impact	Relevant to Offshore Works
Temporary habitat loss / seabed disturbance	Yes
Permanent habitat loss	Yes
Changes in distribution of prey species	Yes
Temporary increase and deposition of suspended sediments	Yes
Water flow (tidal current) changes, including sediment transport considerations	Yes
Temperature changes – local	Yes
EMF	Yes
Introduction or spread of MINNS	Yes
Barriers to species movement	Yes
Underwater noise changes	Yes
Visual / physical disturbance or displacement (above water noise)	Yes
Collision with project vessels	Yes
Accidental Spills	Yes
In-combination effects	Yes

8.1.4 The assessment for each relevant European Site is summarised in **Table 8-1**. Where LSE could not be ruled out, it is proposed that information to inform a RIAA is undertaken for each relevant European Site.

Table 8-2: Summary of Stage 1 Screening for Offshore Works

European Site	Qualifying Feature	Potential Impact	LSE Conclusion			
			C	O&M	D	
Southern Sea SAC	North Harbour porpoise	Temporary habitat loss/seabed disturbance	LSE	LSE	LSE	
		Permanent habitat loss	LSE	LSE	LSE	
		Changes in distribution of prey species	LSE	LSE	LSE	
		EMF	NO LSE	No LSE	NO LSE	
		Underwater noise changes	LSE	LSE	LSE	
		Barriers to species movements	LSE	NO LSE	LSE	
		Visual / physical disturbance or displacement	LSE	LSE	LSE	
		Collision with project vessels	LSE	LSE	LSE	
		In-combination	LSE	LSE	LSE	
Greater SPA	Wash	<b>Breeding seabirds</b> Sandwich tern Little tern Common tern	Temporary habitat loss / seabed disturbance	LSE	LSE	LSE
		<b>Non-breeding seabirds</b> Little gull	Permanent habitat loss	LSE	LSE	LSE
			Changes in distribution of prey species	No LSE	No LSE	No LSE
	Temporary increase and deposition of suspended sediments		No LSE	No LSE	No LSE	
	<b>Non-breeding diver</b> Red-throated diver		Water flow (tidal current) changes, including sediment transport considerations	No LSE	No LSE	No LSE

European Site	Qualifying Feature	Potential Impact		LSE Conclusion		
				C	O&M	D
	<b>Non-breeding seaduck</b> Common scoter					
	<b>Breeding seabirds</b> Common tern Sandwich tern Little tern	Underwater changes	noise	No LSE	No LSE	No LSE
		Visual disturbance / displacement	physical or	No LSE	No LSE	No LSE
	<b>Non-breeding seabirds</b> Little gull	In-combination		No LSE	No LSE	No LSE
	<b>Non-breeding diver</b> Red-throated diver	Underwater changes	noise	LSE	No LSE	No LSE
		Visual disturbance / displacement	physical or	LSE	LSE	LSE
	<b>Non-breeding seaduck</b> Common scoter	In-combination		LSE	LSE	LSE
Inner Dowsing, Race Bank and North Ridge SAC Reefs	Sandbanks which are slightly covered by sea water all the time	Temporary increase and deposition of suspended sediment		LSE	LSE	LSE
		Water flow (tidal current) changes, sediment including transport considerations		NO LSE	No LSE	NO LSE
		In-combination		LSE	LSE	LSE
Humber Estuary SPA	<b>Breeding</b>	Changes in distribution of prey species		No LSE	No LSE	No LSE

European Site	Qualifying Feature	Potential Impact	LSE Conclusion			
			C	O&M	D	
	Pied avocet	Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE	
	Eurasian bittern					
	Little tern					
	<b>Non-breeding</b>	Pied avocet	Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NO LSE
	Eurasian bittern	Black-tailed godwit	Visual / physical disturbance or displacement	No LSE	No LSE	No LSE
	Golden plover	In-combination	No LSE	No LSE	No LSE	
	Hen harrier					
	Red knot					
	Common redshank					
	Ruff					
	Common shelduck					
	Waterbird assemblage					
	Humber Estuary SAC	Sandbanks which are slightly covered by sea water all the time	Temporary increase and deposition of suspended sediments	LSE	LSE	LSE
Estuaries		Water flow (tidal current) changes, including sediment transport considerations	No LSE	No LSE	No LSE	
Mudflats and sandflats not covered by seawater at low tide						
Coastal lagoons		In-combination	LSE	LSE	LSE	

