OSSIAN OFFSHORE WIND FARM: TRANSMISSION INFRASTRUCTURE

EIA SCOPING REPORT: PART 2 (OF 5)

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Ossian Transmission Infrastructure
EIA Scoping Report
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6. ASSESSMENT OF EFFECTS - OFFSHORE ENVIRONMENT

6.1. Introduction

6.1.1.1 This section of the EIA Scoping Report identifies the proposed scope of the assessment for those topics relevant to the offshore elements of the Ossian Transmission Infrastructure.

6.1.1.2 The proposed scope of the assessment for those topics relevant to the offshore elements of the Ossian Transmission Infrastructure has been structured to allow the reader to distinguish between information relevant to specific jurisdictions. Where appropriate and relevant, the baseline environment, designated sites, proposed data sources, relevant guidance, potential impacts and consultation sections are split as follows:

- **General** – information that applies across the topic specific study area (i.e. both English and Scottish waters) and is therefore applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to be made to MD-LOT.
- **English Waters** – information which is specific to the topic specific study area located within English waters and is therefore applicable to the application for a DCO to be made to the Planning Inspectorate.
- **Scottish Waters** – information which is specific to the portion of the topic specific study area located within Scottish waters and is therefore applicable to the application for a Marine Licence to be made to MD-LOT.

6.2. Physical Processes

6.2.1 Introduction

6.2.1.1 This section of the EIA Scoping Report identifies the proposed scope of the assessment for physical processes from construction, operation and maintenance and decommissioning of the proposed Offshore Transmission Infrastructure. This includes the key data sources used to characterise the baseline environment in the vicinity of the Offshore Transmission Infrastructure within Scottish and English waters, and the impacts proposed to be scoped in and out of the assessment for physical processes in the Ossian Transmission Infrastructure ES (hereafter referred to as 'ES').

6.2.1.2 It is proposed that the EIA scope for physical processes will encompass:

- bathymetry;
- waves and wind;
- tidal currents and elevation;
- seabed substrate and geology; and
- suspended sediment and sediment transport.

6.2.1.3 The parameters listed above are collectively referred to as 'physical processes' throughout the remainder of this EIA Scoping Report.

6.2.2 Proposed Study Area for the Assessment

6.2.2.1 The physical processes study area encompasses the Offshore Scoping Boundary and Intertidal Scoping Boundary including the entire water column and seabed that may be influenced by changes to physical processes due to the Offshore Transmission Infrastructure, plus one spring tidal excursion (**Figure 6.2.1**). Further details of the location and extent of the Intertidal Scoping Boundary can be found in **Figure 3.5.1** of **part 1, section 3**.

6.2.2.2 One spring tidal excursion is defined as the distance suspended sediment is transported prior to being carried back on the returning tide. Mean tidal excursion ellipses from the UK Renewables Atlas (ABPmer, 2024) were used to estimate the extent of the physical processes study area. The largest mean tidal excursion within the cable corridor is 15 km in a north-south orientation and 5 km in an east-west orientation across the physical processes study area (ABPmer, 2024). The physical processes study area captures the Zone of Influence (ZoI) of all potential impacts to physical processes resulting from the construction, operation and maintenance and decommissioning phases of the Offshore Transmission Infrastructure.

6.2.2.3 This tidal excursion will also be used to inform other chapters of the ES: benthic subtidal and intertidal ecology, fish and shellfish ecology, marine mammals, infrastructure and other sea users and water quality.

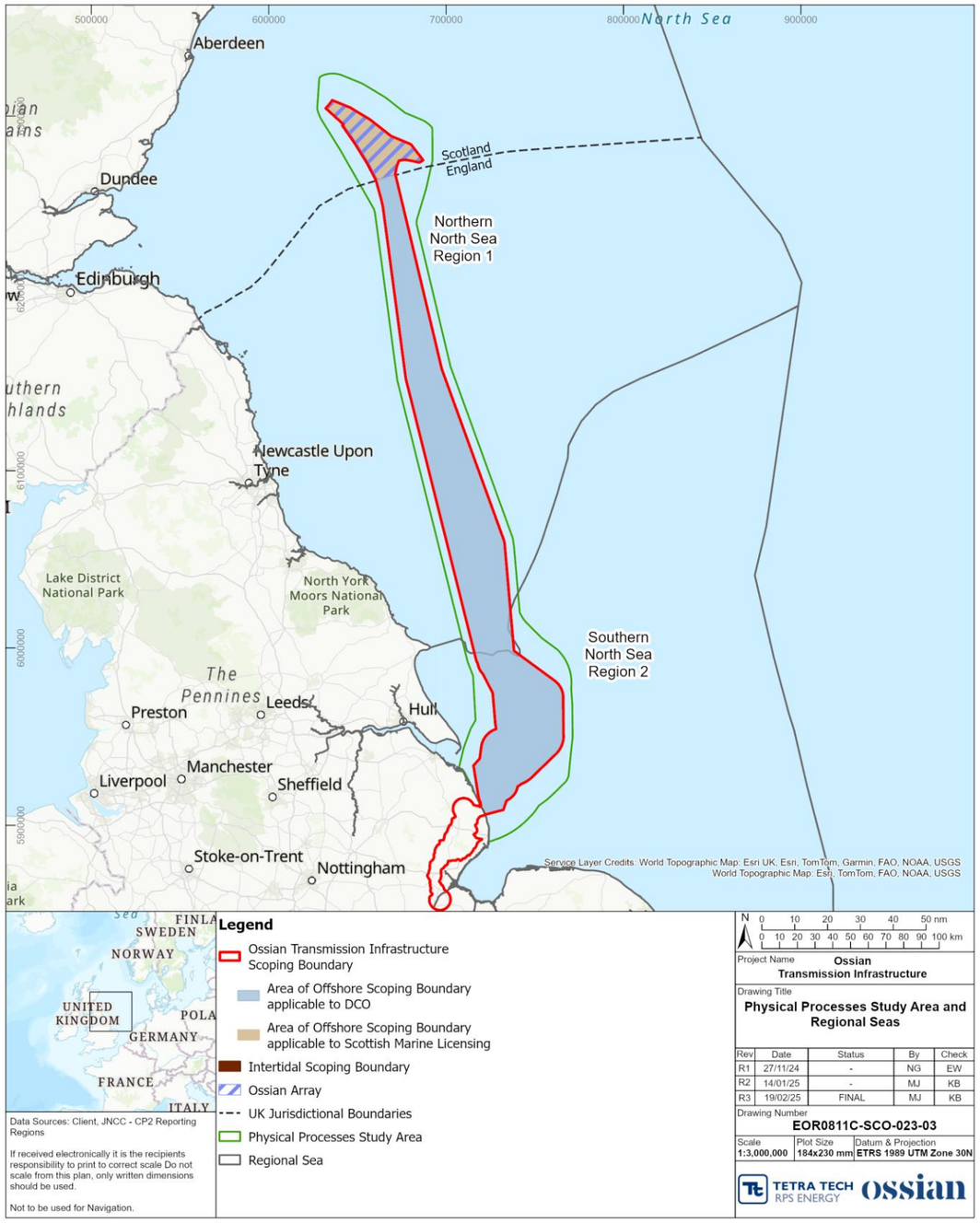

Figure 6.2.1: Overview of Physical Processes Study Area

6.2.3 Baseline Environment

6.2.3.1 An outline of the baseline environment for physical processes based upon an initial review of data sources is provided below. Site-specific survey data from the Array Site Boundary is also outlined where appropriate. This baseline environment section is split into the following subsections to allow the reader to distinguish between information relevant to specific jurisdictions:

- **General** – this subsection summarises baseline environment information across the entire physical processes study area (i.e. both English and Scottish waters) and is therefore applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to be made to MD-LOT.
- **English Waters** – this subsection summarises baseline environment information which is specific to the portion of the physical processes study area located within English waters and is therefore applicable to the application for a DCO to be made to the Planning Inspectorate.
- **Scottish Waters** – this subsection summarises baseline environment information which specific to the portion of the physical processes study area located within Scottish waters and is therefore applicable to the application for a Marine Licence to be made to MD-LOT.

General

Wind and Waves

6.2.3.2 Waves in the North Sea reduce in height in an inshore direction as a result of friction effects in the shallower nearshore waters. The dominant wave direction is from the north over the majority of the physical processes study area, changing to a north-eastern direction on the approach to Landfall (ABPmer, 2018). Annual mean significant wave heights close to the northern aspect of the physical processes study area reach a maximum of 2.1 m (ABPmer, 2024). This reduces to a minimum of circa 0.7 m close to Landfall on the Lincolnshire coast (ABPmer, 2024). There is a seasonal trend in the wave climate with smallest mean significant wave heights in the summer months and largest mean significant wave heights in the winter months. Annual mean wave power reaches a maximum of approximately 20 kW/m across the physical processes study area (ABPmer, 2024).

6.2.3.3 Site-specific metocean data from within the Array Site Boundary (which overlaps with the majority of the Offshore Scoping Boundary in Scottish waters) recorded a maximum significant wave height of 8.96 m in the north of the physical processes study area within Scottish waters, with peak wave periods up to 20 s (Partrac, 2023).

6.2.3.4 Wind within the North Sea varies significantly across the physical processes study area. Towards the north of the physical processes study area, the mean wind speed (m/s at 100 m) is recorded at approximately 10.6 m/s to 11m/s. Similarly to wave height, this decreases towards Landfall to around 7.1 m/s to 8.5 m/s (ABPmer, 2024).

Geology

6.2.3.5 Information on the geology of the physical processes study area provides an understanding of the origin and stability of the seabed, and the geology that will be encountered during the installation of the Offshore Transmission Infrastructure.

6.2.3.6 Offshore marine bedrock data (scale 1:250,000) provided by the British Geographical Survey (BGS) illustrates that the physical processes study area is dominated by chalk, and palaeocene rocks (mudstone, sandstone and lignite) (BGS, 2021).

6.2.3.7 Data provided by BGR (2023) illustrate that geomorphological features, such as moraines and channels, are present along certain sections of the physical processes study area, particularly off the coast of Bamburgh (Northumberland).

Seabed Substrate

6.2.3.8 The physical processes study area is located within Regional Seas 1 and 2 (see **Figure 6.2.1**), as outlined in the UK Offshore Energy Strategic Environmental Assessment 4 (OESEA4) (Department for Business, Energy and Industrial Strategy (BEIS), 2022).

6.2.3.9 Sediments of Regional Sea 1 typically form large areas of seabed sand and gravel, and also form large-scale sandbanks and ridges, as well as smaller sand waves (BEIS, 2022).

6.2.3.10 Within Regional Sea 2, coastal erosion has provided substantial inputs of sediment into the southern North Sea, to form large areas of seabed sand and gravel. Sediments also form large scale sandbanks and ridges, as well as smaller sand waves (BEIS, 2022). Sandy gravel particularly dominates the area close to the Landfall.

6.2.3.11 BGS sediment data (scale 1:250,000) illustrates that seabed sediments within the physical processes study area are dominated by Holocene sediments comprised of mainly sand, with some areas of slightly gravelly sand, gravelly sand and muddy sand (BGS, 2021). Sandy gravel dominates the nearshore area in the vicinity of the Landfall, along with some muddy sandy gravel and gravel deposits (BGS, 2021). The Lincolnshire coastline to the south of the River Humber contains vast areas of mudflats (EMODnet, 2022).

6.2.3.12 As shown in **Figure 6.2.2**, the majority of the physical processes study area is dominated by deep circalittoral sand (A5.27), with intermittent patches of deep circalittoral coarse sediment (A5.15) and occasional patches of deep circalittoral mud (A5.37) (EMODnet, 2022). Further south, the dominant subtidal sediment type transitions to circalittoral coarse sediment (A5.14) and deep circalittoral coarse sediment (A5.15), with small patches of circalittoral fine sand (A5.25) and circalittoral muddy sand (A5.26) (EMODnet, 2022). Other subtidal sediment types present in the physical processes study area include deep circalittoral mixed sediments (A5.45), circalittoral mixed sediments (A5.44), and infralittoral coarse sediment (A5.13) (EMODnet, 2022).

Suspended Sediment and Sediment Transport

6.2.3.13 Finer sediment fractions (e.g. fine sand, mud and silt) are easily mobilised in the water column and are therefore more likely to be suspended. Sand transport rates are relatively low over much of the central North Sea, due to increased water depth and lower tidal current speeds than other regions (HR Wallingford, 2009). Sediment transport rates in the North Sea increase during storm events, as evidenced by the modelling undertaken for Berwick Bank Offshore Wind Farm (SSE Renewables, 2022).

6.2.3.14 In 2016, the Centre for Environment Fisheries and Aquaculture Science (Cefas) Climatography Report was released (Cefas, 2016), which provided the spatial distribution of average non-algal suspended particulate matter (SPM) for the majority of the UK continental shelf. SPM between the Regional Seas saw large variation with higher levels of SPM being reported in the southern North Sea in the vicinity of the Landfall. SPM levels are generally higher in both Regional Seas in the winter months compared to the remainder of the year (Cefas, 2016).

6.2.3.15 Within the physical processes study area and surrounding waters, mean SPM levels were estimated to be between 0 mg/l to circa 30 mg/l from 1998 to 2015, with higher levels typically observed in winter months and towards the shoreline (Cefas, 2016; Silva, 2016). Little to no SPM was recorded surrounding the northern portion of the physical processes study area within Scottish waters (0 mg/l to 1 mg/l), with less than 3 mg/l over the majority of the physical processes study area.

6.2.3.16 Suspended sediment concentrations (SSCs) are primarily influenced by tidal currents, with fluctuations occurring between the spring-neap cycle and the different tidal stages (high water, peak ebb, low water, peak flood). Wave-driven currents during storms can temporarily elevate SSCs and can cause levels to rise significantly, which then gradually decrease back to baseline conditions following these events.

6.2.3.17 Due to the seasonal nature and frequency of storms, SSC levels demonstrate a broadly seasonal pattern. These effects on SSCs are less significant in deeper waters, which have a lower degree of wave penetration than in shallower waters. Therefore, SSCs are likely to be higher in the nearshore areas of the physical processes study area compared to its majority, which is predominantly in deeper water offshore. However, when assessing percentage change of SSCs, the existing higher concentrations of natural suspended sediments in the nearshore areas will result in a smaller percentage change due to a particular increase/decrease in SSCs, in comparison with the same increase/decrease in SSCs in deeper waters where the natural concentrations of suspended sediments are less.

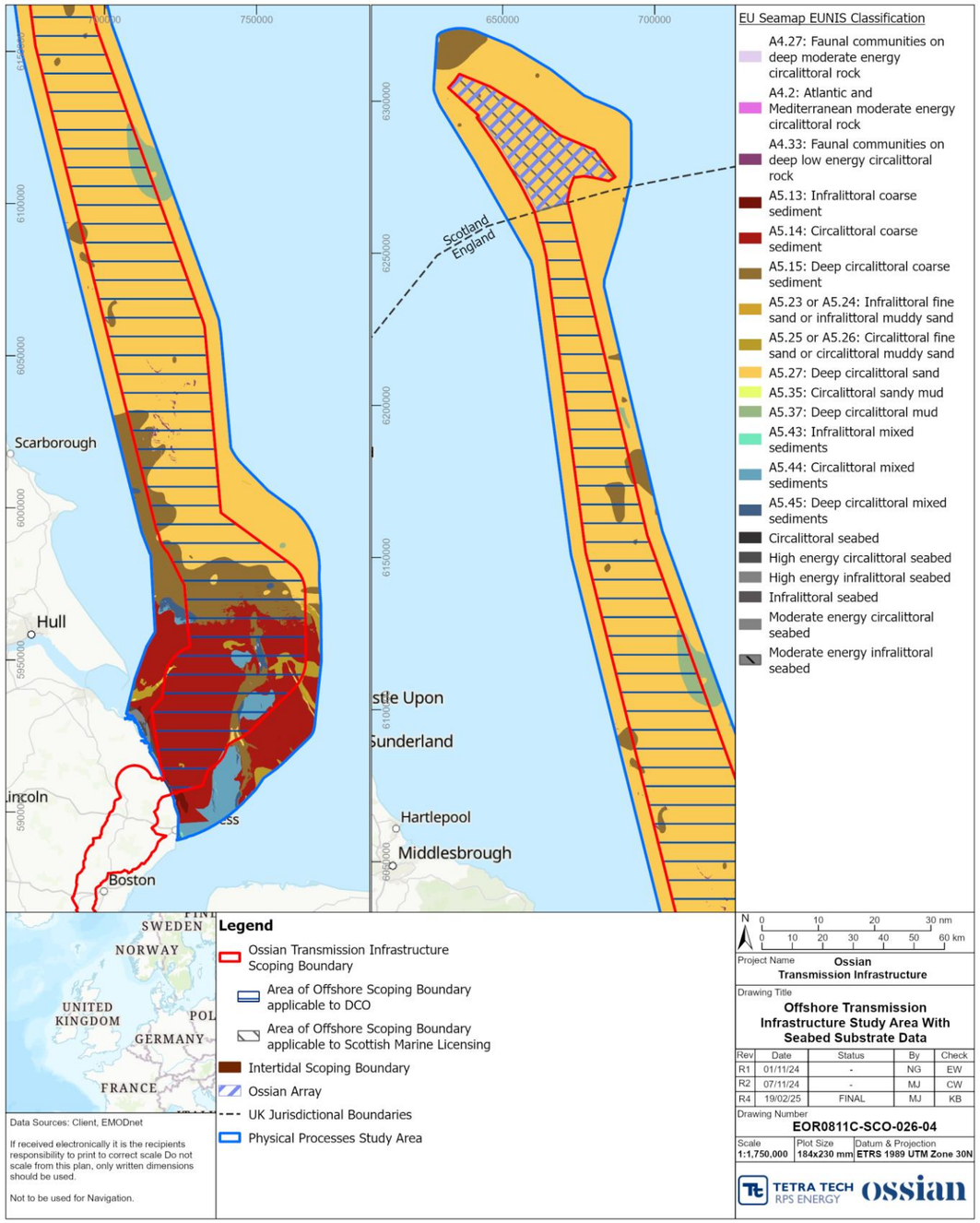

Figure 6.2.2: Seabed Substrate within the Physical Processes Study Area (EMODnet, 2022)

English Waters

Bathymetry

6.2.3.18 The North Sea is largely shallow, and rather flat with an average depth of approximately 80 m (Vindenes *et al.,* 2018). Water depths gradually decrease towards the Landfall as shown in **Figure 6.2.3**. The seafloor of the physical processes study area within English waters generally consists of fewer sediment features than in Scottish waters, although there are some notable tunnel valleys, such as Silver Pit, a glacial tunnel valley located within the physical process study area in the Holderness Offshore MCZ. This glacial valley has a depth of approximately 85 m deep, compared to the 20 m depth of the surrounding area. There are also moraine landforms off the coast of the Landfall area (EMODnet, 2022).

Tidal Currents and Elevation

6.2.3.19 Understanding tidal currents within the outlined physical processes study area will provide an insight into the patterns and rates of naturally occurring sediment transport.

6.2.3.20 The Atlas of UK Marine Renewable Energy Resources reports mean spring tidal ranges between approximately 1.8 m to 6.3 m across the physical processes study area (ABPmer, 2024). The Atlas also indicates spring peak current speeds of approximately 0.3 m/s to 1.6 m/s (ABPmer, 2024), with peak current speeds occurring offshore of Spurn Head. The data suggests tidal currents within the southern North Sea around the Landfall are generally oriented southwards on the flood tide and northwards on the ebb tide. Towards the Landfall, currents are bi-directional, aligned with the coastline, whilst the currents become slightly more orbital in nature offshore (ABPmer, 2024).

6.2.3.21 Designated sites which are located within the physical processes study area related to English waters are listed in **Table 6.2.1** and shown in **Figure 6.2.4**.

Scottish Waters

Bathymetry

6.2.3.22 Geophysical data captured for the Array indicates that water depth within the physical processes study area in Scottish waters ranges between 63.82 m and 88.66 m relative to Lowest Astronomical Tide (LAT) (Ocean Infinity, 2022).

6.2.3.23 The seafloor in the physical processes study area within Scottish waters consists of gentle slopes with a general deeper section towards the east (Ocean Infinity, 2022). The seafloor gradients range from 0° to 5° in the north, with numerous localised steeper areas being observed within ripple areas and flanks of rippled scour depressions. (Ocean Infinity, 2022). Larger sediment features generally run in a north to south direction, while smaller sediment features run in a more east to west direction (Ocean Infinity, 2022).

Tidal Currents and Elevation

6.2.3.24 Site-specific metocean data from within the Array Site Boundary showed the mean spring tidal range to vary from 2.41 m to 2.34 m, and the mean neap tidal range from 1.20 m to 1.17 m (Partrac, 2023). The maximum recorded current speed within the Partrac survey was in July 2023, where a current speed of 0.91 m/s was reached near the surface, whilst the maximum depth-averaged speed of 0.68 m/s occurred in October 2022 (Partrac, 2023).