European Site	Qualifying Feature	Potential Impact	LSE Conclusion		
			C	O&M	D
Grey seal		Changes in distribution of prey species	LSE	LSE	LSE
		Barriers to species movement	No LSE	No LSE	No LSE
		Underwater noise changes	LSE	No LSE	No LSE
		Visual / physical disturbance or displacement	LSE	LSE	LSE
		Collision with project vessels	LSE	LSE	LSE
		In-combination	LSE	LSE	LSE
Sea lamprey River Lamprey		Changes in distribution of prey species	No LSE	No LSE	No LSE
		EMF	No LSE	No LSE	No LSE
		Underwater noise changes	No LSE	No LSE	No LSE
		Barriers to species movement	No LSE	No LSE	No LSE
		Visual/physical disturbance or displacement	No LSE	No LSE	No LSE
		In-combination	No LSE	No LSE	No LSE
Humber Estuary Ramsar	<b>Criterion 1</b> The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine	Temporary increase and deposition of suspended sediments	LSE	LSE	LSE
		Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NO LSE
		In-combination	LSE	LSE	LSE

European Site	Qualifying Feature	Potential Impact	LSE Conclusion		
			C	O&M	D
	waters, intertidal mud and sand flats, saltmarshes, and coastal brackish / saline lagoons.				
	<b>Criterion 3</b>	Changes in distribution of prey species	LSE	LSE	LSE
	The Humber Estuary Ramsar site supports a breeding colony of grey seals at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast.	Barriers to species movements	No LSE	NO LSE	No LSE
		Underwater noise changes	LSE	No LSE	No LSE
		Visual / physical disturbance or displacement	LSE	LSE	LSE
		Collision with project vessels	LSE	LSE	LSE
		In-combination	LSE	LSE	LSE
		Changes in distribution of prey species	No LSE	No LSE	No LSE
	<b>Criterion 8</b>	EMF	NO LSE	No LSE	NO LSE
	The Humber Estuary acts as an important migration route for both river lamprey and sea lamprey between coastal waters and their spawning areas.	Underwater noise changes	No LSE	No LSE	No LSE
		Barriers to species movement	No LSE	NO LSE	No LSE
		Visual / physical disturbance or displacement	No LSE	No LSE	No LSE
		In-combination	No LSE	No LSE	No LSE
	<b>Criterion 5</b>	Changes in distribution of prey species	No LSE	No LSE	No LSE

European Site	Qualifying Feature	Potential Impact	LSE Conclusion		
			C	O&M	D
	Waterbird assemblages of international importance	Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE
	<b>Criterion 6</b>	Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NO LSE
	Bar-tailed godwit	Underwater noise changes Visual / physical disturbance or displacement	No LSE	No LSE	No LSE
	Black-tailed godwit		No LSE	No LSE	No LSE
	Dunlin		No LSE	No LSE	No LSE
	Golden plover		No LSE	No LSE	No LSE
	Red knot	In-combination	No LSE	No LSE	No LSE
	Common redshank		No LSE	No LSE	No LSE
Common shelduck	No LSE		No LSE	No LSE	
Saltfleetby-Theddlethope Dunes and Gibraltar Point SAC	Embryonic shifting dunes	Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE
	Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes"); Shifting dunes with marram	Water flow (tidal current) changes, including sediment transport considerations	NO LSE	LSE	NO LSE
	Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland	In-combination	No LSE	LSE	No LSE
	Dunes with <i>Hippophae rhamnoides</i> ; Dunes with sea-buckthorn		No LSE	LSE	No LSE

European Site	Qualifying Feature	Potential Impact	LSE Conclusion				
			C	O&M	D		
	Humid slacks	dune					
Gibraltar SPA	Point	Breeding Little tern	Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE	
		Non-breeding Bar-tailed godwit	Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NO LSE	
		Grey plover	Underwater changes	No LSE	No LSE	No LSE	
		Sanderling	noise	No LSE	No LSE	No LSE	
			In-combination	No LSE	No LSE	No LSE	
Gibraltar Ramsar	Point	Bar-tailed godwit	Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE	
		Dark-bellied brent goose	Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NO LSE	
		Sanderling	Underwater changes	No LSE	No LSE	No LSE	
		Waterbird assemblage	noise	No LSE	No LSE	No LSE	
		Wetland invertebrate assemblage	In-combination	No LSE	No LSE	No LSE	
The Wash and North Norfolk Coast SAC	Harbour seal		Changes in distribution of prey species	LSE	LSE	LSE	
			Barriers to species movement	No LSE	NO LSE	No LSE	
			Underwater changes	noise	LSE	No LSE	No LSE
			Visual / disturbance or displacement	physical	LSE	LSE	LSE
			Collision with vessels	project	LSE	LSE	LSE
			In-combination		LSE	LSE	LSE

European Site	Qualifying Feature	Potential Impact	LSE Conclusion		
			C	O&M	D
	Sandbanks which are slightly covered by sea water all the time	Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE
	Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Large shallow inlets and bays Reefs Salicornia and other annuals colonising mud and sand Atlantic salt meadows Mediterranean and thermo-Atlantic <i>halophilous</i> scrubs	Water flow (tidal current) changes, including sediment transport considerations	NO LSE	LSE	NO LSE
		In-combination	NO LSE	LSE	NO LSE
The Wash SPA	<b>Breeding</b> Common tern Little tern	Changes in distribution of prey species	No LSE	No LSE	No LSE
	<b>Non-breeding</b> Bar-tailed godwit	Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE
	Bewick's swan Black-tailed godwit Common scoter Eurasian curlew Dark-bellied brent goose	Water flow (tidal current) changes, including sediment transport considerations	NO LSE	LSE	NO LSE
	Dunlin	Underwater noise changes	No LSE	No LSE	No LSE

European Site	Qualifying Feature	Potential Impact	LSE Conclusion		
			C	O&M	D
	Gadwall Common goldeneye Grey plover Red knot Oystercatcher Pink-footed goose Northern pintail Common redshank	Visual / physical disturbance or displacement	No LSE	No LSE	No LSE
	Sanderling Common shelduck Ruddy turnstone Waterbird assemblage Eurasian wigeon	In-combination	No LSE	LSE	No LSE
The Wash Ramsar	<b>Criterion 1</b> The Wash is a large shallow bay comprising very extensive saltmarshes, major intertidal banks of sand and mud, shallow water and deep channels. It is the largest estuarine system in Britain.	Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE
		Water flow (tidal current) changes, including sediment transport considerations	NO LSE	LSE	NO LSE
	<b>Criterion 3</b> Qualifies because of the inter-relationship between its various components including saltmarshes,	In-combination	No LSE	LSE	No LSE

European Site	Qualifying Feature	Potential Impact	LSE Conclusion		
			C	O&M	D
	intertidal sand and mud flats and the estuarine waters. The saltmarshes and the plankton in the estuarine water provide a primary source of organic material which, together with other organic matter, forms the basis for the high productivity of the estuary.				
	<b>Criterion 5</b>	Changes in distribution of prey species	No LSE	No LSE	No LSE
	Waterbird assemblages of international importance	Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE
	<b>Criterion 6</b>	Water flow (tidal current) changes, including sediment transport considerations	NO LSE	LSE	NO LSE
	Bar-tailed godwit	Underwater noise	No LSE	No LSE	No LSE
	Eurasian curlew	Underwater changes	No LSE	No LSE	No LSE
	Dark-bellied brent goose	Visual / physical disturbance / or displacement	No LSE	No LSE	No LSE
	Dunlin		No LSE	No LSE	No LSE
	Grey plover				
	Red knot				
	Oystercatcher				
	Pink-footed goose	In-combination	NO LSE	LSE	NO LSE
	Northern pintail				
	Common redshank				