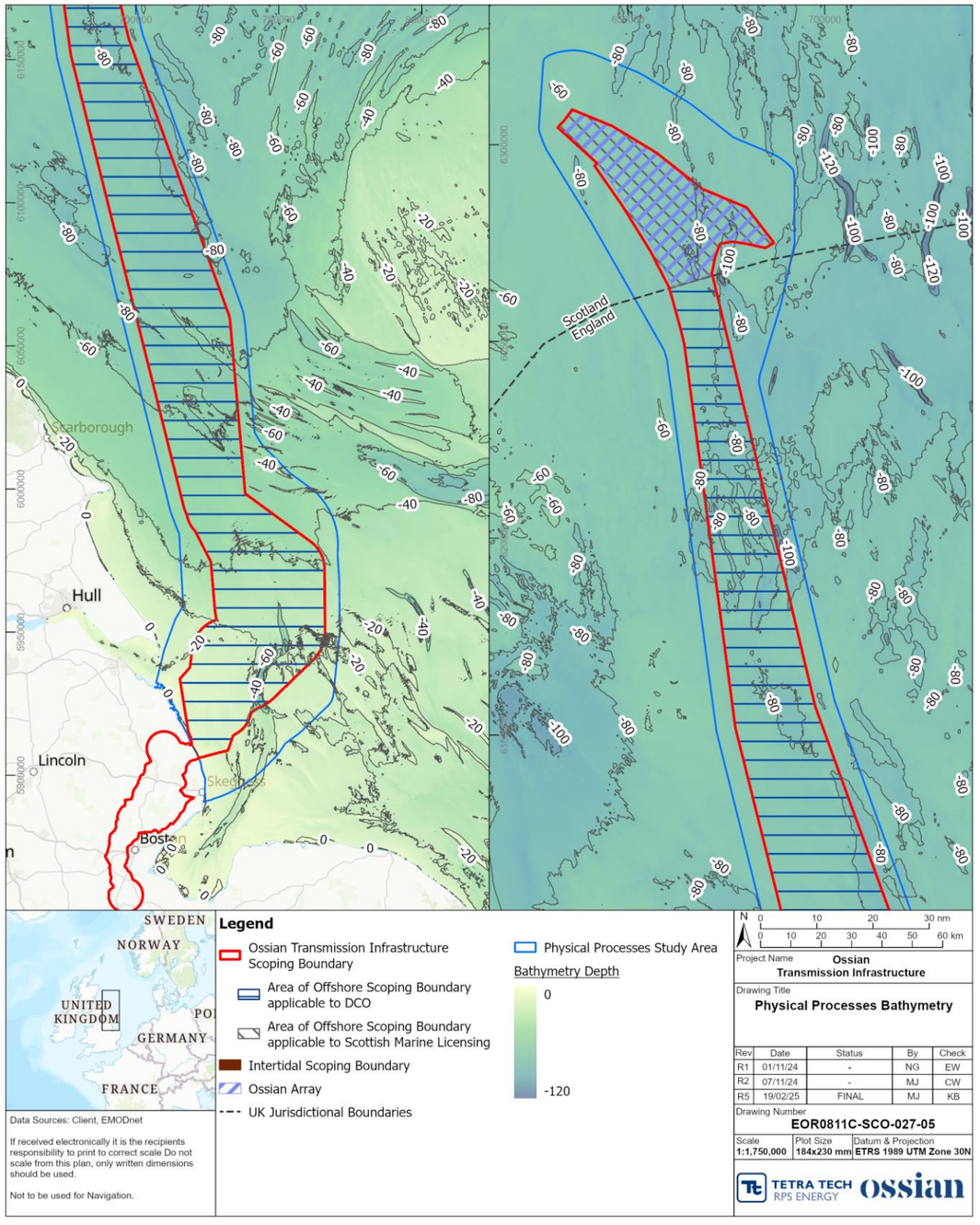

Figure 6.2.3: Bathymetry in the Vicinity of the Physical Processes Study Area (EMODnet, 2022)

Designated Sites

6.2.3.25 Designated sites with relevant physical processes features which are located within the physical processes study area are listed in **Table 6.2.1** and shown in **Figure 6.2.4**. This encompasses European designated sites (i.e. Special Areas of Conservation (SACs)) and nationally designated sites (i.e. Marine Conservation Zones (MCZs)). It should be noted that none of the designated sites of relevance to physical processes are located within Scottish waters, therefore, **Table 6.2.1** does not define jurisdictions in which the designated sites are located as they are all located within English waters.

6.2.3.26 The Offshore and Intertidal Scoping Boundaries overlap with a number of protected sites, including the Holderness Offshore MCZ, Swallow Sand MCZ, Inner Dowsing, Race Bank and North Ridge SAC and The Wash and Norfolk Coast SAC.

6.2.3.27 Relevant physical processes features of designated sites will be fully considered and assessed within the physical processes chapter of the ES.

Table 6.2.1: Designated Sites and their Distances to the Physical Processes Study Area

Designated Site	Distance to Offshore/Intertidal Scoping Boundaries (km)	Relevant Protected Features
English waters		
Marine Conservation Zone		
Holderness Offshore MCZ	0 - overlaps with the Offshore Scoping Boundary (extent of overlap: 557.8 km^2)	• Subtidal coarse sediment • Subtidal sand • Subtidal mixed sediment • North Sea glacial tunnel valleys • Ocean quahog *Arctica islandica*
Holderness Inshore MCZ	5.02	• Intertidal sand and muddy sand • Moderate energy circalittoral rock • High energy circalittoral rock • Subtidal coarse sediment • Subtidal mixed sediments • Subtidal sand • Subtidal mud • Spurn Head geological feature
Swallow Sand MCZ	0 - overlaps with the Offshore Scoping Boundary (extent of overlap: 255.1 km^2)	• Subtidal coarse sediment • Subtidal sand • North Sea glacial tunnel valley
North East of Farnes Deep MCZ	12.87	• Subtidal coarse sediment • Subtidal sand • Subtidal mixed sediments • Subtidal mud • Ocean quahog *Arctica islandica*
Special Area of Conservation		
Inner Dowsing, Race Bank and North Ridge SAC	0 - overlaps with the Offshore Scoping Boundary (extent of overlap: 4.07 km^2)	• Reefs (1170) • Sandbanks which are slightly covered by sea water all the time (1110)
The Wash and North Norfolk Coast SAC	3.61	• Sandbanks which are slightly covered by sea water all the time (1110) • Mudflat and sandflats not covered by seawater at low tide (1140) • Large shallow inlets and bays (1160) • Reefs (1170) • Salicornia and other annuals colonizing mud and sand (1310) • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330) • Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (1420) • Coastal lagoons (1150)

Designated Site	Distance to Offshore/Intertidal Scoping Boundaries (km)	Relevant Protected Features
Humber Estuary SAC	2.7	• Atlantic salt meadows (1330) • Coastal lagoons (1150) • Dunes with *Hippophae rhamnoides* (2160) • Estuaries (1130) • Mudflats and sandflats not covered by seawater at low tide (1140) • Fixed dunes with herbaceous vegetation (“grey dunes”) (2130) • Salicornia and other annuals colonising mud and sand (1310) • Sandbanks which are slightly covered by sea water all the time (1110) • Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes’) (2120)
North Norfolk Coast SAC	23.9	• Coastal lagoons (1150) • Perennial vegetation of stony banks (1220) • Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (1420) • Embryonic shifting dunes (2110) • Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’) (2120) • Fixed dunes with herbaceous vegetation (“grey dunes”) (2130) • Humid dune slacks (2190)
Site of Special Specific Interest		
Gibraltar Point National Nature Reserve SSSI	3.03	• Sand dunes • Saltmarsh • Freshwater marsh
Saltfleetby-Theddlethorpe Dunes National Nature Reserve SSSI	1.28	• Intertidal sand and mudflats • Sand dunes • Saltmarsh • Freshwater marsh
Humber Estuary SSSI	2.7	• Estuary • Intertidal sand and mudflats • Sand dunes • Saltmarsh • Coastal lagoons • Spurn (geomorphological feature)
The Wash SSSI	1.03	• Intertidal mudflats • Saltmarsh
Highly Protected Marine Area		
North East of Farnes Deep HPMA	0 - overlaps with the Offshore Scoping Boundary (extent of overlap: 12.9 km^2)	• The marine ecosystem of the area (including all marine flora and fauna)
Scottish waters		
None		

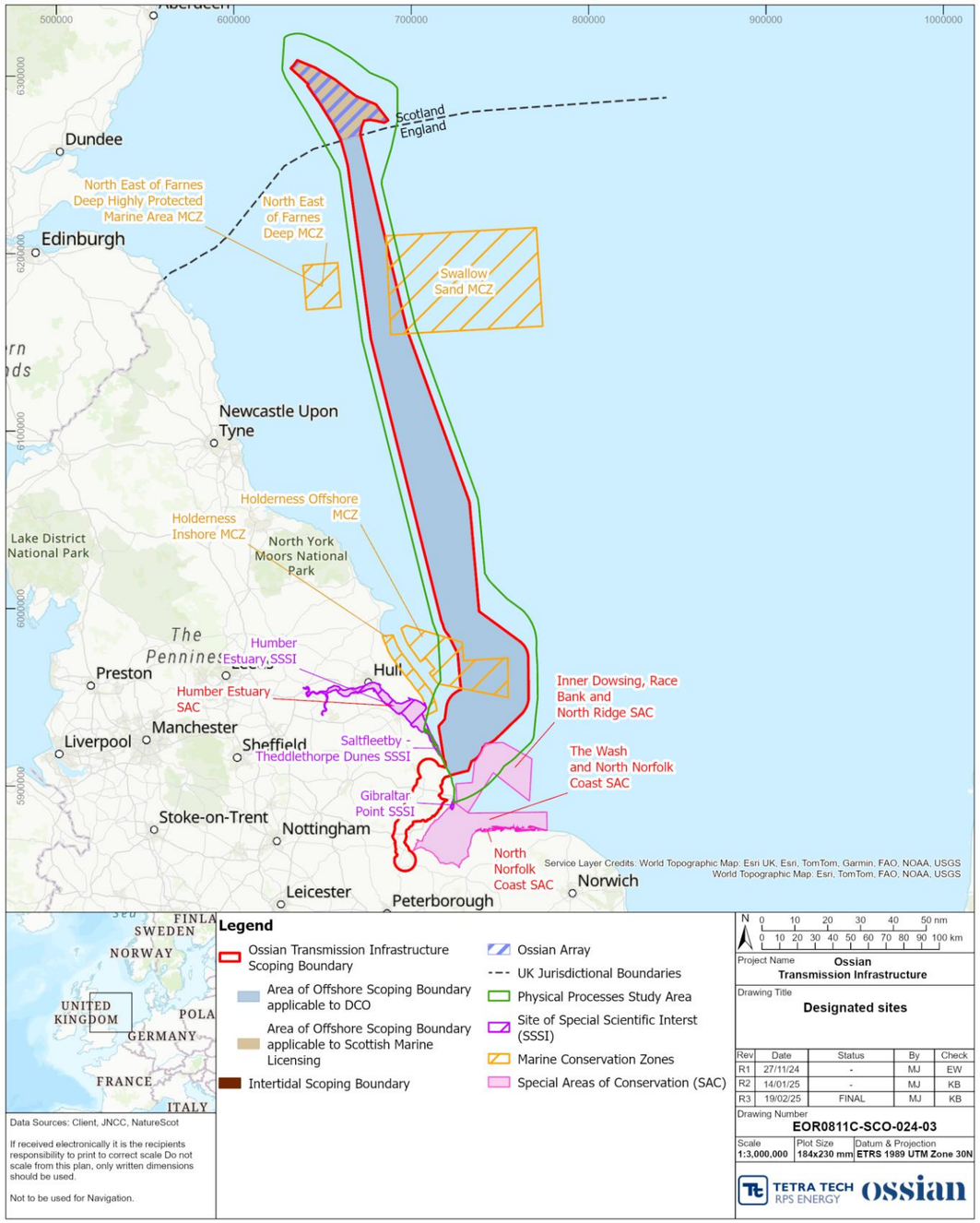

Figure 6.2.4: Relevant Designated Sites in proximity to the Physical Processes Study Area

Future Baseline Conditions

6.2.3.28 The EIA process will consider the existing baseline conditions within the physical processes study area; however, it will also evaluate the future baseline conditions as far as reasonably practicable. The baseline environment is not static, therefore, even if the Ossian Transmission Infrastructure does not progress, the offshore environment will exhibit some degree of natural change. These changes may occur due to naturally occurring cycles and processes and any potential changes resulting from climate change.

6.2.3.29 The Committee on Climate Change (CCC) predict that England will have to adapt to at least 1 m of sea level rise within the near future, with some models estimating this could be as soon as over the next 80 years (CCC, 2018). This is in line with current estimates from the National Aeronautics and Space Administration (NASA) sea level projection tool which predicts that by 2100 the southern North Sea will experience a sea level rise of up to circa 0.7 m (NASA, 2024). United Kingdom Climate Projections 2018 (UKCP18) sea level rise projections estimate a rise of between 0.08 m and 0.49 m at Edinburgh for a low emissions scenario (Representative Concentration Pathway (RCP) 2.6) and between 0.3 m and 0.9 m for a high emissions scenario (RCP8.5) (Met Office, 2018). Edinburgh is in the vicinity of the northern portion of the physical processes study area, whereas towards the south of the physical processes study area, sea level rise is anticipated to be greater due to isostatic rebound. At London, UKCP18 sea level rise projections for a low emissions scenario are between 0.29 m and 0.7 m, or 0.53 m and 1.14 m for a high emissions scenario (Met Office, 2018). This rise is likely to cause an increase in extreme surge level event frequency (International Panel on Climate Change (IPCC), 2021).

6.2.3.30 The physical processes chapter of the ES will ensure to place any potential impacts on receptors into the context of the envelope of change that may occur over the timescale of the Offshore Transmission Infrastructure.

6.2.4 Proposed Data Sources

6.2.4.1 **Table 6.2.2** presents the data sources proposed for the physical processes assessment.

6.2.4.2 Additional data sources (e.g. emerging research and offshore wind EIAs) will also be used to inform the assessment in the physical processes chapter of the ES. Note that, in addition to these data sources, relevant output of the consultation process will also be considered.

Table 6.2.2: Summary of Data Sources Proposed for Assessment

Title	Year	Author	Citation
General (applicable to both English and Scottish waters)			
ABPmer Data Explorer	2018	ABPmer	ABPmer (2018)
Admiralty bathymetric survey data	2014	UK Hydrographic Office (UKHO)	UKHO (2014)
Analysis of tidal currents in the North Sea from shipboard acoustic Doppler current profiler data	2018	Continental Shelf Research	Vindenes *et al.* (2018)
Cambois Connection Marine Scheme Environmental Statement: Volume 2 Chapter 7 Physical Environmental and Seabed Conditions	2023	SSE Renewables	SSE Renewables (2023)
Climate System Forecast Reanalysis (Hourly hindcast wind data at 0.2 degree resolution, spanning 44 years (1979 to 2023), used to drive SEASTATES)	2010	Saha *et al*.	Saha *et al*. (2010)
Database on the Marine Environment (DOME): Sediment Quality Data	2023	International Council for the Exploration of the Sea (ICES)	DOME (2023)
Designated Ramsar Sites	2022	Ramsar Sites Information Service	Ramsar (2022)
Eastern Green Link 3 and Eastern Green Link 4: Environmental Impact Assessment Scoping Report: Volume 1, Part 3, English Offshore Scheme	2024	The Planning Inspectorate (PINS)	National Grid (2024)
Environment Agency Coastal Design Sea Levels for the UK	2018	Environment Agency	Environment Agency (2018)
European Marine Observation and Data Network (EMODnet) – Bathymetry data	2022	EMODnet	EMODnet (2022)
EU SeaMap 2021 habitat types (EUNIS 2019)	2021	EMODnet	EMODnet (2021)
IPCC Sixth Assessment Report Chapter 4: Future Global Climate: Scenario-based Projections and Near-term Information	2021	IPCC	Lee and Marotzke (2021)
JNCC Marine Protected Area Mapper – MCZs, HPMAs, Scottish MPAs, SACs, SPAs.	2023	JNCC	JNCC (2023)
Seabed geology and sediment data (scale: 1:250,000),	2021	British Geographical Survey (BGS)	BGS (2021)
Sea floor geomorphology	2023	Bundesanstalt für Geowissenschaften und Rohstoffe (BGR)	BGR (2023)
Sediment transport pathways in the North Sea	2005	ABPmer	Kenyon and Cooper (2005)
SPM data - Monthly Average non-algal Suspended Particulate Matter (SPM) Concentrations.	2016	Cefas	Silva (2016)
Suspended Sediment Climatologies around the UK	2016	Cefas	Cefas (2016)
United Kingdom Climate Projections 2018 (UKCP18)	2018	Met Office	Met Office (2018)
OESEA4	2018	UK Government	BEIS (2018)
UK Renewable Atlas	2024	ABPmer	ABPmer (2024)
English waters			
Defra Magic Map: Bathing waters map and monitoring data	2024	Defra	Defra (2024)
Designated Sites – SSSIs	2022	Defra	Defra (2022)
Dogger Bank Teesside A and B Environmental Statement: Chapter 9 Marine Physical Processes	2014	Forewind	Forewind (2014)

Title	Year	Author	Citation
Hornsea Project Four Environmental Statement: Volume A2, Chapter 1 Marine Geology, Oceanography and Physical Processes	2021	Orsted	Orsted (2021)
Hornsea Project Three Offshore Wind Farm Environmental Statement: Volume 2, Chapter 1 Marine Processes	2018	Orsted	Orsted (2018)
Outer Dowsing Offshore Wind Farm Preliminary Environmental Information Report: Volume 1, Chapter 7 Marine Processes	2023	Outer Dowsing Offshore Wind	Outer Dowsing Offshore Wind (2023)
SEPA bathing waters	2023	SEPA	SEPA (2023)
Shoreline Management Plan – SMP3	2010	Humber Estuary Coastal Authorities Group	Humber Estuary Coastal Authorities Group (2010)
Triton Knoll Offshore Wind Farm Environmental Statement: Volume 2, Chapter 2 Physical Processes	2012	Triton Knoll Offshore Wind Farm Limited	Triton Knoll Offshore Wind Farm Limited (2012)
Scottish waters			
Berwick Bank Wind Farm Environmental Impact Assessment (EIA) Report, Volume 2, Chapter 7: Physical Processes.	2022	SSE Renewables	SSE Renewables (2022)
Marine Scotland National Marine Plan interactive	2024	Marine Scotland	Marine Scotland (2024)
Ossian Array: EIA Scoping Report	2023	Ossian OWFL	Ossian OWFL (2023)

Site-Specific Data

6.2.4.3 A metocean survey was undertaken within the Array Site Boundary (which overlaps with the majority of the Offshore Scoping Boundary in Scottish waters) in August 2022 which collected data over a period of twelve months (Partrac, 2023). These data sources have been used to inform the baseline for the portion of the Offshore Scoping Boundary in Scottish waters, in conjunction with geophysical data collected within the Array Site Boundary (Ocean Infinity, 2022). These data will also be used to provide a detailed, site-specific baseline characterisation in the physical processes technical report and inform the assessment presented in the physical processes chapter of the ES.

6.2.4.4 In addition, a geophysical survey within the Offshore Scoping Boundary (in English waters) has recently been completed, and this data will be incorporated into the physical processes chapter of the ES. A site-specific benthic subtidal survey (in both English and Scottish waters) is also planned for 2025, the results of which will inform the physical processes chapter of the ES where relevant.

6.2.5 Mitigation Measures

6.2.5.1 The following measures adopted as part of the Offshore Transmission Infrastructure are relevant to the assessment for physical processes. These measures may evolve (and be further clarified) as the design and EIA process progresses:

- Cable burial will be used wherever possible; external cable protection will be used where minimum burial depths cannot be achieved and Ossian will seek to minimise the extent and quantity of any external cable protection laid Development of, and adherence to, an Operation and Maintenance Programme (OMP) which will detail the programme of routine inspections of the Offshore Export Cables to confirm minimum burial depth is maintained.
- Development of, and adherence to, a Cable Plan, informed by the findings of a Cable Burial Risk Assessment (CBRA).

6.2.5.2 The significance of the likely effects of the Offshore Transmission Infrastructure on physical processes may result in the requirement for additional mitigation measures. This will be consulted upon with the statutory consultees throughout the EIA process.

6.2.6 Proposed Scope of the Assessment

6.2.6.1 Potential impacts that are proposed to be scoped into the assessment for physical processes are set out in **Table 6.2.3.**

Table 6.2.3: Potential Impacts Proposed to be Scoped in for Physical Processes

Impact	Project Phase[1]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Increased suspended sediment concentrations and associated deposition	✓	✓	✓	✓	✓	There is potential for increased SSCs and deposition associated with seabed preparation activities, cable installation activities, minor repair and reburial events, and decommissioning activities, such as cable removal, to impact physical features within the physical processes study area. It should be noted that increased SSCs and redeposition is expected to be considerably lower during the operation and maintenance phase than during the construction and decommissioning phases.	A qualitative assessment and literature review of relevant offshore wind farm projects and other relevant projects in the vicinity of the Offshore Export Cable Corridor(s) refined for the ES will be used to provide an overview of the potential impacts to physical processes. Elevations in SSC and subsequent deposition of disturbed sediments will also have the potential to indirectly impact receptors for other offshore topics, including benthic subtidal and intertidal ecology, fish and shellfish ecology, marine mammals, marine archaeology, infrastructure and other users and water quality. For these receptor groups, significance of effect for direct and indirect impacts will not be assigned within the physical processes assessment (but will rather be set out in the relevant topic chapter).
Impacts to seabed morphology	✓	✓	✓	✓	✓	Seabed preparation and removal of infrastructure could potentially alter the seabed morphology. Furthermore, the presence of infrastructure within the water column, primarily in shallow areas, could alter the wave and tidal regime which could impact sediment transport as a result.	The potential impact of the Offshore Transmission Infrastructure on seabed morphology will be informed by a qualitative assessment and literature review of relevant offshore wind farm projects and other relevant projects in the vicinity of the Offshore Export Cable Corridor(s) refined for the ES.
Impacts to sediment transport pathways due to the presence of the infrastructure	×	✓	×	✓	✓	The presence of infrastructure on the seabed (such as cable protection) could potentially disrupt sediment transport pathways directly, which may affect physical features and physical processes receptors.	The potential impact of the Offshore Transmission Infrastructure on sediment transport pathways will be informed by a qualitative assessment and literature review of relevant offshore wind farm projects and other relevant projects in the vicinity of the Offshore Export Cable Corridor(s) refined for the ES.
Impacts to sediment transport and sediment transport pathways at Landfall	✓	✓	✓	✓	×	The Offshore Export Cables makes landfall through the intertidal zone. Installation and decommissioning of the Offshore Export Cables and/or external cable protection, and the presence of cable protection in the vicinity of the Landfall during the operation and maintenance phase may disturb or disrupt the intertidal sediment transport.	The potential impact of the Offshore Transmission Infrastructure on intertidal sediment transport pathways will be informed by a qualitative assessment and literature review of relevant offshore wind farm projects and other relevant projects in the vicinity of the Offshore Export Cable Corridor(s) refined for the ES.

[1] Construction (C), Operation and Maintenance (O), Decommissioning (D)

6.2.7 Impacts Proposed to be Scoped Out

6.2.7.1 Impacts that are proposed to be scoped out of the assessment for physical processes and the justification are set out in **Table 6.2.4**.

Table 6.2.4: Impacts Proposed to be Scoped out of the Assessment for Physical Processes

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
Operation and Maintenance			
Temperature increase during the operation of the cable due to resistance in the cable.	✓	✓	Only relevant for the operation and maintenance phase of the Offshore Transmission Infrastructure. There are no specific regulatory limits applied to temperature changes in the seabed. Any temperature changes will be localised to the immediate environment surrounding the cable, and therefore undetectable against natural temperature fluctuations in the surrounding sediments and water column. Due to this, no likely significant effects can be predicted for physical processes as the magnitude of the impact would not be sufficient to affect stratification.

6.2.8 Proposed Assessment Methodology

6.2.8.1 The assessment methodology proposed to be used for the impacts proposed to be scoped in for physical processes as set out in **Table 6.2.3** is described below.

Legislation and Policy

6.2.8.2 An overview of relevant legislation and policy is provided in **part 1, section 2** of this EIA Scoping Report. Further details of topic-specific legislation and policy will be provided within the physical processes ES chapter.

Relevant Guidance

6.2.8.3 The following guidance documents relevant to the physical processes assessment will be considered in the ES:

- **General (applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to made to MD-LOT):**
  - Guidelines in the use of Metocean data through the lifecycle of a marine renewable development (Cooper *et al*., 2008);
  - Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) Assessment of the Environmental Impacts of Cables (OSPAR, 2009);
  - Review of Cabling Techniques and Environmental Effects applicable to the Offshore Wind Farm Industry. Department for Business Enterprise and Regulatory Reform (BERR) in association with Defra (BERR, 2008); and
  - General advice on assessing potential impacts of and mitigation for human activities on MCZ features, using existing regulation and legislation (Joint Nature Conservation Committee (JNCC) and Natural England, 2011).