European Site	Qualifying Feature	Potential Impact	LSE Conclusion		
			C	O&M	D
	Sanderling Common shelduck Ruddy turnstone				
Flamborough and Filey Coast SPA	<b>Breeding seabirds</b> Razorbill Common guillemot Atlantic Puffin*  <b>Breeding diver</b> Great cormorant*	Changes in distribution of prey species	No LSE	No LSE	No LSE
		Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE
		Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NO LSE
		Underwater noise changes	No LSE	No LSE	No LSE
		Visual / physical disturbance or displacement	No LSE	No LSE	No LSE
		In-combination	No LSE	No LSE	No LSE
North Norfolk Coast SPA	<b>Breeding</b> Sandwich tern	Changes in distribution of prey species	No LSE	No LSE	No LSE
		Temporary increase and deposition of suspended sediment	No LSE	No LSE	No LSE
		Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NO LSE
		Underwater noise changes	No LSE	No LSE	No LSE

European Site	Qualifying Feature	Potential Impact	LSE Conclusion		
			C	O&M	D
Northumberland Marine SPA	<b>Breeding</b> Atlantic puffin Common guillemot Razorbill*	Visual / physical disturbance or displacement	No LSE	No LSE	No LSE
		In-combination	No LSE	No LSE	No LSE
		Changes in distribution of prey species	No LSE	No LSE	No LSE
		Temporary increase and deposition of suspended sediment	No LSE	No LSE	No LSE
		Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NA
		Underwater noise changes	No LSE	No LSE	No LSE
		Visual / physical disturbance or displacement	No LSE	No LSE	No LSE
		In-combination	No LSE	No LSE	No LSE
		Changes in distribution of prey species	LSE	LSE	LSE
		Barriers to species movement	No LSE	NO LSE	No LSE
Berwickshire and North Northumberland Coast SAC	Grey Seal	Underwater noise changes	LSE	No LSE	No LSE
		Visual / physical disturbance or displacement	LSE	LSE	LSE
		Collision with project vessels	LSE	LSE	LSE
		In-combination	LSE	LSE	LSE
		Changes in distribution of prey species	No LSE	No LSE	No LSE
		Outer Firth of Forth and St	<b>Breeding</b>	Changes in distribution of prey species	No LSE

European Site	Qualifying Feature	Potential Impact	LSE Conclusion		
			C	O&M	D
Andrews Bay Complex SPA	Atlantic puffin* Common guillemot*	Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE
		Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NO LSE
		Underwater noise changes	No LSE	No LSE	No LSE
		Visual / physical disturbance or displacement	No LSE	No LSE	No LSE
		In-combination	No LSE	No LSE	No LSE
Coquet Island SPA	<b>Breeding</b> Atlantic puffin*	Changes in distribution of prey species	No LSE	No LSE	No LSE
		Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE
		Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NO LSE
		Underwater noise changes	No LSE	No LSE	No LSE
		Visual / physical disturbance or displacement	No LSE	No LSE	No LSE
Farne Islands SPA	<b>Breeding</b> Atlantic puffin* Common guillemot*	Changes in distribution of prey species	No LSE	No LSE	No LSE
		Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE

European Site	Qualifying Feature	Potential Impact	LSE Conclusion		
			C	O&M	D
		Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NO LSE
		Underwater noise changes	No LSE	No LSE	No LSE
		Visual / physical disturbance or displacement	No LSE	No LSE	No LSE
		In-combination	No LSE	No LSE	No LSE
St Abb's Head to Fast Castle SPA	<b>Breeding</b> Razorbill*	Changes in distribution of prey species	No LSE	No LSE	No LSE
		Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE
		Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NO LSE
		Underwater noise changes	No LSE	No LSE	No LSE
		Visual / physical disturbance or displacement	No LSE	No LSE	No LSE
		In-combination	No LSE	No LSE	No LSE
Fowlsheugh SPA	<b>Breeding</b> Razorbill	Changes in distribution of prey species	No LSE	No LSE	No LSE
		Temporary increase and deposition of suspended sediments	No LSE	No LSE	No LSE
		Water flow (tidal current) changes, including sediment transport considerations	NO LSE	No LSE	NO LSE