Assessment of Effects

6.2.8.4 The physical processes assessment will follow the methodology set out in **part 1, section 5** of this EIA Scoping Report.

6.2.8.5 Numerical modelling is not proposed to be undertaken for the Offshore Transmission Infrastructure, which will utilise a literature review and existing numerical modelling studies undertaken in relation to relevant offshore wind farm projects. Other projects in the vicinity of the Offshore Export Cable Corridor(s) refined for the ES which will be drawn upon may include the Dogger Bank Offshore Wind Farms, the Hornsea Offshore Wind Farm Projects, Outer Dowsing Offshore Wind Farm, Viking Link interconnector, Triton Knoll Offshore Wind Farm, and the Cambois Connection Marine Scheme.

6.2.8.6 It should be noted that projects such as Dogger Bank A and B (located off the coast of Yorkshire and making landfall north of Ulrome, East Yorkshire), Hornsea 1 and 2 (located off the coast of Yorkshire and making landfall south of Grimsby) and Outer Dowsing (located off the Lincolnshire Coast and making landfall at Anderby Creek, Lincolnshire) Offshore Wind Farms have undertaken numerical modelling and no likely significant effects with respect to physical processes were concluded. It is expected that a literature review of relevant projects will sufficiently support the impact assessment for the Offshore Transmission Infrastructure due to the spatial proximity of the projects (e.g. Dogger Bank A and B being located off the Lincolnshire coast, where the Offshore Transmission Infrastructure will be routed). These projects assessed similar impacts to those listed in **Table 6.2.3**.

6.2.8.7 Seabed sediments within the physical processes study area depicted in **paragraph 6.2.3.12** and **Figure 6.2.2** are largely similar to those found at the Hornsea Projects and at Dogger Bank A and B as shown by the EMODnet Map viewer (EMODnet, 2022). Despite differences in cable length, the Offshore Transmission Infrastructure is planned to be laid through the same, predominantly sandy sediment, supporting the expectation that a literature review of these relevant projects will suffice for the impact assessment of the Offshore Transmission Infrastructure in terms of sediment transport and SSCs.

6.2.8.8 Furthermore, the similar wind, tidal and wave conditions surrounding these comparable projects, as shown by the Atlas of UK Marine Renewable Energy Resources (ABPmer, 2024), also supports the statement that current, existing numerical modelling studies, and a literature review will be adequate for the ES.

The intertidal section of the Offshore Transmission Infrastructure will likely be the most sensitive to changes in sediment transport (due to the presence of the infrastructure) and SSCs (due to activities such as cable laying). It is likely that these impacts will be comparable with the Hornsea Four export cable, due to the proximity of the two projects. Direct sediment disturbance from activities such as cable laying were described as "*Negligible, short-term and spatially restricted*" In Hornsea Four Scoping (Ørsted, 2018), with sediment material to fall out of suspension relatively quickly. Similarly, the numerical modelling for the Outer Dowsing Offshore Wind Farm ES, which makes landfall in a similar location to the Ossian Transmission Infrastructure, demonstrated that the "*magnitude of change from increases in SSC is noticeable but temporary, with the majority of effects limited to the near-field and of short-term duration*" (Outer Dowsing Offshore Wind, 2023). As the Ossian Transmission Infrastructure is in a similar area, the effect from waves and tides on sediment transport and dispersion would likely be similar and therefore not lead to significant impacts.

6.2.8.9 In addition, data analysis and assessment undertaken for the Ossian Array EIA Report (Ossian OWFL, 2024), will be used to inform the assessment of impacts within the Offshore Scoping Boundary (in Scottish waters). Metocean data was collected and utilised for the Dogger Bank A and B Offshore Wind Farms, Hornsea Projects and Outer Dowsing Offshore Wind Farm which can be drawn upon in the physical processes chapter of the ES.

Cumulative Effects and Inter-related Effects

6.2.8.10 The Cumulative Effects Assessment (CEA) for physical processes will follow the general methodology set out in **part 1, section 5**. The physical processes chapter of the ES will also consider inter-related effects arising from the Offshore Transmission Infrastructure, including potential project lifetime and receptor-led effects. This assessment will be undertaken in accordance with the standard industry guidance and approach, as outlined in **part 1, section 5** of this EIA Scoping Report.

Transboundary Impacts

6.2.8.11 The approach to transboundary impacts is set out in **part 1, section 5.10** of this EIA Scoping Report. **Part 5, appendix 5.1** in this EIA Scoping Report presents the transboundary impacts screening which has been carried out for the Offshore Transmission Infrastructure. All predicted impacts on physical processes are likely to be limited in extent to the physical processes study area (which is based on the physical processes study area). Therefore, it is considered that any potential impacts associated with the Offshore Transmission Infrastructure will not affect benthic ecology receptors in any European Economic Area (EEA) state. As a result of this screening exercise, it is proposed that transboundary impacts and effects on physical processes are screened out from the EIA process.

Relevant Consultations

6.2.8.12 The Applicant has undertaken introductory consultation with selected consultees, including Natural England, Marine Management Organisation (MMO) and Joint Nature Conservation Committee. Topic specific consultation will be undertaken throughout the PEIR and ES phases via the Evidence Plan Process Steering Group and Expert Topic Group to inform the physical processes chapter in the ES. The following stakeholders relevant to physical processes will be consulted via Expert Topic Group meetings:

- **English waters (applicable to the application for a DCO to be made to the Planning Inspectorate):**
  - Natural England;
  - MMO (and the Centre for Environment, Fisheries and Aquaculture Science (Cefas));
  - Environment Agency;
  - Lincolnshire Wildlife Trusts; and
  - Inshore Fisheries and Conservation Authorities (ICFAs) (e.g. Northumberland/North Eastern IFCAs).
- **Scottish waters (applicable to the application for a Marine Licence to be made to MD-LOT):**
  - NatureScot.

6.2.9 Next Steps

6.2.9.1 The next steps for the physical processes topic are:

- to agree with stakeholders on the approach for the assessment of physical processes (including additional data sources, presenting sensitivities of receptors and mitigation);
- to agree with stakeholders on the potential impacts for assessment in the physical processes chapter of the ES; and
- to discuss with stakeholders any potential requirements for additional monitoring.

6.3. Benthic Subtidal and Intertidal Ecology

6.3.1 Introduction

6.3.1.1 This section of the EIA Scoping Report identifies the proposed scope of the assessment for benthic subtidal and intertidal ecology from construction, operation and maintenance and decommissioning of the proposed Offshore Transmission Infrastructure. This includes the key data sources used to characterise the baseline environment in the vicinity of the Offshore Transmission Infrastructure within Scottish and English waters, and the impacts proposed to be scoped in and out of the assessment for benthic subtidal and intertidal ecology in the ES.

6.3.1.2 The scope of this baseline characterisation and assessment for benthic subtidal and intertidal ecology covers all relevant benthic ecology receptors which have the potential to be impacted by the Offshore Transmission Infrastructure. The scope also covers ocean quahog *Arctica islandica* and horse mussel *Modiolus modiolus,* which are not considered in the fish and shellfish section of the EIA Scoping Report, due to their lack of commercial value.

6.3.2 Proposed Study Area for the Assessment

6.3.2.1 A benthic subtidal and intertidal ecology study area has been defined to inform the baseline characterisation for benthic subtidal and intertidal ecology and is shown in **Figure 6.3.1**. Further details of the location and extent of the Intertidal Scoping Boundary can be found in **Figure 3.5.1** of **part 1, section 3**.

6.3.2.2 The benthic subtidal and intertidal ecology study area encompasses the Offshore Scoping Boundary and Intertidal Scoping Boundary plus an additional precautionary 15 km buffer either side (seawards of the corridor) based upon the maximum extent of the physical processes study area (see **part 2, section 6.2**).

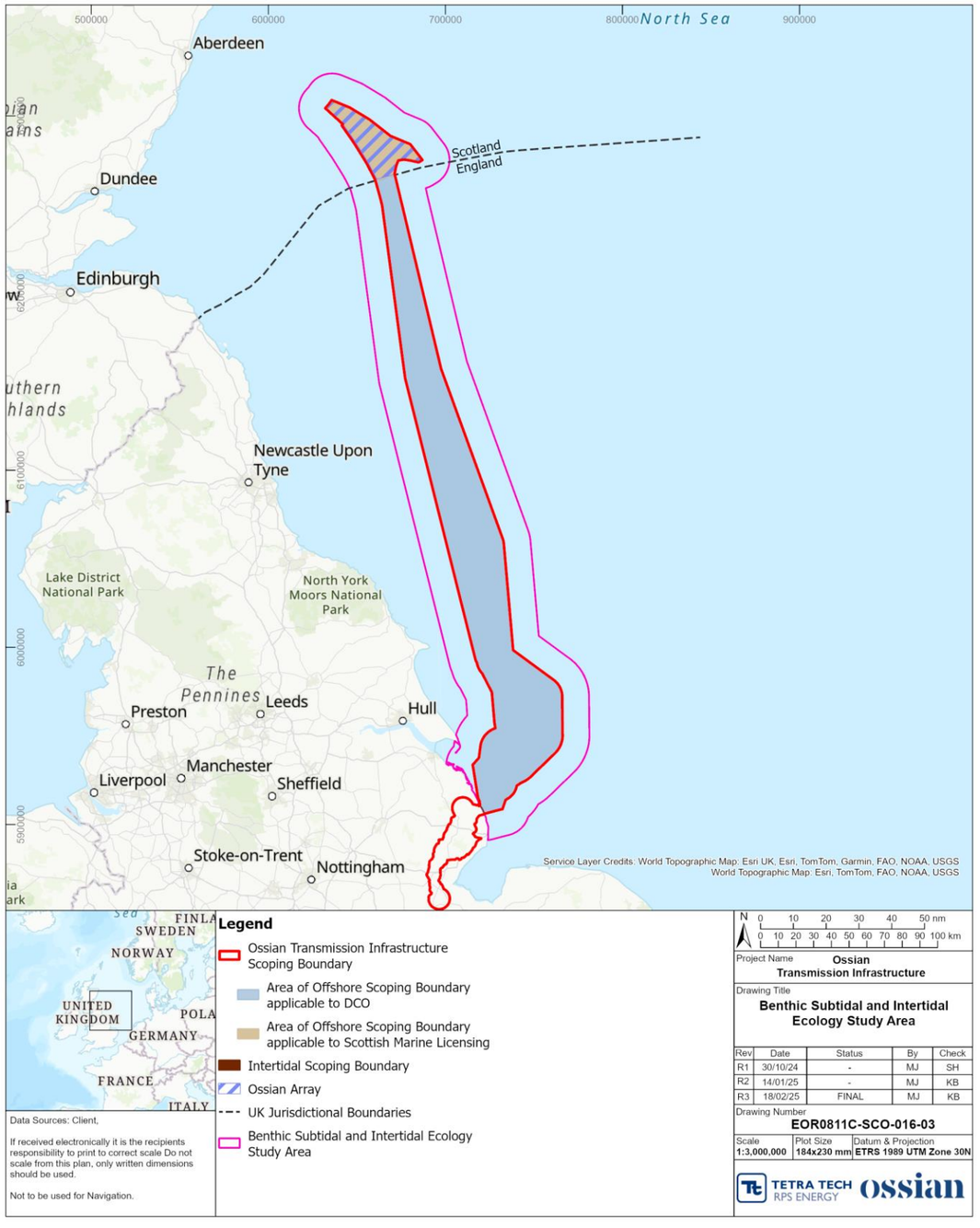

Figure 6.3.1: Benthic Subtidal and Intertidal Ecology Study Area

Site-Specific Data

6.3.2.3 Site-specific benthic surveys were undertaken over the Array Site Boundary (which overlaps with the majority of the Offshore Scoping Boundary in Scottish waters; see **paragraph 6.3.2.5**) in July 2022 to inform the baseline characterisation of benthic subtidal ecology for the Array EIA Report. This data has been used to inform the baseline characterisation within this EIA Scoping Report and will also be used to inform the baseline characterisation and the determination of impacts for the benthic subtidal and intertidal technical report and chapter (within Scottish waters) for the ES.

6.3.2.4 Site-specific surveys for benthic ecology for the Offshore Transmission Infrastructure are planned for 2025 (including an intertidal and subtidal survey). The site-specific surveys include grab sampling and seabed imagery sampling, as well as intertidal surveys. The benthic subtidal survey will take place across the Offshore Scoping Boundary (in Scottish and English waters; see **paragraph 6.3.2.5**), and the intertidal survey will take place across the Intertidal Scoping Boundary (**Figure 6.3.1**). This site-specific data will be used to enhance the data collected during the desk-based review for benthic subtidal and intertidal ecology, which will inform the baseline characterisation and determination of impacts for the ES.

6.3.2.5 It is noted that there is a small section of the Offshore Scoping Boundary in Scottish waters which does not overlap with the Array Site Boundary (and therefore was not surveyed in July 2022; see **Figure 6.3.1**). However, the site-specific surveys planned for the Offshore Transmission Infrastructure in 2025 will cover both this area and the Offshore Scoping Boundary within English waters. Therefore, the Offshore Scoping Boundary will be fully surveyed, and the baseline comprehensively characterised for the purposes of the ES.

6.3.3 Baseline Environment

6.3.3.1 An outline of the baseline environment for benthic subtidal and intertidal ecology based upon an initial review of key data sources is provided below. This baseline environment section is split into the following subsections to allow the reader to distinguish between information relevant to specific jurisdictions:

- **English Waters** – this subsection summarises baseline environment information which is specific to the portion of the benthic and subtidal ecology study area located within English waters and is therefore applicable to the application for a DCO to be made to the Planning Inspectorate.
- **Scottish Waters** – this subsection summarises baseline environment information which specific to the portion of the benthic and subtidal ecology study area located within Scottish waters and is therefore applicable to the application for a Marine Licence to be made to MD-LOT.

6.3.3.2 This baseline is based upon extensive desktop information available for the benthic subtidal and intertidal ecology study area, including scientific literature and EIA Scoping Reports and ESs from other projects and/or plans. It is recognised that given at this stage no site-specific data is available, these sources may not provide a definitive list of species present. The baseline characterisation will be further refined for the ES based on the results of the site-specific surveys for benthic subtidal and intertidal ecology, providing confidence that all benthic subtidal and intertidal ecology receptors which have the potential to be impacted by the Offshore Transmission Infrastructure are accounted for in the ES. It is also noted that for the purposes of this EIA Scoping Report, only publicly available sources of information have been used. The key desktop data sources used to inform this section of the EIA Scoping Report are shown in **Table 6.3.4**.

English Waters

Subtidal Sediments

6.3.3.3 The definition of the subtidal zone is the area where the seabed is below the reach of the lowest spring tide (Marine Scotland, 2023). EUSeaMap data has been used to classify the subtidal sediment types in the benthic subtidal and intertidal ecology study area (European Marine Observation and Data Network (EMODnet), 2021). This data is shown in **Figure 6.3.2**, which includes European Nature Information System (EUNIS) classification habitat types and codes. In the accompanying descriptive text (**paragraph 6.2.3.12**), the habitat codes are displayed in brackets following the full habitat type name, which corresponds to the habitat types shown in **Figure 6.3.2**.

6.3.3.4 Within the Offshore Scoping Boundary (in English waters), the dominant subtidal sediment type transitions to circalittoral coarse sediment (A5.14) and deep circalittoral coarse sediment (A5.15), with small patches of circalittoral fine sand (A5.25) and circalittoral muddy sand (A5.26). Closer to the Landfall, the subtidal sediment changes to moderate energy infralittoral seabed.

6.3.3.5 Other subtidal sediment types less dominant within the benthic subtidal and intertidal ecology study area include deep circalittoral mixed sediments (A5.45), circalittoral mixed sediments (A5.44), sublittoral biogenic reefs (A5.6), sublittoral polychaete worm reefs on sediment (A5.61) and infralittoral coarse sediment (A5.13).

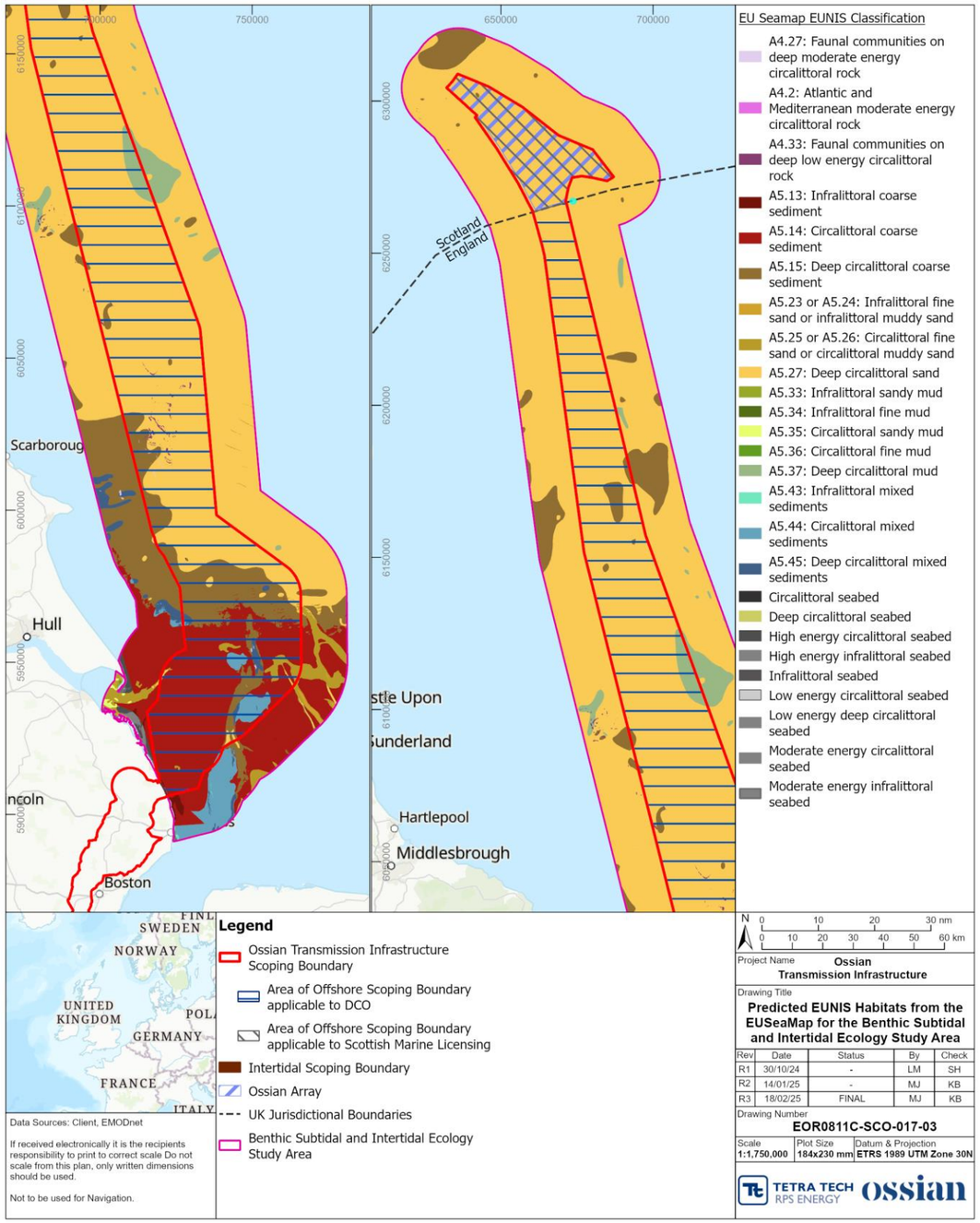

Figure 6.3.2: Predicted EUNIS Habitats from the EUSeaMap Data (EMODnet, 2021) within the Benthic Subtidal and Intertidal Ecology Study Area

Subtidal and Intertidal Sediment Contamination

6.3.3.6 Analysis of sediment quality samples from the International Council for the Exploration of the Sea Database on the Marine Environment (DOME) was undertaken along the full length of the Eastern Green Link 3 and 4 project, which is located in a similar area to the Offshore Scoping Boundary (in English waters) (see **Figure 6.3.1**). This data (presented in the Eastern Green Link 3 and 4 Scoping Report) has hence been used to inform the understanding of sediment quality within the English portion of the Offshore Scoping Boundary. For all sample records taken from the DOME Portal for the Eastern Green Link 3 and 4 project (DOME, 2023), contaminant levels were below Cefas Action Level 1. The project indicated that there were potential sources of contamination within the project area, including gas fields and disposal sites, but noted that there was no indication of elevated contaminant levels above Cefas Action Level 1 (National Grid, 2024). No publicly available analysis of sediment quality has been reported from any site-specific sampling for the Eastern Green Link 3 and 4 project at this stage.

6.3.3.7 The Cefas Action Level Viewer (Cefas, 2024a) provides assessed dredged sediment contaminant data (collected under the Actions Levels review project to determine Action Levels in the assessment of whether dredged material is suitable for disposal at sea), which has also been used to provide an indication of contaminant levels within the benthic subtidal and intertidal ecology study area (encompassing the Offshore and Intertidal Scoping Boundaries in English waters), close to the potential Landfall locations. It should be noted that data were collated from 1998 to 2019 and may not be representative of more recent contaminant levels.

6.3.3.8 From the available data, there was no indication of levels of any assessed contaminant (including organotins, PAH, PCB and Total Hydrocarbons) above Cefas Action Level 1 within the Offshore and Intertidal Scoping Boundaries (in English waters), close to potential Landfall locations. However, at the mouth of the Humber Estuary (which is located within the 15 km buffer used to define the benthic subtidal and intertidal ecology study area, north-west of the Offshore Scoping Boundary), there were a number of samples from 2013 which were reported to have levels of Total Hydrocarbons exceeding Cefas Action Level 1. The levels of the other assessed contaminants did not exceed Cefas Action Level 1 in any samples within the benthic subtidal and intertidal ecology study area (Cefas, 2024a). Assessed data were for samples located in the nearshore environment, close to the potential Landfall locations, and so do not represent contaminant levels in areas further offshore or in the Offshore Scoping Boundary (in Scottish waters).

6.3.3.9 The site-specific benthic subtidal survey planned for 2025 (see **paragraph 6.3.2.4**) will include sediment chemistry analysis. This data will be used to inform the baseline levels of sediment contamination in the benthic subtidal and intertidal ecology study area. The data will be supplemented by other recently published data from the area; for example, other site-specific surveys for offshore wind farm projects. As such, following these surveys, there will be higher certainty in the reported levels of contaminants within the benthic subtidal and intertidal ecology study area.

Subtidal Benthic Communities

6.3.3.10 Available desktop data and site-specific data from other projects have been used to inform the characterisation of subtidal benthic communities within the benthic subtidal and intertidal ecology study area.

6.3.3.11 The Eastern Green Link 3 and 4 EIA Scoping Report characterises the subtidal benthic communities across a similar area to the Offshore Scoping Boundary (in English waters) (see **Figure 6.3.1**), based on typical communities for the broadscale habitat types identified using EUSeaMap data (EMODnet, 2021). These broadscale habitat types provide an indication of the potential subtidal benthic communities in the benthic subtidal and intertidal ecology study area (National Grid, 2024) and a similar approach to baseline characterisation has been adopted here (i.e. to use the broadscale habitat types identified using EUSeaMap data for the Offshore Scoping Boundary to indicate potential presence of benthic communities). The typical benthic fauna characterising the broadscale habitat types identified in **paragraph 6.3.3.4** and **6.3.3.5** for the benthic subtidal and intertidal ecology study area are shown in **Table 6.3.1**.

Table 6.3.1: Broadscale Habitat Types and Associated Typical Subtidal Communities within the Benthic Subtidal and Intertidal Ecology Study Area

Broadscale habitat type	EUNIS habitat description
Deep circalittoral sand	Offshore (deep) circalittoral habitats with fine sands or non-cohesive muddy sands. Very little data is available on these habitats however they are likely to be more stable than their shallower counterparts and characterised by a diverse range of polychaetes, amphipods, bivalves and echinoderms.
Deep circalittoral coarse sediment	Offshore (deep) circalittoral habitats with coarse sands and gravel or shell. This habitat may cover large areas of the offshore continental shelf although there is relatively little quantitative data available. Such habitats are quite diverse compared to shallower versions of this habitat and generally characterised by robust infaunal polychaete and bivalve species. Animal communities in this habitat are closely related to offshore mixed sediments, and in some areas, the settlement of *Modiolus modiolus* larvae may occur and consequently these habitats may occasionally have large numbers of juvenile *M. modiolus*. In areas where the mussels reach maturity their byssus threads bind the sediment together, increasing stability and allowing an increased deposition of silt.
Deep circalittoral mud	In mud and cohesive sandy mud in the offshore circalittoral zone, typically below 50 m to 70 m, a variety of faunal communities may develop, depending upon the level of silt/clay and organic matter in the sediment. Communities are typically dominated by polychaetes but often with high numbers of bivalves such as *Thyasira* spp., echinoderms and foraminifera.
Circalittoral coarse sediment	Tide-swept circalittoral coarse sands, gravel and shingle generally in depths of over 15 m to 20 m. This habitat may be found in tidal channels of marine inlets, along exposed coasts and offshore. This habitat, as with shallower coarse sediments, may be characterised by robust infaunal polychaetes, mobile crustacea and bivalves. Certain species of sea cucumber (e.g. *Neopentadactyla*) may also be prevalent in these areas along with the lancelet *Branchiostoma lanceolatum*.
Circalittoral fine sand	Clean fine sands with less than 5% silt/clay in deeper water, either on the open coast or in tide-swept channels of marine inlets in depths of over 15 m to 20 m. The habitat may also extend offshore and is characterised by a wide range of echinoderms (in some areas including the pea urchin *Echinocyamus pusillus*), polychaetes and bivalves. This habitat is generally more stable than shallower, infralittoral sands and consequently supports a more diverse community.
Circalittoral muddy sand	Circalittoral non-cohesive muddy sands with the silt content of the substratum typically ranging from 5% to 20%. This habitat is generally found in water depths of over 15 m to 20 m and supports animal-dominated communities characterised by a wide variety of polychaetes, bivalves such as *Abra alba* and *Nucula nitidosa*, and echinoderms such as *Amphiura* spp. and *Ophiura* spp., and *Astropecten irregularis*. These circalittoral habitats tend to be more stable than their infralittoral counterparts and as such support a richer infaunal community.
Deep circalittoral mixed sediments	Offshore (deep) circalittoral habitats with slightly muddy mixed gravelly sand and stones or shell. This habitat may cover large areas of the offshore continental shelf although there is relatively little data available. Such habitats are often highly diverse with a high number of infaunal polychaete and bivalve species. Animal communities in this habitat are closely related to offshore gravels and coarse sands and in some areas, populations of the horse mussel *Modiolus modiolus* may develop in these habitats.

Broadscale habitat type	EUNIS habitat description
Circalittoral mixed sediments	Mixed (heterogeneous) sediment habitats in the circalittoral zone (generally below 15 m to 20 m) including well mixed muddy gravelly sands or very poorly sorted mosaics of shell, cobbles and pebbles embedded in or lying upon mud, sand or gravel. Due to the variable nature of the seabed a variety of communities can develop which are often very diverse. A wide range of infaunal polychaetes, bivalves, echinoderms and burrowing anemones such as *Cerianthus lloydii* are often present in such habitat and the presence of hard substrata (shells and stones) on the surface enables epifaunal species to become established, particularly hydroids such as *Nemertesia* spp. and *Hydrallmania falcata*. The combination of epifauna and infauna can lead to species rich communities.
Sublittoral biogenic reefs	This habitat type includes polychaete reefs, bivalve reefs (e.g. mussel beds) and cold water coral reefs. These communities develop in a range of habitats from exposed open coasts to estuaries, marine inlets and deeper offshore habitats and may be found in a variety of sediment types and salinity regimes.
Sublittoral polychaete worm reefs on sediment	Sublittoral reefs of polychaete worms in mixed sediments found in a variety of hydrographic conditions. Such habitats may range from extensive structures of considerable size to loose agglomerations of tubes. Such communities often play an important role in the structural composition or stability of the seabed and provide a wide range of niches for other species to inhabit. Consequently, polychaete worm reefs often support a diverse flora and fauna.
Infralittoral coarse sediment	Moderately exposed habitats with coarse sand, gravelly sand, shingle and gravel in the infralittoral zone, are subject to disturbance by tidal steams and wave action. Such habitats found on the open coast or in tide-swept marine inlets are characterised by a robust habitat of infaunal polychaetes such as *Chaetozone setosa* and *Lanice conchilega*, cumacean crustacea such as *Iphinoe trispinosa* and *Diastylis bradyi*, and venerid bivalves. Habitats with the lancelet *Branchiostoma lanceolatum* may also occur.

Intertidal Sediments

6.3.3.12 EUSeaMap data and data from other projects in the area have been used to classify the intertidal sediment types in the benthic subtidal and intertidal ecology study area (EMODnet, 2021); this data is shown in **Figure 6.3.2**. The definition of the intertidal zone is the area of seashore that is exposed at low tide and inundated at high tide (Marine Scotland, 2023). The Offshore Export Cable(s) will make landfall at the Lincolnshire coast, between the southern edge of Sandilands and Anderby Creek, south of Mablethorpe (**Figure 6.3.1**). Therefore, the baseline characterisation of intertidal sediments has been based on the potential Landfall areas encompassed by the benthic subtidal and intertidal ecology study area.

6.3.3.13 The intertidal sediment type is made up of infralittoral seabed, infralittoral sediment, infralittoral coarse sediment (A5.13) and circalittoral coarse sediment (A5.14). Circalittoral mixed sediments (A5.44) and infralittoral mixed sediments (A5.43) are also found in the southern section of the benthic subtidal and intertidal ecology study area. A mosaic of intertidal sediment types characterises the benthic subtidal and intertidal ecology study area close to the entrance to the Humber Estuary and the entrance to the Wash. These sediment types are shown in **Figure 6.3.2**.

6.3.3.14 The Eastern Green Link 3 and 4 EIA Scoping Report characterises the intertidal sediments for two potential landfalls on the Lincolnshire coast (Anderby Creek and Theddlethorpe, both within the benthic subtidal and intertidal ecology study area). The available data for this location identified the intertidal area to be characterised by littoral sand, moderate to high energy infralittoral coarse sediment and a moderate to high energy regime (National Grid, 2024).

6.3.3.15 The Humber Gateway Offshore Wind Farm (located 0.69 km west of the Offshore Scoping Boundary to the north of the mouth of the Humber Estuary and 15 km from the nearest point on the Lincolnshire coast – Donna Nook; overlapping with the benthic subtidal and intertidal study area) undertook benthic intertidal surveys to characterise the intertidal sediments for the Holderness Coast landfall location (located just north of the Humber Estuary and west of the benthic subtidal and intertidal study area). The sediments in this area were found to be largely composed of coarse sand and gravel overlaying boulder clay (E.ON, 2005).

Intertidal Benthic Communities

6.3.3.16 Available desktop data and site-specific data from other projects has been used to inform the characterisation of intertidal benthic communities within the benthic subtidal and intertidal ecology study area.

6.3.3.17 The Humber Gateway Offshore Wind Farm benthic intertidal surveys identified that infaunal invertebrates were extremely scarce along the area of the Holderness coast surveyed, with a total of three species recorded and only 14 individuals across the whole area. It was considered following these surveys that the intertidal area is impoverished with low species diversity both at individual sites and across the intertidal area. The dominant species overall at the mid and lower shores was found to be the isopod *Eurydice pulchra*, with the amphipod *Haustorius arenarius* characterising the lower shore. The amphipod *Pontocrates arenarius* was also recorded occasionally in the upper, mid and lower shore sampling stations (E.ON, 2005).

6.3.3.18 The Eastern Green Link 3 and 4 EIA Scoping Report characterises the intertidal benthic communities across a similar area to the Offshore and Intertidal Scoping Boundaries (in English waters) (see **Figure 6.3.1**), based on typical communities for the identified broadscale habitat types (EMODnet, 2021; see **paragraph 6.3.3.11**). These provide an indication of the potential intertidal benthic

communities in the benthic subtidal and intertidal ecology study area (National Grid, 2024) and a similar approach to baseline characterisation has been adopted here. The typical benthic fauna characterising the broadscale habitat types identified in **paragraph 6.3.3.12** for the benthic subtidal and intertidal ecology study area are shown in **Table 6.3.2**.

Table 6.3.2: Broadscale Habitat Types and Associated Typical Intertidal Communities within the Benthic Subtidal and Intertidal Ecology Study Area

Broadscale habitat type	EUNIS habitat description
Infralittoral seabed	No EUNIS habitat description available. These shallow habitats are normally found close to the shore but can be used to classify benthic communities on the low shore.
Infralittoral sediment	No EUNIS habitat description available. These shallow sediments in fully marine or near fully marine conditions support various animal-dominated communities, with relatively low proportions of seaweeds.
Infralittoral coarse sediment	Moderately exposed habitats with coarse sand, gravelly sand, shingle and gravel in the infralittoral zone, are subject to disturbance by tidal steams and wave action. Such habitats found on the open coast or in tide-swept marine inlets are characterised by a robust habitat of infaunal polychaetes such as *Chaetozone setosa* and *Lanice conchilega*, cumacean crustacea such as *Iphinoe trispinosa* and *Diastylis bradyi*, and venerid bivalves. Habitats with the lancelet *Branchiostoma lanceolatum* may also occur.
Circalittoral coarse sediment	Tide-swept circalittoral coarse sands, gravel and shingle generally in depths of over 15 m to 20 m. This habitat may be found in tidal channels of marine inlets, along exposed coasts and offshore. This habitat, as with shallower coarse sediments, may be characterised by robust infaunal polychaetes, mobile crustacea and bivalves. Certain species of sea cucumber (e.g. *Neopentadactyla*) may also be prevalent in these areas along with the lancelet *Branchiostoma lanceolatum*.
Circalittoral mixed sediments	Mixed (heterogeneous) sediment habitats in the circalittoral zone (generally below 15 m to 20 m) including well mixed muddy gravelly sands or very poorly sorted mosaics of shell, cobbles and pebbles embedded in or lying upon mud, sand or gravel. Due to the variable nature of the seabed a variety of communities can develop which are often very diverse. A wide range of infaunal polychaetes, bivalves, echinoderms and burrowing anemones such as *Cerianthus lloydii* are often present in such habitat and the presence of hard substrata (shells and stones) on the surface enables epifaunal species to become established, particularly hydroids such as *Nemertesia* spp. and *Hydrallmania falcata*. The combination of epifauna and infauna can lead to species rich communities.
Infralittoral mixed sediments	Shallow mixed (heterogeneous) sediments in fully marine or near fully marine conditions, supporting various animal-dominated communities, with relatively low proportions of seaweeds. This habitat may include well mixed muddy gravelly sands or very poorly sorted mosaics of shell, cobbles and pebbles embedded in mud, sand or gravel. Due to the quite variable nature of the sediment type, a widely variable array of communities may be found, including those characterised by bivalves, polychaetes and file shells.

6.3.3.19 Designated sites which are located within the benthic subtidal and intertidal ecology study area related to English waters are listed in **Table 6.3.3** and shown in **Figure 6.3.3.**

Scottish Waters

Subtidal Sediments

6.3.3.20 The dominant subtidal sediment type in the northern section of the benthic subtidal and intertidal ecology study area (including the Offshore Scoping Boundary in Scottish waters) is deep circalittoral sand (A5.27), with intermittent patches of deep circalittoral coarse sediment (A5.15) and occasional patches of deep circalittoral mud (**Figure 6.3.2**).

6.3.3.21 The site-specific benthic survey data across the Array Site Boundary showed limited variation in sediment composition. The dominant sediment fraction was sand, with an average content of 86.4%. Furthermore, some areas comprised sand

with a higher gravel content. The two dominant subtidal habitats from these site-specific surveys were reported as “Faunal communities of Atlantic circalittoral sand” and “Faunal communities of Atlantic circalittoral mixed sediment”. Site-specific geophysical data collected across the Array Site Boundary showed the seabed to be characterised by sand, gravel and the occasional observation of diamicton. There was also a widespread presence of mega ripples and sand waves, indicating some degree of sediment mobility (Ossian OWFL, 2022).

Subtidal Sediment Contamination

6.3.3.22 Within the Offshore Scoping Boundary (in Scottish waters), sediment contamination levels are expected to be very low overall, in line with the findings of the site-specific surveys of the Array Site Boundary (which overlaps with this area). These surveys found that concentrations of Total Organic Matter (TOM), Total Organic Carbon (TOC), and Polycyclic Aromatic Hydrocarbons (PAH) were low across the Array Site Boundary. Total Hydrocarbon Content (THC) concentrations were also low across the Array Site Boundary and no sample sites were found to exceed the Dutch Research for Man and Environment (RIVM) intervention levels (Hin *et al.,* 2010). All levels of metals and PAH in the grab samples were below Cefas Action Level 1, and all but one sample in this area were also below the National Environment Agency (NEA) 2 Good threshold and the Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines threshold (CCME, 1995; 2001; NEA, 2016 (Revised 2020)). Levels of organotin and Polychlorinated biphenyls (PCBs) were below the limit of detection in most samples (Ossian OWFL, 2024).

Subtidal Benthic Communities

6.3.3.23 The site-specific benthic surveys undertaken across the Array Site Boundary (overlapping with a large part of the Offshore Scoping Boundary in Scottish waters; see **Figure 6.3.1**) found the presence of two subtidal habitats “*Echinocyamus pusillus*, *Ophelia borealis*, and *Abra prismatica* in circalittoral fine sand” (SS.SSa.CFiSa.EpusOborApri), and “*A. prismatica*, *Bathyporeia elegans*, and polychaetes in circalittoral fine sand” (SS.SSa.CFiSa.ApriBatPo). High abundances of annelids, primarily sand mason worm *Lanice conchilega* and the bristleworm *Spiophanes bombyx* were identified. In total, 196 non-colonial taxa were recorded from the grab samples, with the most abundant being *L. conchilega*, *S. bombyx*, bivalve *A. prismatica*, bristleworm *Scoloplos armiger* and pea urchin *E. pusillus.* The colonial fauna was dominated by cnidarians and bryozoans, while echinoderms comprised the majority of the total biomass collected during grab sampling. Faunal analysis of the epibenthic beam trawling indicated that the non-colonial phyletic composition was dominated by arthropods, with 46 taxa recorded. The colonial fauna identified comprised cnidarians, bryozoans and porifera. The total fauna recorded in the trawls was dominated by chordates (i.e. fish), which contributed 67% of the total biomass, followed by echinoderms (15%) and bryozoans (7%) (Ossian OWFL, 2022).

Designated Sites

6.3.3.24 Designated sites with relevant benthic qualifying features which are located within the benthic subtidal and intertidal ecology study area are listed in **Table 6.3.3** and shown in **Figure 6.3.3**. This encompasses European designated sites (i.e. Special Areas of Conservation (SACs)) and nationally designated sites (i.e. Marine Conservation Zones (MCZs) and Highly Protected Marine Areas (HPMA)). It should be noted that none of the designated sites of relevance to benthic subtidal and intertidal ecology are located within Scottish waters, therefore, Table 6.3.3 does not define jurisdictions in which the designated sites are located as they are all located within English waters.

6.3.3.25 The Offshore and Intertidal Scoping Boundaries overlap with a number of protected sites, including the Holderness Offshore MCZ, Swallow Sand MCZ, Humber Estuary SAC, The Wash and North Norfolk Coast SAC and Inner Dowsing, Race Bank and North Ridge SAC. The extent of the overlaps with these protected sites is listed in brackets in **Table 6.3.3.** The other protected sites with relevant benthic qualifying features within the benthic subtidal and intertidal ecology study area include the North Norfolk Coast SAC, North East of Farnes Deep HPMA and North East of Farnes Deep MCZ. As shown in **Figure 6.3.3,** there is no overlap between the Offshore Scoping Boundary and any Scottish MPAs.

6.3.3.26 Further detail on the potential effects on benthic ecology features of MCZs will be presented in the MCZ Screening Assessment (see **part 5, appendix 9.1**). In addition, a Stage 1 Likely Significant Effect (LSE) Screening Report has been produced to inform the Habitats Regulations Assessment for the Offshore Transmission Infrastructure, which will assess the potential for the Offshore Transmission Infrastructure (and Onshore Transmission Infrastructure) to result in a LSE on European designated sites (including SACs designated for benthic features). It is noted that that European sites located in the UK are no longer part of the Natura 2000 network and are now included as part of the National Site Network. Further detail on the Habitats Regulations process is provided in the Stage 1 LSE Screening Report (Ossian OWFL, 2025).

6.3.3.27 Relevant benthic ecology features of designated sites will be fully considered and assessed within the benthic subtidal and intertidal ecology chapter of the ES. The information to support the assessment on European designated sites will be provided within the Information to Support Appropriate Assessment (ISAA), which will accompany the ES.

Table 6.3.3: Designated Sites with Benthic Quantifying Features within the Benthic Subtidal and Intertidal Study Area

Designated site	Distance to Offshore/Intertidal Scoping Boundaries (km)	Relevant protected features
English waters		
Marine Conservation Zone		
Holderness Offshore MCZ	0 - overlaps with the Offshore Scoping Boundary (extent of overlap: 557.8 km^2)	• Subtidal coarse sediment • Subtidal mixed sediments • Subtidal sand • North Sea glacial tunnel valleys (Inner Silver Pit) • Ocean quahog *Arctica islandica*
Swallow Sand MCZ	0 - overlaps with the Offshore Scoping Boundary (extent of overlap: 255.1 km^2)	• Subtidal coarse sediment • Subtidal sand • North Sea glacial tunnel valley
North East of Farnes Deep MCZ	12.9	• Subtidal coarse sediment • Subtidal sand • Subtidal mixed sediments • Subtidal mud • Ocean quahog *Arctica islandica*
Special Area of Conservation		
Humber Estuary SAC	2.7	• Atlantic salt meadows (1330) • Coastal lagoons (1150) • Dunes with *Hippophae rhamnoides* (2160) • Estuaries (1130) • Mudflats and sandflats not covered by seawater at low tide (1140) • Fixed dunes with herbaceous vegetation (“grey dunes”) (2130) • Salicornia and other annuals colonising mud and sand (1310) • Sandbanks which are slightly covered by sea water all the time (1110) • Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes’) (2120)
The Wash and North Norfolk Coast SAC	3.61	• Sandbanks which are slightly covered by sea water all the time (1110) • Mudflat and sandflats not covered by seawater at low tide (1140) • Large shallow inlets and bays (1160) • Reefs (1170) • Salicornia and other annuals colonizing mud and sand (1310) • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330) • Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (1420) • Coastal lagoons (1150)

Designated site	Distance to Offshore/Intertidal Scoping Boundaries (km)	Relevant protected features
Inner Dowsing, Race Bank and North Ridge SAC	4.07	• Reefs (1170) • Sandbanks which are slightly covered by sea water all the time (1110)
North Norfolk Coast SAC	23.9	• Costal lagoons (1150) • Perennial vegetation of stony banks (1220) • Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (1420) • Embryonic shifting dunes (2110) • Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') (2120) • Fixed dunes with herbaceous vegetation ("grey dunes") (2130) • Humid dune slacks (2190)
Highly Protected Marine Area		
North East of Farnes Deep HPMA	0 - overlaps with the Offshore Scoping Boundary (extent of overlap: 12.9 km^2)	• The marine ecosystem of the area (including all marine flora and fauna)
Scottish waters		
None		

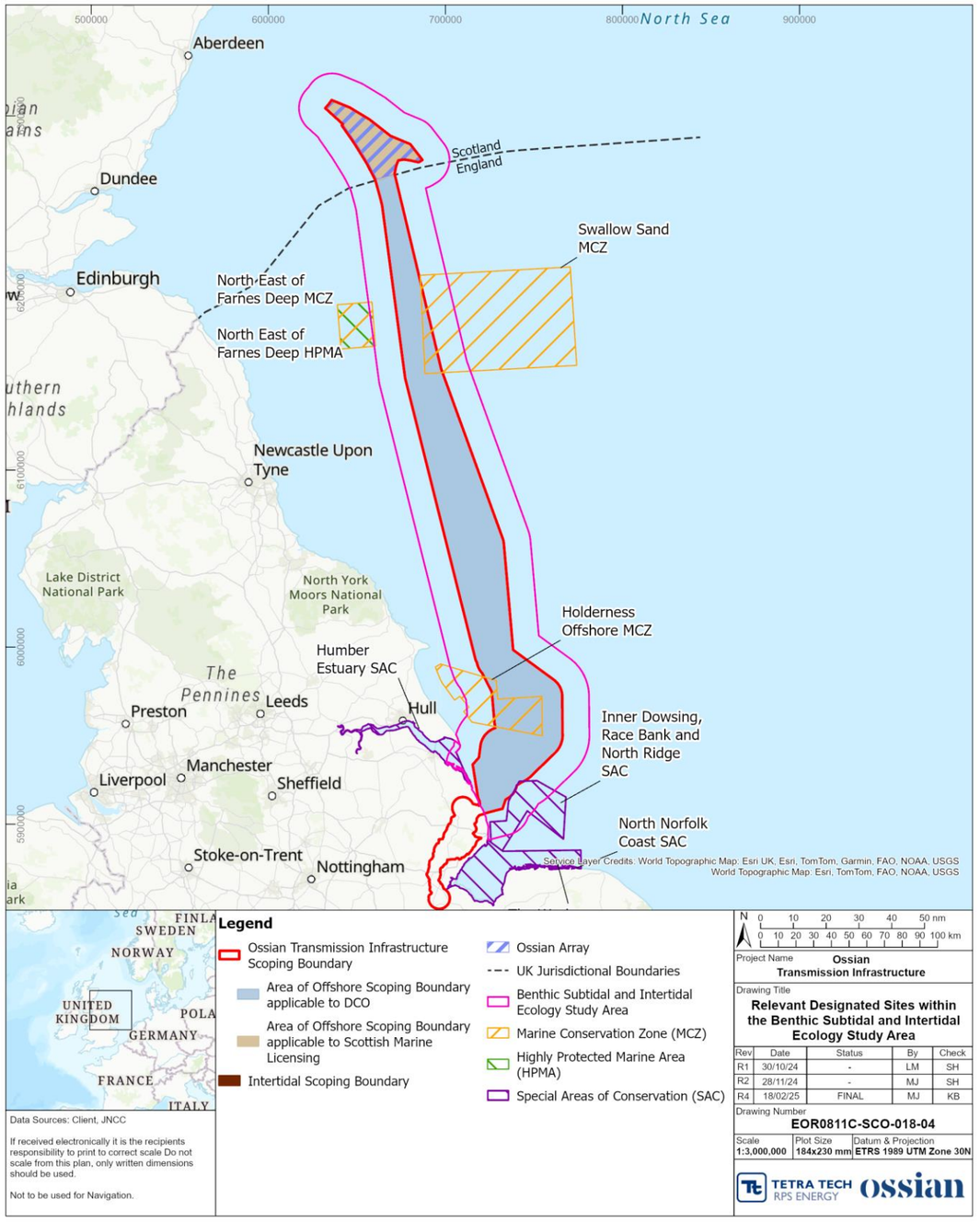

Figure 6.3.3: Relevant Designated Sites within the Benthic Subtidal and Intertidal Ecology Study Area

Future Baseline Conditions

6.3.3.28 The EIA process will consider the existing baseline conditions within the benthic subtidal and intertidal ecology study area; however, it will also evaluate the future baseline conditions as far as reasonably practicable. The baseline environment is not static, therefore, even if the Ossian Transmission Infrastructure does not come forward, the environment will exhibit some degree of natural change. These changes may occur due to naturally occurring cycles and processes and any potential changes resulting from climate change.