European Site	Qualifying Feature	Potential Impact	LSE Conclusion			
			C	O&M	D	
Forth SPA	Islands <b>Breeding</b> Atlantic puffin	Underwater changes	noise	No LSE	No LSE	No LSE
		Visual disturbance / displacement	physical or	No LSE	No LSE	No LSE
		In-combination		No LSE	No LSE	No LSE
		Changes in distribution of prey species		No LSE	No LSE	No LSE
		Temporary increase and deposition of suspended sediments		No LSE	No LSE	No LSE
		Water flow (tidal current) changes, sediment considerations	including transport	No LSE	No LSE	No LSE
		Underwater changes	noise	No LSE	No LSE	No LSE
Marine European Transboundary Sites	Mammal Harbour Porpoise Grey Seal Harbour seal	Visual disturbance / displacement	physical or	No LSE	No LSE	No LSE
		In-combination		No LSE	No LSE	No LSE
		Underwater changes	noise	No LSE	No LSE	No LSE
		In-combination		No LSE	No LSE	No LSE

## English Onshore Scheme

8.1.5 A review of **Section 2** within this report identified nine potential impact pathways during construction and decommissioning, listed in **Table 8-3** below.

Table 8-3 Potential Impact Pathway Summary (onshore works)

Potential Impact	Relevant to Onshore Works
Changes to water quality	Yes
Change in water levels/flows	Yes
Introduction or spread of INNPS	Yes
Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	Yes
Changes to air quality	Yes
Displacement and Barrier Effects	Yes
Direct injury / killing of fish	Yes
Changes in distribution of prey species	Contextually Distinct <sup>6</sup>
In-combination effects	Yes

8.1.6 The assessment for each relevant European Site is summarised in **Table 8-4**. Where LSE could not be ruled out, it is proposed that information to inform a RIAA is undertaken for each relevant European Site.

Table 8-4: Summary of Stage 1 Screening for Onshore Works

European Site	Qualifying Feature	Potential Impact	LSE Conclusion	
			C	D
Greater Wash SPA	<b>Breeding</b>	Changes to water quality	LSE	LSE
	Sandwich tern	Introduction or spread of INNPS	LSE	LSE
	Little tern	Disturbance to qualifying species (changes to levels of	LSE	LSE
Common tern				

<sup>6</sup> The impact in this context refers to a different ecological and/or work-related situation. While it might appear similar to another impact, it occurs in a separate setting and/or due to a different source.

European Site	Qualifying Feature	Potential Impact	LSE Conclusion	
			C	D
	<b>Non-breeding</b>	noise, vibration, lighting and visual baseline)		
	Red-throated diver	Changes to air quality	LSE	LSE
	Common scoter Little gull	Displacement and Barrier Effects	LSE	LSE
		In-combination	LSE	LSE
Humber Estuary SPA	<b>Non-breeding</b>	Changes in water quality	LSE	LSE
	Golden plover	Introduction or spread of INNPS	LSE	LSE
		Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	LSE	LSE
		Changes in air quality	LSE	LSE
		Displacement and Barrier Effects	LSE	LSE
		In-combination	LSE	LSE
Humber Estuary SAC	Sea lamprey River lamprey	Changes in water quality	LSE	LSE
		Introduction or spread of INNPS	LSE	LSE
		Changes in water levels/flows	LSE	LSE
		Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	LSE	LSE
		Direct injury / killing of fish	LSE	LSE
		Changes to air quality	LSE	LSE
		Displacement and Barrier Effects	LSE	LSE
		In-combination	LSE	LSE
	Grey seal	Changes to water quality	LSE	LSE
		Introduction or spread of INNPS	No LSE	No LSE