6.3.3.29 Variability and changes in naturally occurring processes may bring direct and indirect changes to benthic subtidal and intertidal ecology. For example, changes to the migration of benthic species may occur, which would lead to alterations in benthic community structure (Brierley and Kingsford, 2009). Changes to sediments as result of changes to the ocean currents may lead to changes in the distribution of features of conservation importance such as *S. spinulosa* reefs. The timescale over which change in benthic communities may occur as a result of increasing sea temperatures and hydrodynamic changes is largely unknown.

6.3.3.30 The benthic subtidal and intertidal ecology chapter of the ES will ensure to place any potential impacts on receptors into the context of the envelope of change that may occur over the timescale of the Offshore Transmission Infrastructure.

6.3.4 Proposed Data Sources

6.3.4.1 **Table 6.3.4** presents the data sources proposed for the benthic subtidal and intertidal ecology assessment.

6.3.4.2 Additional data sources (e.g. emerging research, aggregate site monitoring data and EIAs for other offshore development) may be used to characterise the baseline environment for benthic subtidal and intertidal ecology in the technical report of the ES, to ensure a robust characterisation is provided. The benthic subtidal and intertidal ecology baseline assessment will also be informed through the physical processes baseline characterisation and through consultation with relevant bodies (see **part 2, section 6.2**).

Table 6.3.4: Summary of Key Data Sources for Benthic Subtidal and Intertidal Ecology

Title	Year	Author	Citation
General (applicable to both English and Scottish waters)			
Marine Monitoring Handbook, United Kingdom (UK) Marine Special Areas of Conservation Project	2001	JNCC	Davies *et al.* (2001)
Guidelines for the conduct of benthic studies at marine aggregate extraction sites	2011	Cefas	Ware and Kenny (2011)
A big data approach to macrofaunal baseline assessment, monitoring and sustainable exploration of the seabed	2017	Cefas	Cooper and Barry (2017)
EMODNet broad-scale seabed habitat map for Europe (EUSeaMap) This includes Habitat suitability model for *Sabellaria spinulosa* reefs in the UK	2021	EMODnet	EMODnet (2021)
Marine Protected Area Mapper	2020	JNCC	JNCC (2020)
National Biodiversity Network (NBN) Atlas	2021	NBN Atlas	NBN (2021)
Dredge Contaminant Seabed Data in UK Waters 1998 – 2019 (Action Levels Tool)	2024	Cefas	Cefas (2024a)
OneBenthic Portal – Open Science database	2024	Cefas	Cefas (2024b)
Eastern Green Link 3 and Eastern Green Link 4: Environmental Impact Assessment Scoping Report: Volume 1, Part 3, English Offshore Scheme	2024	National Grid	National Grid (2024)
Intertidal substrate foreshore data	2024	Defra	Defra (2024a)
Defra Magic Map	2024	Defra	Defra (2024b)
British Geological Survey (BGS) GeoIndex Offshore portal for marine habitats data	2021	BGS	BGS (2021)
English waters			
Humber Gateway, Environmental Statement: Section 8 – Description of the Biological Baseline Environment	2005	E.ON	E.ON (2005)
Triton Knoll Offshore Windfarm EIA	2016	Triton Knoll Offshore Wind Farm Limited	Triton Knoll Offshore Wind Farm Limited (2016)
Outer Dowsing EIA Report	2024	Outer Dowsing Offshore Wind	Outer Dowsing Offshore Wind (2024)

Title	Year	Author	Citation
Dogger Bank South Offshore Wind Farms ES	2024	RWE Renewables	RWE Renewables (2024)
Hornsea Project Four Offshore Wind Farm EIA	2021	Orsted Hornsea Project Four Limited	Orsted Hornsea Project Four Limited (2024)
The Humber Regional Environmental Charactersiation (REC) Study: A multidisciplinary study of the geology, biology, and archaeology of an 11,000 km^2 area off the east coast of England	2021	The Marine Aggregate Levy Sustainability Fund	Tappin *et al.* (2021)
Scottish waters			
Mapping habitats and biotopes from acoustic datasets to strengthen the information base of Marine Protected Areas in Scottish Waters	2014	JNCC	Sotheran and Crawford-Avis (2014)
Biotope assignment of grab samples from four surveys undertaken in 2011 across Scotland's seas (2012)	2014	JNCC	Pearce *et al.* (2014)
Ossian Array: EIA Report	2024	Ossian OWFL	Ossian OWFL (2024)
The Marine Scotland National Marine Plan Interactive (NMPi) maps	2024	Marine Scotland	Marine Scotland (2024)

6.3.5 Mitigation Measures

6.3.5.1 The following measures adopted as part of the Offshore Transmission Infrastructure are relevant to the assessment for benthic subtidal and intertidal ecology. These measures may evolve (and be further clarified) as the design and EIA processes progress:

- The development of, and adherence to, an appropriate Code of Construction Practice (CoCP) (which applies to the DCO Application).
- The development of, and adherence to, a Construction Method Statement (CMS) (which applies to the Marine Licence).
- The development of, and adherence to a, Cable Plan, informed by the findings of a Cable Burial Risk Assessment (CBRA).
- The development of, and adherence to, an Environmental Management Plan (EMP).
- Development of, and adherence to a Marine Pollution Contingency Plan (MPCP).
- Development of, and adherence to an Invasive Non-Native Species (INNS) Management Plan.
- The development of, and adherence to a Decommissioning Programme.

6.3.5.2 The significance of effects of the Offshore Transmission Infrastructure on benthic subtidal and intertidal ecology may result in the requirement for additional mitigation measures. This will be consulted upon with the statutory consultees throughout the EIA process.

6.3.6 Proposed Scope of the Assessment

6.3.6.1 Potential impacts that are proposed to be scoped into the assessment for benthic subtidal and intertidal ecology are set out in **Table 6.3.5**.

Table 6.3.5: Potential Impacts Proposed to Be Scoped In for Benthic Subtidal and Intertidal Ecology

Impact	Project Phase[2]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Temporary habitat loss/disturbance	✓	×	✓	✓	✓	During construction and decommissioning, there is potential for impacts arising from temporary habitat loss and disturbance of habitats on benthic subtidal and intertidal ecology. During construction, these impacts could arise from site preparation activities (including potential Unexploded Ordinance (UXO) clearance) in advance of cable installation, including anchor placements and pre-cabling seabed clearance. During decommissioning, these impacts could arise from decommissioning activities to remove cables and cable protection.	During construction and decommissioning, there is potential for impacts arising from temporary habitat loss and disturbance of habitats on benthic subtidal and intertidal ecology. During construction, these impacts could arise from site preparation activities (including potential Unexploded Ordinance (UXO) clearance) in advance of cable installation, including anchor placements and pre-cabling seabed clearance. During decommissioning, these impacts could arise from decommissioning activities to remove cables and cable protection.
Increased Suspended Sediment Concentrations (SSCs) and associated deposition	✓	×	✓	✓	✓	During construction and decommissioning, there is potential for impacts arising from increased SSCs and associated sediment deposition on benthic subtidal and intertidal ecology. During construction, these impacts could arise from construction activities, including seabed preparation/clearance (including potential UXO clearance), and cable installation. During decommissioning, these impacts could arise from the removal of cables and cable protection. Any such impacts are expected to be highly localised to the vicinity of the activities and temporary. Changes in SSCs can affect benthic receptors through changes in water clarity and reduced feeding due to increases in suspended solids, smothering and siltation rate changes.	During construction and decommissioning, there is potential for impacts arising from increased SSCs and associated sediment deposition on benthic subtidal and intertidal ecology. During construction, these impacts could arise from construction activities, including seabed preparation/clearance (including potential UXO clearance), and cable installation. During decommissioning, these impacts could arise from the removal of cables and cable protection. Any such impacts are expected to be highly localised to the vicinity of the activities and temporary. Changes in SSCs can affect benthic receptors through changes in water clarity and reduced feeding due to increases in suspended solids, smothering and siltation rate changes.

[2] Construction (C), Operation and Maintenance (O), Decommissioning (D)

Impact	Project Phase[2]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Long term habitat loss	✓	✓	✓	✓	✓	During construction, operation and maintenance and decommissioning, there is potential for impacts arising from long-term habitat loss on benthic subtidal and intertidal ecology. For example, there is potential for long-term habitat loss to occur directly under any cable protection required along the Offshore Export Cable(s). Permanent habitat loss may occur under any infrastructure that is decommissioned and left in-situ at the end of the lifetime of the Offshore Transmission Infrastructure, such as cable protection.	The approach will be to clearly quantitatively present the maximum spatial scale of impacts and will be based on information in the PDE. For long-term habitat loss, the MDS will present the largest areas of habitat potentially affected in the long-term, in the benthic subtidal and intertidal ecology study area. During operation and maintenance, impacts are expected to differ from effects arising during the construction phase. As such, the magnitude of impacts will be determined for these phases separately as part of the assessment in the ES. During decommissioning, impacts are expected to be less than or equal to impacts arising during the construction phase. As such, the magnitude of impacts will be assumed to be less than those described for the construction phase, above.
Disturbance/remobilisation of sediment-bound contaminants	✓	✓	✓	✓	✓	During construction, operation and maintenance and decommissioning, there is potential for impacts arising from the release of sediment-bound contaminants on benthic subtidal and intertidal ecology. Impacts may arise from seabed disturbance, such as from cable installation or seabed clearance (including potential UXO clearance), which has the potential to remobilise sediment-bound contaminants. Any impacts during operation and maintenance are expected to be less than the construction phase, due to these impacts arising from cable maintenance activities only, which will take place intermittently in the operation and maintenance phase. During decommissioning, there is potential for impacts arising from the release of sediment-bound contaminants on benthic subtidal and intertidal ecology. These impacts could arise from the removal of cables and cable protection.	The physical processes assessment will be based upon a literature review of relevant offshore wind farm projects and other relevant projects in the vicinity of the Offshore Export Cable Corridor(s) refined for the ES to provide an overview of the potential impacts to physical processes (as set out in **section 6.2**). This will be used to inform the assessment of effects arising from increased SSCs and associated sediment deposition, which will hence inform the assessment of potential impacts from the release of sediment-bound contaminants. Desktop sources including the Cefas Action Level viewer (Cefas, 2024a) will also be used to help determine the level of sediment contamination within the Offshore Export Cable Corridor(s) refined for the ES (and within the benthic subtidal and intertidal ecology study area, if required). Data from other offshore wind farm surveys will also be used to inform this impact assessment. Targeted site-specific surveys are planned for 2025 to characterise benthic ecology, which will include the collection of sediment samples for contaminant analysis. During operation and maintenance and decommissioning, impacts are expected to be less than or equal to impacts arising during the construction phase. As such, the magnitude of impacts will be assumed to be less than those described for the construction phase, above.

Impact	Project Phase[2]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Colonisation of hard structures	✗	✓	✗	✓	✓	During operation and maintenance, there is potential for impacts arising from colonisation of hard structures on benthic subtidal and intertidal ecology. Seabed infrastructure (e.g. cable protection) provides a surface which has the potential to be colonized by a variety of marine organisms. This can lead to local biodiversity increases, but also can facilitate the spread of INNS (see impact pathway below).	The approach will be to clearly qualitatively present the maximum spatial scale of impacts and will be based on information in the PDE.
Increased risk of introduction and spread of INNS	✓	✓	✓	✓	✓	During construction, operation and maintenance and decommissioning, there is potential for impacts arising from increased risk of introduction and spread of INNS. This is due to vessel movements required during all phases and through the availability of new hard infrastructure in the marine environment (e.g. cable protection) which are expected to be colonised by a range of marine species. This infrastructure can provide a 'stepping stone' for INNS.	No specific modelling is required to inform this impact assessment. The approach will be to clearly qualitatively present the maximum spatial scale of impacts and will be based on information in the PDE.
Changes in physical processes	✗	✓	✗	✓	✓	During operation and maintenance, there is potential for impacts arising from changes in physical processes on benthic subtidal and intertidal ecology. For example, the presence of cable protection may introduce localised changes to tidal flow or the wave climate, which may affect sediment transport pathways, with knock-on impacts on benthic subtidal and intertidal ecology.	The physical processes assessment will be based upon a literature review of relevant offshore wind farm projects and other relevant projects in the vicinity of the Offshore Export Cable Corridor(s) refined for the ES to provide an overview of the potential impacts to physical processes (as set out in **section 6.2**). This will be used to inform the assessment of effects arising from changes in physical processes.

Impact	Project Phase[2]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Electromagnetic Fields (EMF) from subsea electrical cabling	×	✓	×	✓	✓	During operation and maintenance, there is potential for impacts arising from EMF from subsea electrical cabling on benthic subtidal and intertidal ecology. Subsea electrical cables (e.g. high voltage alternating current Offshore Export Cable(s)) emit EMFs along their lengths, which has the potential to alter background EMFs. This has the potential to affect benthic subtidal and intertidal ecology by changing the behaviours and physiology of relevant benthic ecology receptors.	The approach will be to clearly qualitatively present the maximum spatial scale of impacts and will be based on information in the PDE and scientific literature on EMFs in the marine environment, including associated effects on benthic subtidal and intertidal ecology.
Removal of colonised hard structures	×	×	✓	✓	✓	As described for construction and operation and maintenance, infrastructure in the marine environment has the potential to be colonised by a variety of marine organisms. Any removal of artificial hard substrates during decommissioning has the potential to result in adverse impacts on benthic subtidal and intertidal ecology receptors. Potential impacts on benthic ecology include the loss of species and habitats colonizing these artificial structures.	During decommissioning, impacts associated with colonisation of hard structures are expected to be less than or equal to effects arising during the construction phase. As such, the magnitude of impacts will be assumed to be less than or equal to the construction phase, described above. Consideration will also be given in the assessment to the associated impact of removal of these structures. This assessment will be based on information in the PDE and decommissioning plans.

6.3.7 Impacts Proposed to be Scoped Out

6.3.7.1 Impacts that are proposed to be scoped out of the assessment for benthic subtidal and intertidal ecology and the justification are set out in **Table 6.3.6**.

Table 6.3.6: Impacts Proposed to Be Scoped out of the Assessment for Benthic Subtidal and Intertidal Ecology

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
All Phases			
Thermal emissions from operational cables	✓	✓	Thermal emissions from operational cables have the potential to affect benthic receptors. However, there is limited evidence to suggest that these cables significantly affect the temperature of the sea and the surrounding marine environment. For buried cables, temperature changes at the seabed surface are low, due to the increased distance of the cable to the seabed surface and increased dissipation of heat (Meißner *et al*., 2007). The anticipated target burial depth for the Offshore Export Cable(s) is between 1 m and 3 m (subject to CBRA confirmation). A study conducted at Nysted Offshore Wind Farm in Denmark (Meißner *et al*., 2007) found the temperature change in the top 30 cm of sediment above a high voltage cable (132 kV) to be a maximum of 2°C. Given the target burial depth, any temperature changes at the seabed surface are likely to be minimal and unlikely to affect benthic receptors. Cable burial will be used wherever practicable; external cable protection will be used where minimum burial depths cannot be achieved. Ossian will seek to minimise the extent and quantity of any external cable protection laid. Due to any resulting effects from thermal emissions from operational cables being highly localised and cables being buried or protected, no likely significant effects on benthic receptors are anticipated.
Accidental release of pollutants	✓	✓	During all phases, there is potential for the accidental release of pollutants; for example, by vessels and other equipment. However, this risk will be reduced with the implementation of measures adopted as part of the project, including an EMP and MPCP (see **paragraph 6.3.5.1**). These plans will consider the potential for accidental spills, any additional potential contaminant releases and will present mitigation plans in case of an accidental release of pollutants. As such, the resulting likelihood of a release of pollutants occurring will be very low and any effects from the release of pollutants will be reduced.
Construction			
Colonisation of hard structures	✓	✓	During the construction phase, minimal impacts associated with colonisation of hard structures are expected. Some colonisations from benthic species may occur during the construction period, but the scale of this will be minimal and expected to be much less than described for the operation and maintenance phase.
Operation and Maintenance			
Temporary habitat loss and disturbance of habitats	✓	✓	During the operation and maintenance phase, minimal impacts associated with temporary habitat loss and disturbance of habitats are expected. Effects may arise from minor repairs or cable reburial events only; therefore, the areas of disturbance are expected to be much smaller than for the construction and decommissioning phases.
Increased SSCs and associated sediment deposition	✓	✓	During the operation and maintenance phase, minimal impacts associated with increased SSCs and associated sediment deposition are expected. Impacts may arise from minor repairs or cable reburial events only; therefore, any increases in SSCs are expected to be much smaller than for the construction and decommissioning phases.

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
Construction and Decommissioning			
EMFs from subsea electrical cabling	✓	✓	During construction and decommissioning phases, no likely significant effects associated with EMFs from subsea electrical cabling are expected, since no EMFs are expected to occur during these phases when the cables are not in operation.

6.3.8 Proposed Assessment Methodology

6.3.8.1 The assessment methodology proposed to be used for the impacts proposed to be scoped in for benthic subtidal and intertidal ecology as set out in **Table 6.3.5** is described below.

Legislation and Policy

6.3.8.2 An overview of relevant legislation and policy is provided in **part 1, section 2** of this EIA Scoping Report. Further details of the topic specific legislation and policy will be provided within the benthic subtidal and intertidal ecology ES chapter.

Relevant Guidance

6.3.8.3 The following guidance documents relevant to the benthic subtidal and intertidal ecology assessment will be considered in the ES:

- **General (applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to made to MD-LOT):**
  - Refining the criteria for defining areas with a 'low resemblance' to Annex I stony reef (Golding, 2020);
  - Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2019);
  - Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects (Judd, 2012);
  - Best methods for identifying and evaluating *Sabellaria spinulosa* and cobble reef (Limpenny *et al.,* 2010);
  - Identification of the Main Characteristics of Stony Reef Habitats under the Habitats Directive (Irving, 2009);
  - Guidance on Environmental Considerations for Offshore Wind Farm Development (OSPAR, 2008); and
  - Defining and Managing Sabellaria spinulosa Reefs (Gubbay, 2007).
- **Scottish waters (applicable to the application for a Marine Licence to be made to MD-LOT):**
  - Scottish National Heritage (now NatureScot) guidance: Guidance on Survey and Monitoring in Relation to Marine Renewables Deployments in Scotland – Volume 5: Benthic Habitats (Saunders *et al.,* 2011); and
  - Consenting, EIA, and Habitat Regulations Assessment Guidance for Marine Renewable Energy Developments in Scotland (European Marine Energy Centre and Xodus, 2010).

Assessment of Effects

6.3.8.4 The benthic subtidal and intertidal ecology assessment will follow the methodology set out in **part 1, section 5** of this EIA Scoping Report.

6.3.8.5 Specific to benthic subtidal and intertidal ecology, Important Ecological Features (IEFs) will be identified using the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines (CIEEM, 2019; see Relevant Guidance below) and presented in the benthic subtidal and intertidal ecology technical report of the ES. This will include consideration of Priority Marine Features which have been identified within the benthic subtidal and intertidal ecology study area. For the purposes of assessment, a combination of the Marine Evidence Based Sensitivity Assessment (MarESA) and Feature Activity Sensitivity Tool (FeAST) will be used to determine the sensitivity of receptors to each relevant impact.

6.3.8.6 A detailed baseline characterisation for the Offshore Transmission Infrastructure will be presented in the benthic subtidal and intertidal ecology technical report of the ES, which will expand on the high-level baseline characterisation presented in this Scoping Report. The benthic subtidal and intertidal ecology technical report of the ES will use site-specific survey data (see **paragraph 6.3.2.4**) and the most recent available desktop sources. This report will inform the benthic subtidal and intertidal ecology chapter of the ES.

Cumulative Effects and Inter-related Effects

6.3.8.7 The Cumulative Effects Assessment (CEA) for benthic subtidal and intertidal ecology will follow the general methodology set out in **part 1, section 5**. The benthic subtidal and intertidal ecology chapter of the ES will also consider inter-related effects arising from the Offshore Transmission Infrastructure, including potential project lifetime and receptor-led effects. This assessment will be undertaken in accordance with the standard industry guidance and approach, as outlined in **part 1, section 5** of the EIA Scoping Report.

Transboundary Impacts

6.3.8.8 The approach to transboundary impacts is set out in **part 1, section 5.10** of this EIA Scoping Report. **Part 5, appendix 5.1** in this EIA Scoping Report presents the transboundary impacts screening which has been carried out for the Offshore Transmission Infrastructure. All predicted impacts on benthic subtidal and intertidal ecology are likely to be limited in extent to the benthic subtidal and intertidal ecology study area. Therefore, it is considered that any potential impacts

associated with the Offshore Transmission Infrastructure will not affect benthic ecology receptors in any European Economic Area (EEA) state. As a result of this screening exercise, it is proposed that transboundary impacts and effects on benthic subtidal and intertidal ecology are screened out from the EIA process.

Relevant Consultations

6.3.8.9 The Applicant has undertaken introductory consultation with selected consultees, including Natural England, Marine Management Organisation (MMO) and Joint Nature Conservation Committee. Topic specific consultation will be undertaken throughout the PEIR and ES phases via the Evidence Plan Process Steering Group and Expert Topic Group to inform the benthic subtidal and intertidal ecology chapter in the ES. The following stakeholders relevant to benthic subtidal and intertidal ecology will be consulted via Expert Topic Group meetings:

- **English waters (applicable to the application for a DCO to be made to the Planning Inspectorate):**
  - Natural England;
  - MMO (and the Centre for Environment, Fisheries and Aquaculture Science (Cefas));
  - Environment Agency;
  - Lincolnshire Wildlife Trusts; and
  - Inshore Fisheries and Conservation Authorities (ICFAs) (e.g. Northumberland/North Eastern IFCAs).
- **Scottish waters (applicable to the application for a Marine Licence to be made to MD-LOT):**
  - NatureScot.

6.3.9 Next Steps

6.3.9.1 The next steps for the benthic subtidal and intertidal ecology topic are:

- to agree with stakeholders upon the approach for the assessment of benthic subtidal and intertidal ecology (including presenting sensitivities of receptors, appropriate monitoring and mitigation);
- to agree with stakeholders upon the potential impacts for assessment in the benthic subtidal and intertidal ecology chapter of the ES; and
- to discuss the qualitative assessments with key stakeholders for impacts which cannot be assessed quantitatively.

6.4. Fish and Shellfish Ecology

6.4.1 Introduction

6.4.1.1 This section of the EIA Scoping Report identifies the proposed scope of the assessment of impacts for fish and shellfish ecology from construction, operation and maintenance and decommissioning of the Offshore Transmission Infrastructure. This includes the key data sources to characterise the baseline environment in the vicinity of the Offshore Transmission Infrastructure within Scottish and English waters and the impacts proposed to be scoped in and out of the assessment for fish and shellfish ecology in the ES.

6.4.1.2 The scope of the baseline characterisation and assessment for fish and shellfish ecology covers all fish species and shellfish species with the potential to be impacted by the Offshore Transmission Infrastructure, including marine fish, diadromous fish and commercial shellfish species. Shellfish species, including ocean quahog *Arctica islandica* and horse mussel *Modiolus modiolus* will instead be considered in the benthic subtidal and intertidal ecology section of this EIA Scoping Report (see **part 2, section 6.3**), due to their lack of commercial value.

6.4.2 Proposed Study Area for the Assessment

6.4.2.1 A broad fish and shellfish ecology study area has been defined for the purposes of characterising the baseline for fish and shellfish ecology and is large enough to consider all direct and indirect impacts relevant to fish and shellfish ecology. The fish and shellfish ecology study area is defined as follows and is shown in **Figure 6.4.1**. Further details of the location and extent of the Intertidal Scoping Boundary can be found in **Figure 3.5.1** of **part 1, section 3**.

6.4.2.2 The fish and shellfish ecology study area encompasses the Offshore Scoping Boundary and Intertidal Scoping Boundary plus a 100 km buffer, which encompasses the wider North Sea habitats and provides a wider context for fish and shellfish species and populations, which are spatially and temporally variable. This broad area is considered appropriate as it is large enough to encompass all fish and shellfish species and their associated habitats which may be directly or indirectly impacted by the Offshore Transmission Infrastructure (e.g. from habitat loss/disturbance). The approach to defining this fish and shellfish ecology study area is based on common best practice from other EIA for similar export cable projects (EnBW, 2022; EnBW, 2024).

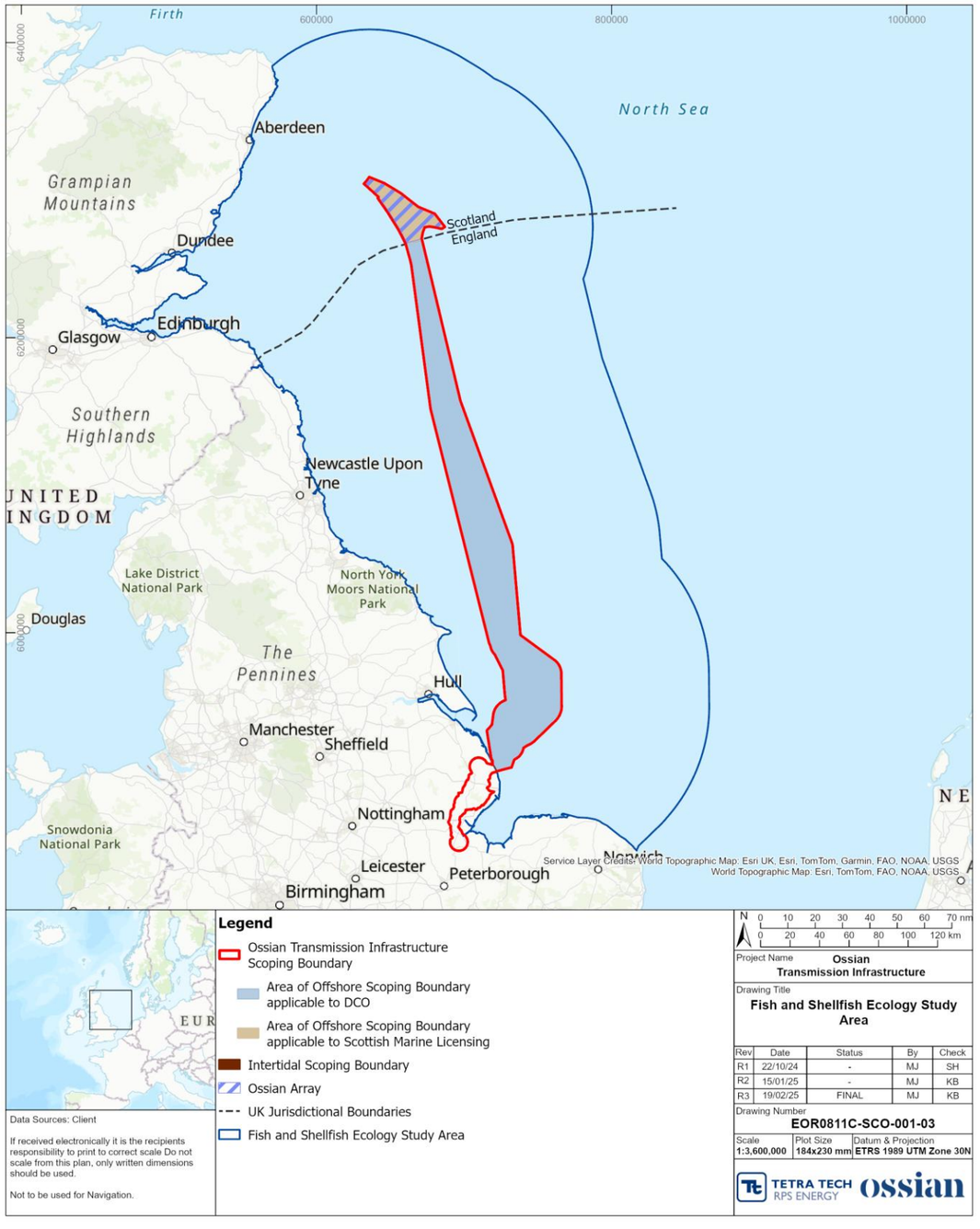

Figure 6.4.1: Fish and Shellfish Ecology Study Area

Site-Specific Data

6.4.2.3 No site-specific surveys have been undertaken to date to provide characterisation of habitats and species assemblages in the fish and shellfish ecology study area. Site-specific surveys for benthic ecology (including an intertidal and subtidal survey) are planned for 2025, which will inform the baseline characterisation for the fish and shellfish technical report of the ES and the determination of impacts for the fish and shellfish ecology chapter of the ES, to ensure a robust assessment is undertaken. Site-specific surveys for the Array Site Boundary (which overlaps with the majority of the Offshore Scoping Boundary in Scottish waters) conducted in July 2022 have also been used to inform baseline characterisation (Ossian OWFL, 2022).

6.4.2.4 The planned site-specific benthic surveys for the Offshore Transmission Infrastructure include grab sampling and seabed imagery sampling, as well as intertidal surveys. The benthic subtidal survey will take place across the Offshore Scoping Boundary (in Scottish and English waters), and the intertidal survey will take place across the Intertidal Scoping Boundary. Although these surveys are for the purposes of baseline characterisation for benthic subtidal and intertidal ecology, this will provide important information on seabed types and substrate suitability for spawning of fish (including sandeel and herring) and habitat for fish and shellfish species. Therefore, site-specific data will be used to enhance the data collected during the desk-based review for fish and shellfish ecology.

6.4.3 Baseline Environment

6.4.3.1 An outline of the baseline environment for fish and shellfish ecology, based upon an initial review of key data sources, is provided below. This baseline environment section is split into the following subsections to allow the reader to distinguish between information relevant to specific jurisdictions:

- **General** – this subsection summarises baseline environment information across the entire fish and shellfish ecology study area (i.e. both English and Scottish waters) and is therefore applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to be made to MD-LOT.
- **English Waters** – this subsection summarises baseline environment information which is specific to the portion of the fish and shellfish ecology study area located within English waters and is therefore applicable to the application for a DCO to be made to the Planning Inspectorate.
- **Scottish Waters** – this subsection summarises baseline environment information which specific to the portion of the fish and shellfish ecology study area located within Scottish waters and is therefore applicable to the application for a Marine Licence to be made to MD-LOT.

6.4.3.2 Extensive contemporary and historic information is available regarding fish and shellfish ecology in the North Sea. The baseline characterisation of the fish and shellfish ecology study area has been based on these sources, which include scientific literature, along with EIA Scoping Reports and Environmental Statements from other offshore wind farms in the fish and shellfish ecology study area. It is recognised that these sources do not provide a definitive list of species present.

General

Fish Assemblage

6.4.3.3 Data sources show that the fish assemblage of the fish and shellfish ecology study area includes demersal, pelagic, diadromous and elasmobranch fish species, including both commercial and non-commercial species. This baseline assessment reflects both Scottish and English waters, as there is no difference between the high-level baseline presented in this EIA Scoping Report between Scottish and English waters. The demersal species identified include sandeel Ammodytidae spp., Atlantic cod *Gadus morhua* (hereafter referred to as cod), haddock *Melanogrammus aeglefinus*, whiting *Merlangius merlangus*, lemon sole *Microstomus kitt*, ling *Molva molva*, saithe *Pollachius virens* and plaice *Pleuronectes platessa*. Pelagic species identified include herring *Clupea harengus*, sprat *Sprattus sprattus*, and mackerel *Scomber scombrus*. Elasmobranch species identified include spotted ray *Raja montagui,* thornback ray *Raja clavata,* tope shark *Galeorhinus galeus,* small-spotted catshark *Scyliorhinus canicula,* spurdog *Squalus acanthias,* thorny skate *Amblyraja radiata* and cuckoo ray *Leucoraja naevus* (Coull, *et al.,* 1998, Daan *et al.,* 2005, Baxter *et al.,* 2011, Ellis *et al.,* 2012).

6.4.3.4 Fishing data from International Council for the Exploration of the Sea (ICES) rectangles has been used to indicate the commercial fish species present in the fish and shellfish ecology study area. It is noted that commercial landings data is skewed towards species targeted by fishing vessels, so does not provide a general characterisation of all fish species present; however, this data remains useful to identify the presence of fish of commercial value within the fish and shellfish ecology study area. The Offshore and Intertidal Scoping Boundaries crosses 12 ICES rectangles: 35F0, 36F0, 36F1, 37F0, 38F0, 38E9, 39F0, 39E9, 40E9, 40F0, 41E9 and 42E9 (**Figure 6.4.2**). The top four pelagic species caught in 2022 within these rectangles by weight in tonnes were herring, mackerel, horse mackerel *Trachurus trachurus* and allis shad *Alosa alosa*. These species were also the top four pelagic species caught in 2022 by catch value (£s). The top six demersal species caught in 2022 within these rectangles by weight in tonnes were whiting, haddock, monks and anglers *Lophius* spp. and common dab *Limanda limanda*. By value, the most caught demersal species were whiting, monks and anglers, halibut *Hippoglossus hippoglossus* and haddock (Marine Management Organisation (MMO), 2023). The top three demersal species caught in 2023 in UK waters by weight in tonnes were haddock, monks and anglers and cod (MMO, 2024). Further information on commercial fish species in included in the commercial fisheries section of the EIA Scoping Report (see **part 2, section 6.7**).

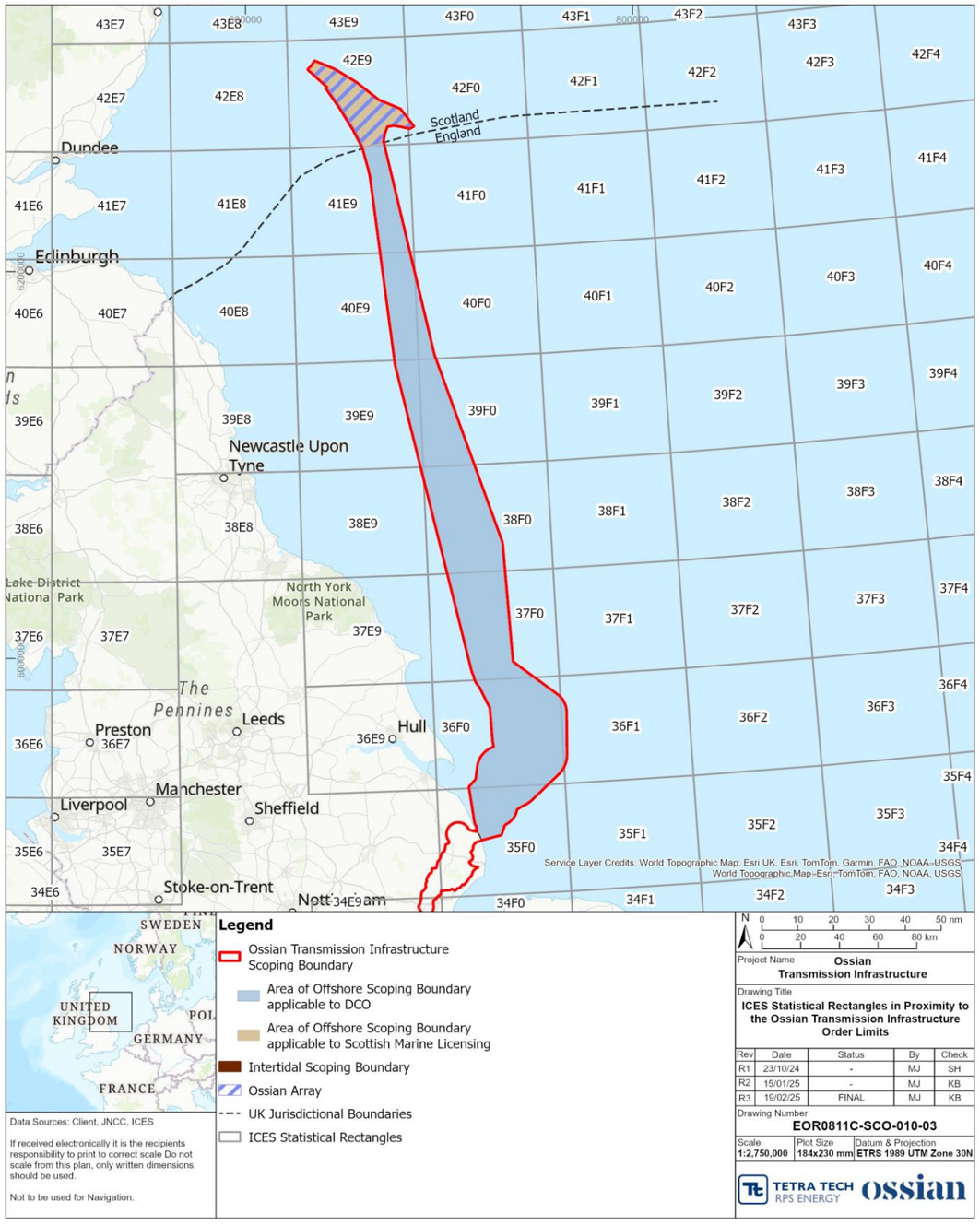

Figure 6.4.2: ICES Statistical Rectangles in Proximity to the Offshore and Intertidal Scoping Boundaries

Diadromous Fish Species

6.4.3.5 Diadromous fish are those which migrate between freshwater and the marine environment for breeding. There is potential that these species may migrate through the Offshore and Intertidal Scoping Boundaries during certain periods of the year.

6.4.3.6 Based on information on diadromous fish populations on the east coast of Scotland and England presented in the Eastern Green Link 3 and 4 (EGL3 and EGL4 which overlaps with the Offshore Scoping Boundary in English waters) EIA Scoping Report, the following diadromous and catadromous fish are potentially present in the fish and shellfish ecology study area: twaite shad *Alosa fallax*, allis shad, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, Atlantic salmon *Salmo salar*, European eel *Anguilla anguilla* and European smelt *Osmerus eperlanus* (National Grid, 2024).

6.4.3.7 The Ossian Array EIA Report identified the same seven diadromous and catadromous species as being present on the east coast of Scotland, with the addition of sea trout *Salmo trutta* (Ossian OWFL, 2024). As such, there is a total of eight diadromous and catadromous species considered as potentially present in the vicinity of the Offshore and Intertidal Scoping Boundaries.

6.4.3.8 No site-specific surveys are proposed to inform the assessment for diadromous and catadromous fish as a precautionary approach will be taken, where it is assumed that the species outlined in **paragraphs 6.4.3.6** and **6.4.3.7** are likely to be present in the fish and shellfish ecology study area during migration at key stages of their life cycles. This is the standard approach taken for other offshore wind projects including projects nearby which have recently been consented which have the potential for a larger impact on diadromous fish than the Offshore Transmission Infrastructure (e.g. Hornsea projects, which also make landfall near to the Humber Estuary; Ørsted, 2021). The aim of the impact assessment is to determine whether construction, operation and maintenance, or decommissioning activities associated with the Offshore Transmission Infrastructure have the potential to disrupt species migration. Therefore, migratory seasons will be an important element of the baseline characterisation and will be informed by key desktop data sources (Maitland and Hatton-Ellis, 2003; Malcolm *et al.,* 2010, 2015; Godfrey *et al.,* 2015; Hume, 2017; Lothian *et al.,* 2017; Newton *et al.,* 2017; Gardiner *et al*., 2018; Seagreen, 2018). An overview of the timings of migration for these diadromous fish is presented **Table 6.4.1.**

Table 6.4.1: Timings and Durations of Migrations for Diadromous Fish Species Relevant to the Offshore Transmission Infrastructure

Species	Timing of Downstream Migration	Timing Spent at Sea Before First Return	Timing of Upstream Migration	Source
Allis shad *Alosa alosa* and twaite shad *Alosa fallax*	Autumn (juveniles)	2 years spent in estuaries and marine areas. Do not return to fresh water until they are sexually mature.	April to June (to spawn in freshwater)	Maitland and Hatton-Ellis, 2003, ABPMer, 2019
Atlantic salmon *Salmo salar*	April to June	1 to 4 years	All year, with a peak in late summer/early autumn	Malcolm *et al*., 2010, 2015, ABPMer, 2019
European eel *Anguilla anguilla*	June to November	May not return to freshwater, many do not	Varies spatially, typically arrives in coastal waters of eastern Scotland in December and may migrate upstream until June	Malcolm *et al*., 2010
River lamprey *Lampetra fluviatilis*	From late autumn onwards (to feed in estuaries)	Spends 1 to 2 years in estuaries	Winter and spring, when temperatures are <10^{o}	NatureScot, 2022a, ABPMer, 2019
Sea lamprey *Petromyzon marinus*	From late autumn onwards (to open sea) (timing varies between rivers)	18 to 24 months	April to May (to spawn in May to June)	NatureScot, 2022a, ABPMer, 2019
Sea trout *S. trutta*	Spring	2 or more	April to June	Malcolm *et al*., 2010
Sparling *Osmerus eperlanus*	N/A (migration to estuaries only)	Spends time in estuaries	February to April (to spawn in estuaries and large rivers)	NatureScot, 2022b

6.4.3.9 Some designated sites in the region are of relevance to the assessment of diadromous and catadromous fish. Designated sites and associated qualifying features are presented in **paragraph 6.3.3.24** *et seq.* It is important to note that since freshwater pearl mussel *Pinctada margaritifera* (previously *Margaritifera margaritifera*) rely on the Atlantic salmon and sea trout smelting populations during their parasitic larval stage (Taeubert and Geist, 2017), this species may be indirectly affected if Atlantic salmon is affected. Therefore, protected sites designated for freshwater pearl mussel will also be included the assessment in the ES, despite these species not being present in the offshore environment.

Shellfish Assemblage

6.4.3.10 Commercial landings data from ICES rectangles in the area provide an overview of species likely to be present in the fish and shellfish ecology study area. The Offshore and Intertidal Scoping Boundaries cross twelve main ICES rectangles (see **paragraph 6.4.3.4**; **Figure 6.4.2**). The top five shellfish caught in 2022 within these rectangles by weight in tonnes were crabs, lobsters, scallops, Norway lobster *Nephrops norvegicus* (hereafter referred to as Nephrops) and whelks Buccinidae spp. Nephrops, crabs and scallops were also the top five shellfish caught in 2023 by catch value (MMO, 2024; **see part 2, section 6.7**).

6.4.3.11 Within the fish and shellfish ecology study area, there are consistently high landings of common lobster *Homarus gammarus*, edible crab *Cancer pagurus*, Nephrops, king scallop *Pecten maximus*, and common whelk *Buccinum undatum* (MMO, 2024; National Grid, 2024). According to desktop sources of information, the Offshore Scoping Boundary may cross areas with high densities of zoeae (free swimming crustacean), and areas of commercial importance for Nephrops (Eaton *et al.,* 2003; FishSource, 2023). Further information on commercial fish species in included in the commercial fisheries section of this EIA Scoping Report (see **part 2, section 6.7**).

6.4.3.12 Other species identified as present on the east coast of England by the EGL3 and EGL4 (overlapping with the Offshore Scoping Boundary in English waters) EIA Scoping Report include European common squid *Alloteuthis subulata*, brown shrimp *Crangon crangon*, and common cockle *Cerastoderma edule*.

6.4.3.13 The EIA Scoping Report for the Array Site Boundary also identified the following species to be commonly occurring in the fish and shellfish ecology study area: velvet swimming crab *Necora puber*, razor clam *Solen* spp., surf clam *Spisula* spp., clams *Mya arenaria*, squid *Loligo* spp. and octopi of the family Ommastrephidae (Mesquita *et al.,* 2016, 2017; Marine Scotland, 2021; Ossian OWFL, 2022). Occasionally occurring species were found to be green crab *Carcinus maenas*, common prawn *Palaemon serratus* and queen scallop *Aequipecten opercularis* (Marine Scotland, 2021; Ossian OWFL, 2022).

6.4.3.14 No site-specific surveys have been undertaken to characterise the shellfish assemblage for the Offshore Scoping Boundary. However, benthic surveys undertaken for the Array Site Boundary and for the EGL3 and EGL4 projects have been used to provide an indication of shellfish species which may be present in the fish and shellfish ecology study area.