European Site	Qualifying Feature	Potential Impact	LSE Conclusion	
			C	D
		Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	No LSE	No LSE
		Changes to air quality	No LSE	No LSE
		In-combination	LSE	LSE
Humber Estuary Ramsar	<b>Criterion 8</b> The Humber Estuary acts as an important migration route for both river lamprey and sea lamprey between coastal waters and their spawning areas.	Changes in water quality	LSE	LSE
		Changes in water levels/flows	LSE	LSE
		Introduction or spread of INNPS	LSE	LSE
		Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	LSE	LSE
		Displacement and Barrier Effects	LSE	LSE
		Changes to air quality	LSE	LSE
		Direct injury / killing of fish	LSE	LSE
		In-combination	LSE	LSE
	<b>Criterion 3</b> The Humber Estuary Ramsar site supports a breeding colony of grey seals at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast.	Changes to water quality	LSE	LSE
		Introduction or spread of INNPS	No LSE	No LSE
		Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	No LSE	No LSE
		Changes to air quality	No LSE	No LSE
		In-combination	LSE	LSE
Golden plover	Changes in water quality	LSE	LSE	
	Introduction or spread of INNPS	LSE	LSE	
	Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	LSE	LSE	

European Site	Qualifying Feature	Potential Impact	LSE Conclusion	
			C	D
		Changes in air quality	LSE	LSE
		Displacement and Barrier Effects	LSE	LSE
		In-combination	LSE	LSE
The Wash Harbour Seal and North Norfolk Coast SAC		Changes to water quality	LSE	LSE
		Introduction or spread of INNPS	No LSE	No LSE
		Disturbance to qualifying species (changes to levels of noise, vibration, lighting and visual baseline)	No LSE	No LSE
		Changes to air quality	No LSE	No LSE
		In-combination	LSE	LSE

## 8.2 Conclusion

- 8.2.1 It should be noted that the findings of this Screening are expected to be updated ahead of the DCO application submission. At this stage more information on design and construction methods, especially in relation to the onshore works, will be available. Additional information is also expected to be available on other plans and projects requiring consideration for in-combination assessment at that time. It is therefore possible that the conclusions of this Screening assessment may change prior to submission of the DCO application, and therefore that the list of sites requiring consideration in the RIAA may also change.
- 8.2.2 Considering the conclusions, the Applicant is intending to prepare a RIAA for the following European Sites:
- English Offshore Scheme:
    - Southern North Sea SAC;
    - Greater Wash SPA;
    - Inner Dowsing, Race Bank and North Ridge SAC;
    - Humber Estuary SAC;
    - Humber Estuary Ramsar;
    - Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC;
    - The Wash and North Norfolk Coast SAC;
    - The Wash SPA;

- The Wash Ramsar; and
- Berwickshire and North Northumberland Coast SAC.
- English Onshore Scheme:
  - Greater Wash SPA;
  - Humber Estuary SPA;
  - Humber Estuary SAC;
  - Humber Estuary Ramsar; and
  - The Wash and North Norfolk SAC.

# Annex A: List of Relevant Marine Mammal Transboundary European Sites

Table A1 Relevant Transboundary European Sites

Site Code	Site Name	Site Type	Relevant Designated Species	Distance from Project (km)
<b>Netherlands</b>				
NL2008002	Klaverbank	SAC / Site of Community Importance (SCI)	Harbour porpoise	130.4 km
NL2008001	Doggerbank	SAC / SCI	Harbour porpoise	136.4 km
<b>Belgium</b>				
BEMNZ0001	Vlaamse Banken	SAC	Harbour porpoise	241.3 km
<b>Germany</b>				
DE1003301	Doggerbank	SAC	Harbour porpoise	236.2 km
<b>France</b>				
FR3102002	Bancs des Flandres	SAC	Harbour porpoise	246.7 km

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