6.4.3.15 During the site-specific benthic surveys for the Array Site Boundary, queen scallop and horse mussels were identified, noting that no horse mussel beds were observed (Ossian OWFL, 2022). No shellfish-targeted surveys were undertaken for the EGL3 and EGL4 projects; however, benthic surveys characterized the benthos and determined that the broadscale habitat in the fish and shellfish ecology study area had the potential to host shellfish species. The species which may be present based on broadscale habitat types included horse mussel as well as a number of mobile crustaceans (e.g. amphipods including *Ampelisca spinipes;* these species are considered in the benthic subtidal and intertidal ecology section of this EIA Scoping Report (see **part 2, section 6.3**). Areas suitable for horse mussel beds were also noted.

6.4.3.16 There are several non-commercial shellfish species with potential to occur in the fish and shellfish ecology study area. As noted in **paragraph 6.4.1.1**, these species will be considered within the benthic subtidal and intertidal ecology section of this EIA Scoping Report (see **part 2, section 6.3**).

Spawning and/or Nursery Grounds

6.4.3.17 Coull *et al.* (1998) identified potential nursery and spawning grounds for a range of species in the North Sea, based on larvae, egg and benthic habitat survey data. Spatial distribution of high intensity nursery and spawning grounds is also provided in Ellis *et al.* (2012), which provides updated data for several fish and shellfish species in the fish and shellfish ecology study area. It is noted that these sources do not give the exact definition of the boundaries of spawning and nursery grounds.

6.4.3.18 Other sources of information which will be considered in the baseline characterisation of spawning and nursery grounds for the ES include:

- spawning grounds of haddock in the North Sea and West of Scotland (González-Irusta and Wright, 2016a);
- spawning grounds of Atlantic cod in the North Sea (González-Irusta and Wright, 2016b);
- spawning grounds of whiting (González-Irusta and Wright, 2017);
- updating Fisheries Sensitivity Maps in British Waters (Aires *et al.,* 2014); and
- developing Essential Fish Habitat maps for fish and shellfish species in Scotland (Franco *et al.,* 2023).

6.4.3.19 **Table 6.4.2** presents a summary of the species with known spawning or nursery grounds which have been identified in the fish and shellfish ecology study area. **Figure 6.4.3** to **Figure 6.4.7** show the spawning and nursery grounds for relevant fish and shellfish species within the vicinity of the Offshore and Intertidal Scoping Boundaries.

Table 6.4.2: Key Species with Spawning and Nursery Grounds Which Overlap with the Offshore and Intertidal Scoping Boundaries. Spawning and Nursery Intensity Specified where Available. Taken from Coull *et al.* (1998) and Ellis *et al.* (2012)

Species	Spawning grounds	Nursery grounds	Spawning intensity	Nursery intensity
Teleost Fish				
Anglerfish *Lophius piscatorius*	N	Y	N/A	Low intensity
Whiting *Merlangius merlangus*	N	Y	N/A	Low intensity and high intensity
Cod *Gadus morhua*	Y	Y	Low intensity	Low intensity and high intensity
European hake *Merluccius merluccius*	N	Y	N/A	Low intensity
Haddock *Melanogrammus aeglefinus*	N	Y	N/A	Not specified
Herring *Clupea harengus*	Y	Y	Undetermined intensity	Low intensity and high intensity
Ling *Molva molva*	N	Y	N/A	Low intensity
Lemon sole *Microstomus kitt*	Y	Y	Undetermined intensity	Intensity not specified
Mackerel *Scomber scombrus*	Y	Y	Low intensity	Low intensity
Plaice *Pleuronectes platessa*	Y	Y	Low intensity and high intensity	Low intensity
Norway pout *Trisopterus esmarkii*	Y	Y	Low Intensity	Intensity not specified
Sandeel Ammodytidae	N	Y	N/A	Low intensity
Sprat *Sprattus sprattus*	Y	Y	Undetermined intensity	Intensity not specified

Species	Spawning grounds	Nursery grounds	Spawning intensity	Nursery intensity
Elasmobranchs				
Spurdog *Squalus acanthias*	N	Y	N/A	Low intensity
Shellfish				
Norway lobster *Nephrops norvegicus*	N	Y	N/A	Low intensity/Intensity not specified

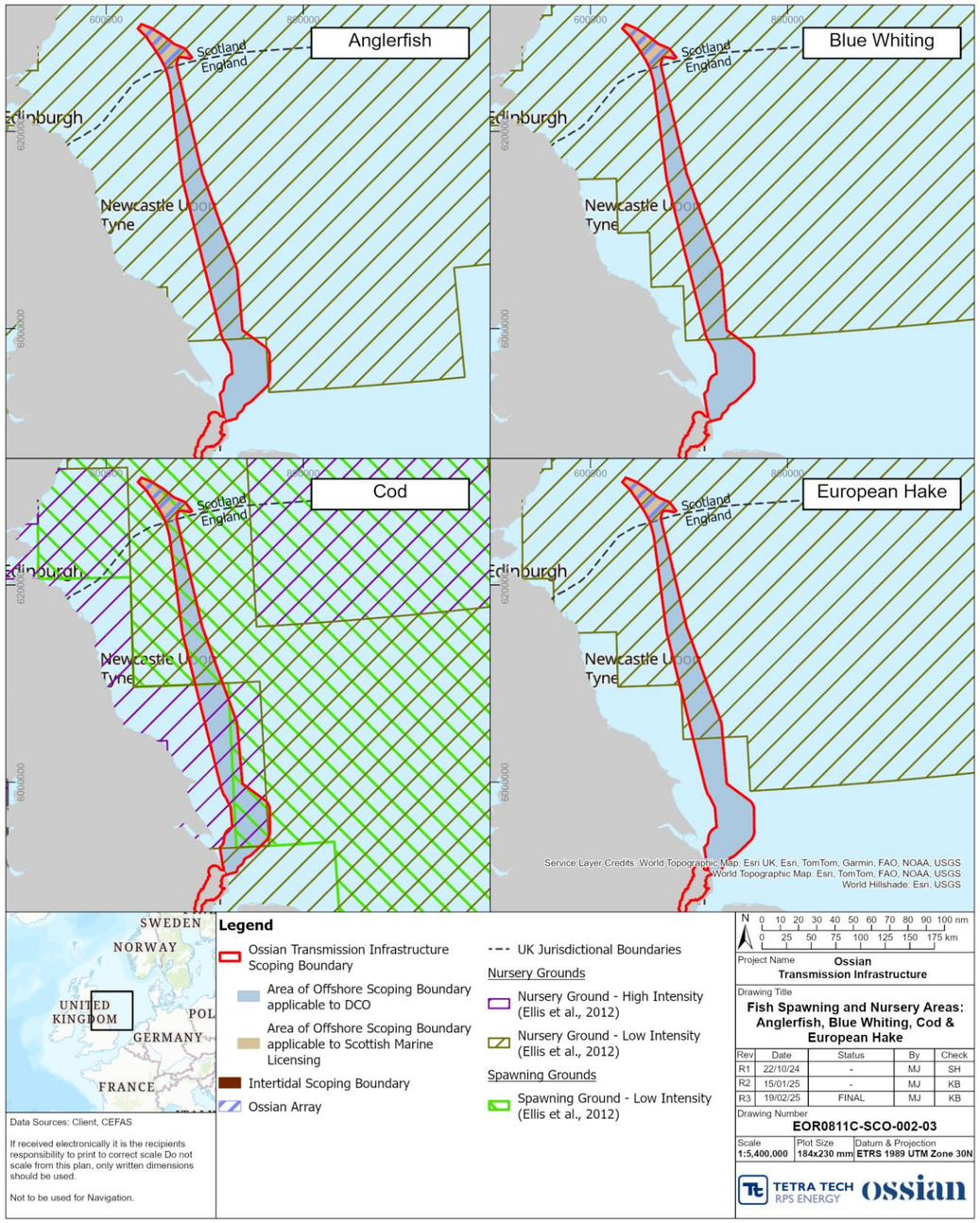

Figure 6.4.3: Spawning and Nursery Areas Overlapping with the Offshore and Intertidal Scoping Boundaries for Anglerfish, Blue Whiting, Cod and European Hake (Source: Coull *et al.*, 1998 and Ellis *et al.*, 2012)

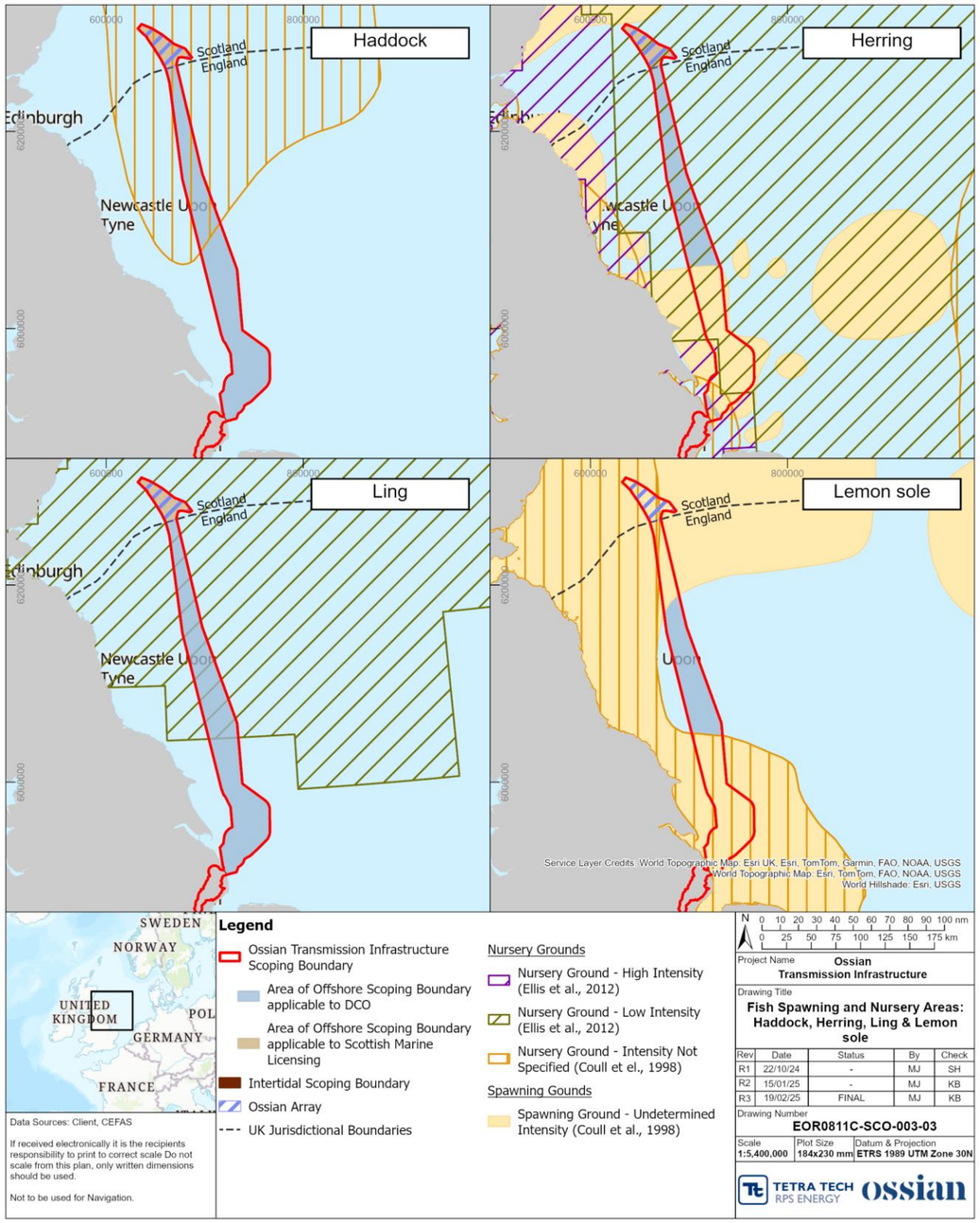

Figure 6.4.4: Spawning and Nursery Areas Overlapping with the Offshore and Intertidal Scoping Boundaries for Haddock, Herring, Ling and Lemon Sole (Source: Coull *et al*., 1998 and Ellis *et al*., 2012)

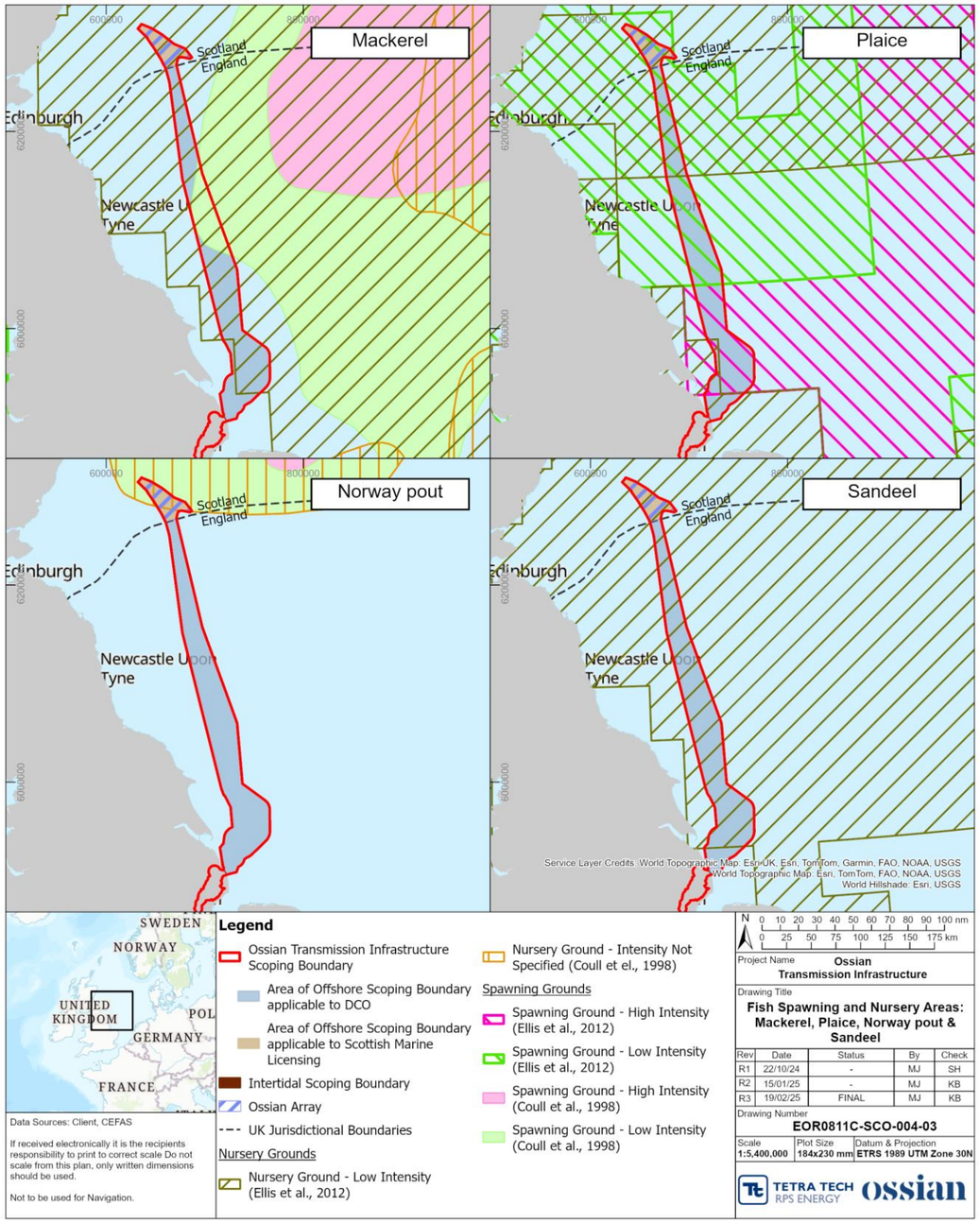

Figure 6.4.5: Spawning and Nursery Areas Overlapping with the Offshore and Intertidal Scoping Boundaries for Mackerel, Plaice, Norway Pout and Sandeel (Source: Coull *et al.,* 1998 and Ellis *et al.,* 2012)

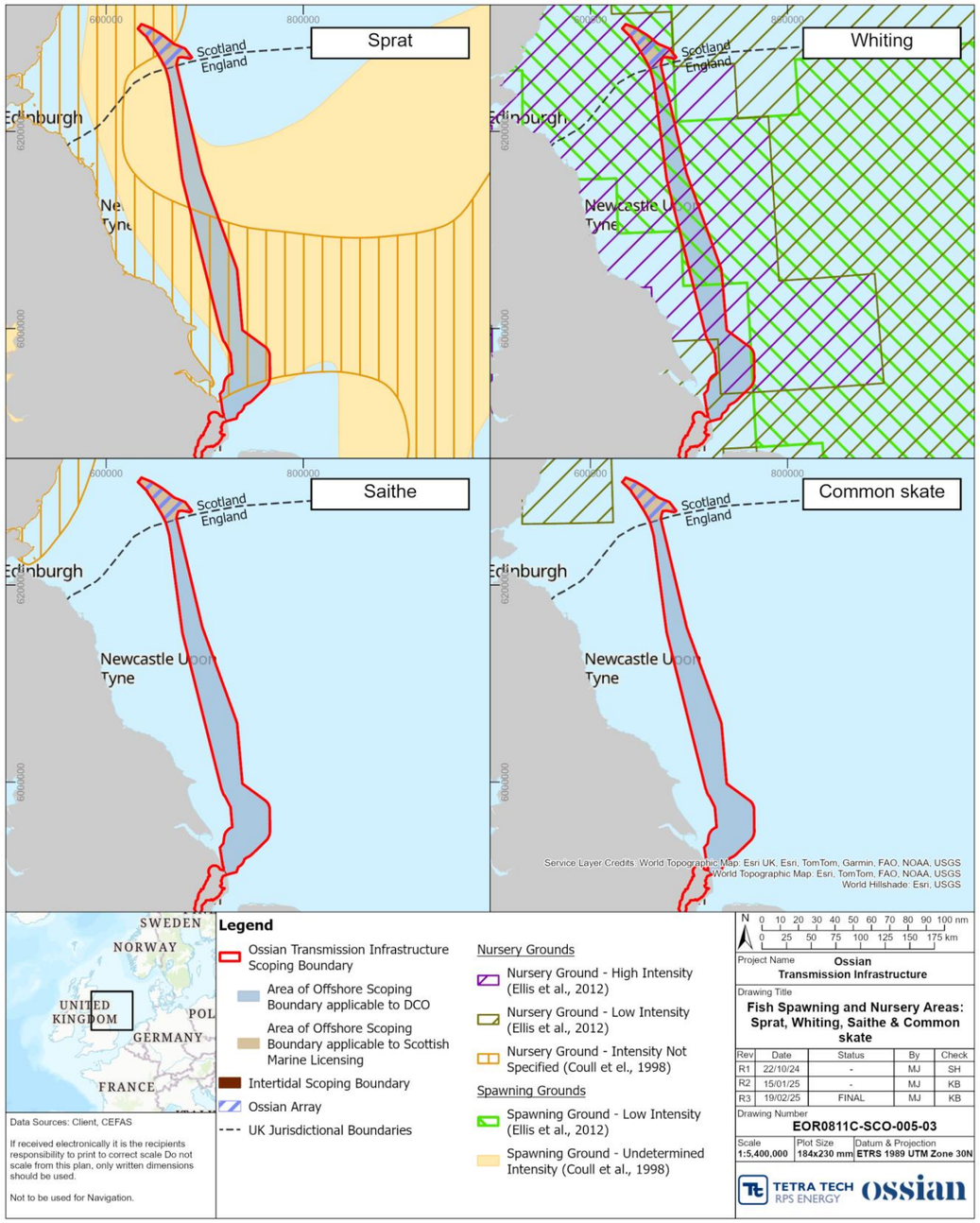

Figure 6.4.6: Spawning and Nursery Areas Overlapping with the Offshore and Intertidal Scoping Boundaries for Sprat, Whiting, Saithe and Common Skate (Source: Coull *et al.*, 1998 and Ellis *et al.*, 2012)

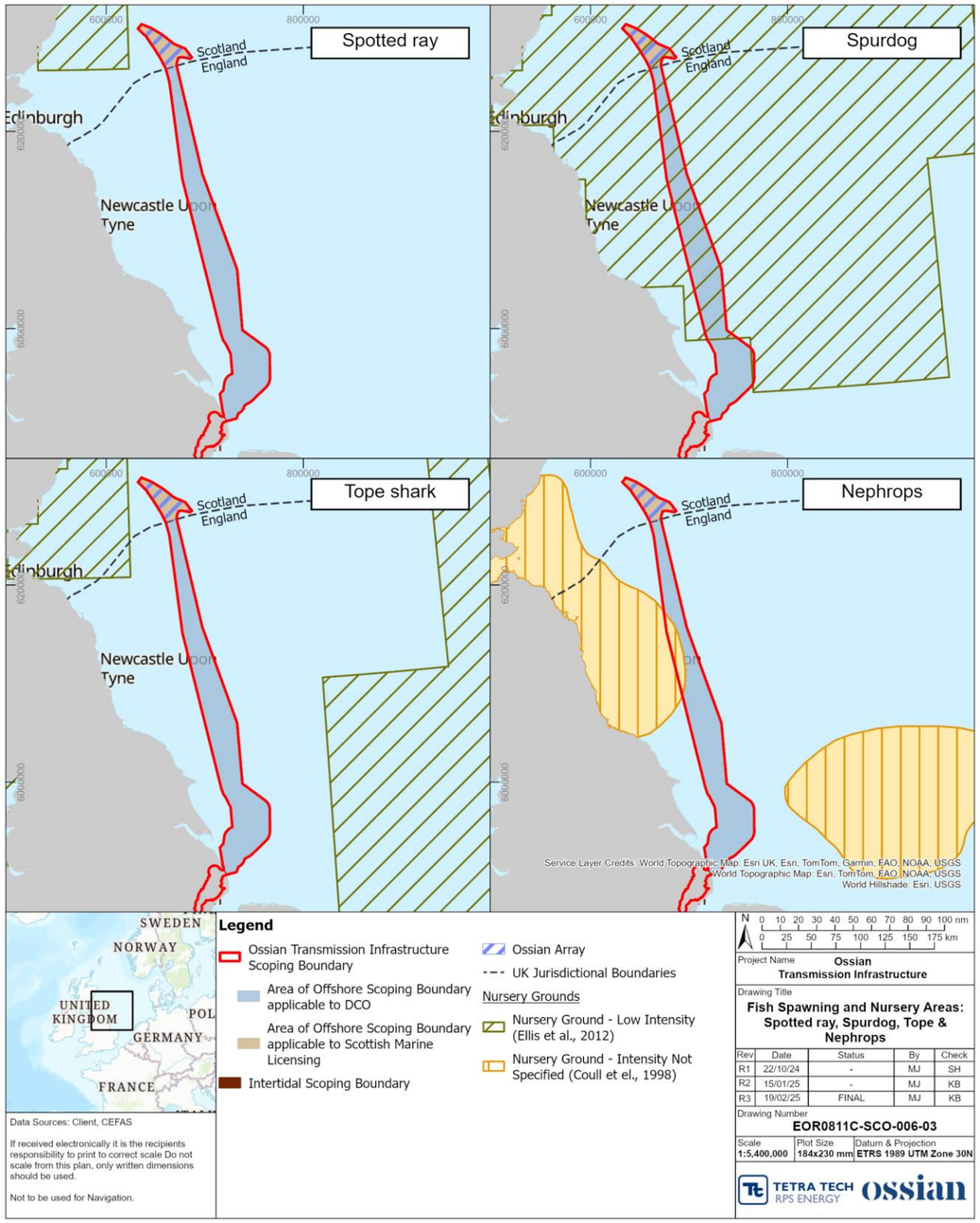

Figure 6.4.7: Spawning and Nursery Areas Overlapping with the Offshore and Intertidal Scoping Boundaries for Spotted Ray, Spurdog, Tope Shark and Nephrops (Source: Coull *et al.*, 1998 and Ellis *et al.*, 2012)

Protected Species

6.4.3.20 The key fish and shellfish receptors which have the potential to be affected by the Offshore Transmission Infrastructure have been identified and are set out in **Table 6.4.3**. These species are those of conservation significance which are likely or have the potential to be present within the fish and shellfish ecology study area and/or which have spawning/nursery grounds overlapping with the Offshore and Intertidal Scoping Boundaries. These species will be considered and assessed within the fish and shellfish ecology chapter of the ES.

6.4.3.21 Protected species identified in the fish and shellfish ecology study area include those:

- protected under national and international conventions (e.g. the Oslo and Paris Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention);
- protected under national and international legislation (e.g. The Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) and Wildlife and Countryside Act 1981 (as amended));
- listed on the International Union for Conservation of Nature (IUCN) red list (2024);
- protected as Priority Marine Features (PMFs) in Scottish waters; and
- protected as a Priority Species (i.e. species protected under UK Post-2010 Biodiversity Framework) and listed as a Species of Principal Importance (SPIs) under Section 41 of the Natural Environment and Rural Communities Act 2006).

Table 6.4.3: Key Fish and Shellfish Receptors of Conservation Significance Which Have the Potential to be Affected by the Offshore Transmission Infrastructure

Species	OSPAR Convention	IUCN	PMF	SPI and Priority Species
Teleost Fish				
Herring *Clupea harengus*	N	Least Concern	Y	Y
Horse mackerel *Trachurus trachurus*	N	Vulnerable	Y	Y
Mackerel *Scomber scombrus*	N	Least Concern	Y	Y
Atlantic cod *Gadus morhua*	Y	Vulnerable	Y	Y
Atlantic halibut *Hippoglossus hippoglossus*	N	Endangered	Y	Y
Anglerfish *Lophius piscatorius*	N	Least Concern	N	Y
Haddock *Melanogrammus aeglefinus*	N	Vulnerable	N	N
Ling *Molva molva*	N	Not Evaluated	Y	Y
Plaice *Pleuronectes platessa*	N	Least Concern	N	Y
Saithe *Pollachius virens*	N	Not Evaluated	Y	N
Dover sole *Solea solea*	N	Least Concern	N	Y
Lemon sole *Microstomus kitt*	N	Least Concern	N	N
Whiting *Merlangius merlangus*	N	Least Concern	Y	Y
Sandeel Ammodytidae	N	Least Concern	Y	Y
Sprat *Sprattus sprattus*	N	Data deficient	N	N
Norway pout *Trisopterus esmarkii*	N	Least Concern	Y	N
Diadromous species				
Allis shad *Alosa alosa*	Y	Least Concern	N	Y
River lamprey *Lampetra fluviatilis*	N	Least Concern	Y	Y
Sea lamprey *Petromyzon marinus*	N	Least Concern	Y	Y
European smelt *Osmerus eperlanus*	N	Least Concern	Y	Y
Twaite shad *Alosa fallax*	N	Least Concern	N	Y
Atlantic salmon *Salmo salar*	Y	Vulnerable	Y	Y

Species	OSPAR Convention	IUCN	PMF	SPI and Priority Species
European eel *Anguilla anguilla*	Y	Critically endangered	Y	Y
Sea trout *S. trutta trutta*	Y	Least Concern	Y	Y
Freshwater pearl mussel[3] *Pinctada margaritifera* (previously *Margaritifera margaritifera*)	N	Endangered	N	N
Elasmobranch species				
Common skate *Dipturus batis*	Y	Critically endangered	Y	Y
Spotted ray *Aetobatus narinari*	Y	Least Concern	N	N
Thornback ray *Raja clavata*	Y	Near threatened	N	N
Spurdog *Squalus acanthias*	N	Vulnerable	Y	Y[4]
Tope shark *Galeorhinus galeus*	N	Vulnerable	Y	Y[2]

English Waters

Fish Assemblage

6.4.3.22 Site-specific surveys (trawls surveys and trammel net surveys) were undertaken between 2004 and 2007 to characterise the baseline environment for the Humber Gateway Offshore Wind Farm (located 0.69 km west from the Offshore Scoping Boundary (see **Figure 6.4.1**), north of the mouth of the River Humber, 15 km from the nearest point on the Lincolnshire coast – Donna Nook) (E.ON, 2005). Results from these surveys have been used to identify species which may occur in the south of the fish and shellfish ecology study area, closer to the Landfall. Twenty-one species were recorded during the trawl surveys, with the most abundant species being the long spined sea scorpion *Taurulus bubalis* and whiting. Other key species included pogge *Agonus cataphractus*, pouting *Trisopterus luscus*, herring, common dab and flounder *Platichthys flesus*. During the trammel net survey, cod was found in high abundance; other key species included whiting, lesser spotted dogfish *Scyliorhinus canicula*, Dover sole *Solea solea* and thornback ray (E.ON, 2005).

6.4.3.23 Site-specific surveys undertaken for the Blyth Offshore Wind Farm Area (located 74.8 km west from the Offshore Scoping Boundary) in 2010 found the most abundant fish species to be demersal plaice, whiting, dab and cod (AMEC, 2011). Other species identified included haddock, hake, herring, saithe, Dover sole, turbot and ling. Lesser spotted dogfish and cuckoo ray were also identified (AMEC, 2011).

6.4.3.24 An epibenthic beam trawl campaign was completed in 2017 for the Hornsea 3 Project (location 77.5 km east of the Offshore Scoping Boundary). These surveys found the fish communities characterising the area to comprise mainly of demersal fish including whiting, dab, plaice, solenette and grey gurnard. Other species caught in lower abundances included lemon sole, Dover sole and cod. Pelagic species identified includes sprat, herring and mackerel. In particular, high abundances of herring were recorded during the spring survey in inshore areas close to the Humber Estuary. Both lesser sandeel and greater sandeel were also recorded in these trawl surveys, but it is noted that these survey methods were not designed to sample sandeel (Orsted, 2017).

6.4.3.25 Basking shark *Cetorhinus maximus* can occur in summer months from southern Cornwall to the Scottish Isles. However, there have only been four sightings of basking shark in the fish and shellfish ecology study area within the last 10 years (National Biodiversity Network (NBN), 2024). As such, this is not considered to be a species likely to be present in the fish and shellfish ecology study area and it has been proposed to be scoped out of further assessment in the fish and shellfish ecology chapter of the ES (see **Table 6.4.7**).

6.4.3.26 Designated sites which are located within the fish and shellfish study area related to English waters are listed in **Table 6.4.4** and shown in **Figure 6.4.8**.

Scottish Waters

Fish Assemblage

6.4.3.27 A site-specific survey was undertaken for the Array Site Boundary in July 2022, which has been used to inform the baseline characterisation for fish and shellfish ecology (Ossian OWFL, 2022). It is noted that species occurring in the Array Site Boundary may not be representative of species further south, closer to the Landfall; this is discussed further in **paragraph 6.4.3.22**.

6.4.3.28 During the epibenthic beam trawl survey for the Array Site Boundary (which overlaps with the majority of the Offshore Scoping Boundary in Scottish waters), 16 fish species were observed. The most abundant species were the long rough

[3] Included due to their dependency on Atlantic salmon and sea trout

[4] Protected as a Priority Species on the UK Post 2010 Biodiversity Framework only and is not protected under Section 41 of the Natural Environment and Rural Communities Act 2006.

dab *Hippoglossoides platessoides*, plaice, common dab, Norway pout *Trisopterus esmarkii*, lemon sole, sandeel and grey gurnard *Eutrigla gurnardus* (Ossian OWFL, 2022*)*.

Designated Sites

6.4.3.29 Designated sites with relevant fish and shellfish qualifying features which overlap with the fish and shellfish ecology study area are listed in **Table 6.4.4** and shown in **Figure 6.4.8**. This encompasses European Sites (i.e. Special Areas of Conservation (SACs)) and nationally designated sites (i.e. Marine Conservation Zones (MCZs) and Highly Protected Marine Areas (HMPA)). These designated sites are relevant to provide a broader context of fish and shellfish within the fish and shellfish ecology study area.

6.4.3.30 Further detail on the potential likely significant effects on fish and shellfish features of MCZs and the North East of Farnes Deep HPMA will be presented in the MCZ Screening Assessment (see **part 5, appendix 9.1**). In addition, a Stage 1 Likely Significant Effect (LSE) Screening Report has been produced to inform the Habitats Regulations Assessment for the Offshore Transmission Infrastructure, which assesses the potential for the Offshore Transmission Infrastructure (and Onshore Transmission Infrastructure) to result in an LSE on European designated sites (including SACs designated for fish and shellfish features). Although all SACs with the potential to be impacted by the Offshore Transmission Infrastructure were considered for this Stage 1 LSE Screening Report, only the Humber Estuary SAC has been screened into the assessment for fish and shellfish designated features, based on the predicted largest ZoI for underwater noise Ossian OWFL, 2025). It is noted that that European sites located in the UK are no longer part of the Natura 2000 network and are now included as part of the UK National Site Network. Further detail on the Habitats Regulations process is provided in the Stage 1 LSE Screening Report (Ossian OWFL, 2025).

6.4.3.31 Relevant fish and shellfish features of designated sites will be fully considered and assessed within the fish and shellfish ecology chapter of the ES. The information to support the assessment on European designated sites will be provided within the Information to Support Appropriate Assessment (ISAA), which will accompany the ES.

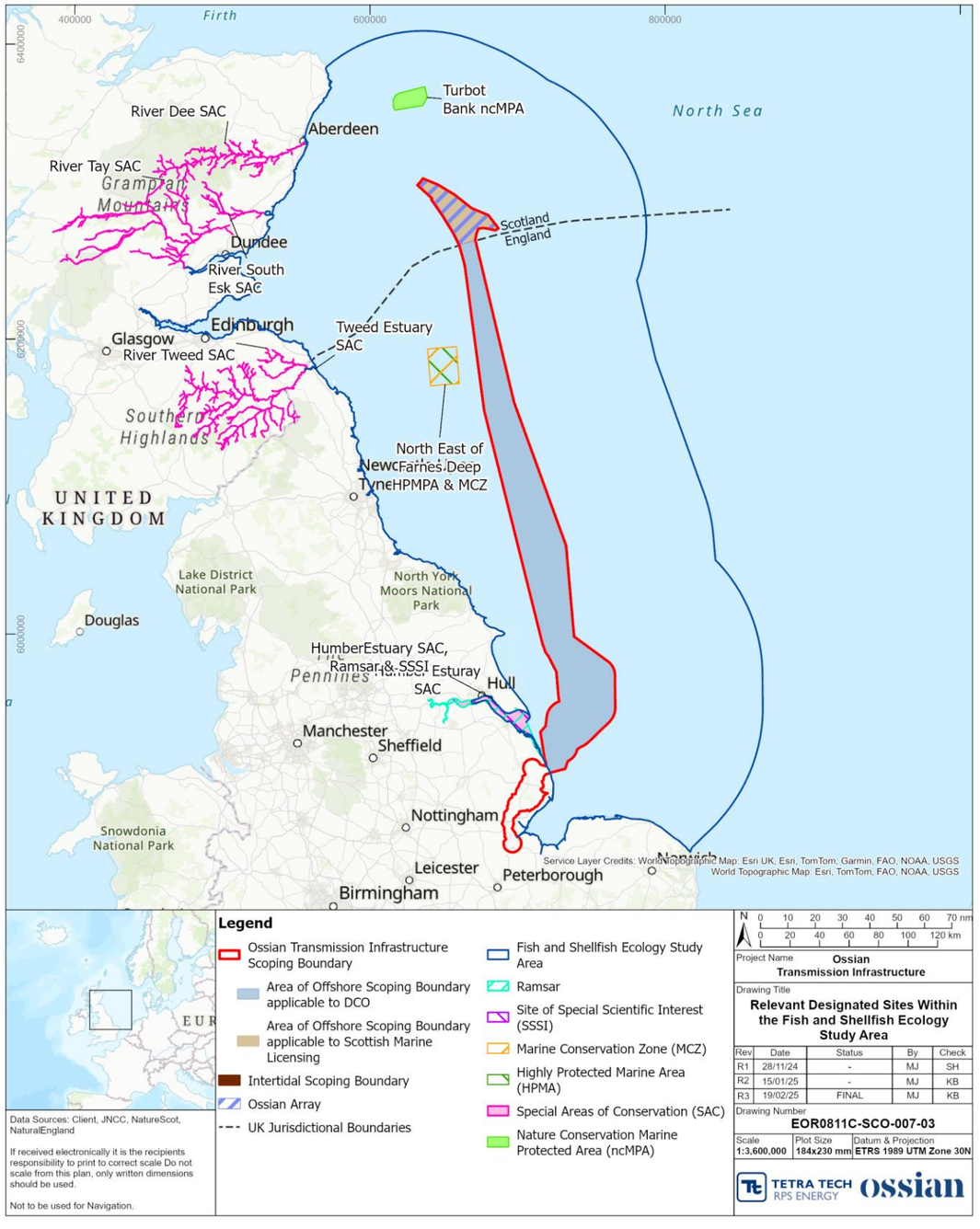

Figure 6.4.8: Relevant Designated Sites within the Fish and Shellfish Ecology Study Area

Table 6.4.4: Designated Sites with Fish and Shellfish Qualifying Features Within the Fish and Shellfish Ecology Study Area

Designated site	Distance to Offshore/Intertidal Scoping Boundaries (km)	Relevant designated features
General (applicable to both English and Scottish waters)		
Special Area of Conservation		
River Tweed SAC*****	112.6	• Atlantic salmon *Salmo salar* • Sea lamprey *Petromyzon marinus* • River lamprey *Lampetra fluviatilis*
Site of Scientific Interest		
River Tweed SSSI*****	112.6	• Atlantic salmon *Salmo salar* • Sea lamprey *Petromyzon marinus* • River lamprey *Lampetra fluviatilis*
English waters		
Highly Protected Marine Area		
North East of Farnes Deep HPMA[5]	12.9	• The marine ecosystem of the area (including all marine flora and fauna)
Special Area of Conservation		
Humber Estuary SAC*****	2.7	• Sea lamprey *Petromyzon marinus* • River lamprey *Lampetra fluviatilis*
Tweed Estuary SAC*****	108.8	• Sea lamprey *Petromyzon marinus* • River lamprey *Lampetra fluviatilis*
Ramsar site		
Humber Estuary Ramsar[6]*****	2.7	• Sea lamprey *Petromyzon marinus* • River lamprey *Lampetra fluviatilis*
Scottish waters		
Nature Conservation Marine Protected Area		
Turbot Bank ncMPA	63.2	• Sandeel Ammodytidae spp.
Special Area of Conservation		
River Dee SAC*****	92.9	• Atlantic salmon *Salmo salar* • Freshwater pearl mussel *Pinctada margaritifera* (previously *Margaritifera margaritifera*)
River Tay SAC*	168.9	• Atlantic salmon *Salmo salar* • Sea lamprey *Petromyzon marinus* • River lamprey *Lampetra fluviatilis*
River South Esk SAC*****	114.8	• Atlantic salmon *Salmo salar* • Freshwater pearl mussel *Pinctada margaritifera* (previously *Margaritifera margaritifera*)
River Teith SAC*	237.9	• Atlantic salmon *Salmo salar* • Sea lamprey *Petromyzon marinus* • River lamprey *Lampetra fluviatilis*

Future Baseline Conditions

6.4.3.32 The EIA process will consider the existing baseline conditions within the fish and shellfish ecology study area, however, it will also evaluate the future baseline conditions as far as reasonably practicable. The baseline environment is not static, therefore, even if the Ossian Transmission Infrastructure does not progress, the offshore environment will exhibit some degree of natural change. These changes may occur due to naturally occurring cycles and processes and any potential changes resulting from climate change.

6.4.3.33 Variability and changes in naturally occurring processes may bring direct and indirect changes to fish and shellfish populations and communities in the mid to

[5] The North East of Farnes Deep HPMA is also designated as an MCZ. However, the MCZ is not designated for fish and shellfish qualifying features.

[6] The Humber Estuary SSSI is a component SSSI of the wider Ramsar designation of the Humber Estuary (Natural England, 2011).

***** These sites are designated for diadromous fish.

long term future (Heath *et al*., 2012). Furthermore, changes to fisheries management measures over the lifetime of the Offshore Transmission Infrastructure may also affect fish and shellfish species, communities and habitats in the fish and shellfish ecology study area (e.g. the recent closure of sandeel fisheries in Scottish waters).

6.4.3.34 The fish and shellfish ecology chapter of the ES will ensure to place any potential impacts on receptors into the context of the envelope of change that may occur over the timescale of the Offshore Transmission Infrastructure.

6.4.4 Proposed Data Sources

6.4.4.1 **Table 6.4.5** presents the data sources proposed for the fish and shellfish ecology assessment.

6.4.4.2 Many of these sources have been summarised briefly in the following sections to inform the baseline characterisation for fish and shellfish ecology within this EIA Scoping Report. These data sources will be expanded on further within the fish and shellfish technical report to ensure a robust characterisation is provided. Some of these sources have not been cited within this EIA Scoping Report but have been provided as an indication of other sources which will be considered for the fish and shellfish ecology chapter and technical report of the ES.

6.4.4.3 Additional data sources (e.g. emerging research and relevant EIAs including for offshore wind and cable projects) will also be used to inform the assessment in the fish and shellfish ecology chapter of the ES. Note that, in addition to these data sources, relevant output of the consultation process will also be considered. The fish and shellfish ecology baseline assessment will also be informed through the commercial fisheries baseline characterisation and through consultation with relevant commercial fisheries bodies (see **part 2, section 6.7**).

6.4.4.4 Information on UXO presence within the fish and shellfish study area will be collected during a UXO desktop assessment and will be used to inform the fish and shellfish ecology chapter of the ES.

Table 6.4.5: Summary of Key Data Sources for Fish and Shellfish Ecology

Title	Year	Author	Citation
General (applicable for both English and Scottish waters)			
Fisheries Sensitivity Maps	1998	Coull, *et al.*	Coull, *et al* (1998)
North Sea Elasmobranchs: distribution, abundance and biodiversity	2005	Daan *et al.*	Daan *et al.* (2005)
Spawning and nursery grounds of selected fish species in United Kingdom (UK) waters	2012	Ellis *et al.*	Ellis *et al.* (2012)
Fish and Shellfish Stocks 2013 Edition	2013	Barreto and Bailey	Barreto and Bailey (2013)
Updating Fisheries Sensitivity Maps in British Waters	2014	Aires *et al.*	Aires *et al.* (2014)
Fish and Shellfish Stocks 2016 Edition: Shellfish Stocks Section	2016	Mclay *et al.*	Mclay *et al.* (2016)
Fish and Shellfish Stocks 2016 Edition: Fish Stocks Section	2016	Barreto and Bailey	Barreto and Bailey (2016)
Marine Protected Area Mapper	2020	JNCC	JNCC (2020)
International Bottom Trawl Surveys	2022	ICES	ICES (2022)
International Herring Larvae Surveys (IHLS)	2022	ICES	ICES (2022)
UK Sea Fisheries Statistics 2022	2023	MMO	MMO (2023)
2019 to 2023 UK Fleet Landings by ICES Rectangle Stock and Exclusive Economic Zone	MMO	2019 to 2023	MMO (2024)
Norway Lobster Farn Deep (FU 6)	2023	FishSource	FishSource (2023)
Crab and lobster fisheries - stock assessments: results 2016 to 2019	2023	Mesquita *et al.*	Mesquita *et al.* (2023)

Title	Year	Author	Citation
Recommendations on bioacoustical metrics relevant for regulating exposure to anthropogenic underwater sound	2024	Lucke *et al.*	Lucke et al. (2024)
UK Sea Fisheries Annual Statistics Report 2023	2024	MMO	MMO (2024)
English waters			
Edible crab *Cancer pagurus* larvae surveys off the east coast of England: implications for stock structure	2003	Eaton *et al.*	Eaton *et al.* (2003)
Habitats and species of principal importance in England	2022	Department for Environment, Food and Rural Affairs and Natural England	Department for Environment, Food and Rural Affairs and Natural England (2022)
Humber Gateway, Environmental Statement: Section 8 – Description of the Biological Baseline Environment	2005	E.ON	E.ON (2005)
Eastern Green Link 3 and Eastern Green Link 4: Environmental Impact Assessment Scoping Report: Volume 1, Part 3, English Offshore Scheme	2024	National Grid	National Grid (2024)

Title	Year	Author	Citation
Scottish waters			
Review of migratory routes and behaviour of Atlantic salmon, sea trout and European eel in Scotland's coastal environment: implications for the development of marine renewables	2010	Malcolm *et al.*	Malcolm *et al.* (2010)
Scotland's Marine Atlas: Information for the National Marine Plan	2011	Baxter *et al.*	Baxter *et al.* (2011)
Ossian Array: EIA Report	2024	Ossian Offshore Wind Farm Limited (OWFL)	Ossian OWFL (2024)
Spatio-Temporal Variability in Scottish Smolt Emigration Times and Sizes	2015	Malcolm *et al.*	Malcolm *et al.* (2015)
Crab and lobster fisheries in Scotland: Results of Stock Assessments 2009-2012	2016	Mesquita *et al.*	Mesquita *et al.* (2016)
A review of the geographic distribution, status, and conservation of Scotland's lampreys	2017	Hume	Hume (2017)
Scottish Sea Fisheries Statistics – Fishing Effort and Quantity and Value of Landings by ICES Rectangle	2021/2022	Marine Scotland	Marine Scotland (2021) Marine Scotland (2023)
Ossian Array: EIA Scoping Report	2022	Ossian OWFL	Ossian OWFL (2022)
The Marine Scotland National Marine Plan Interactive (NMPi) maps	2024	Marine Scotland	Marine Scotland (2024)

Title	Year	Author	Citation
Species listed as Priority Marine Features (Scotland)	2024	MarLIN	MarLIN (2024)

6.4.5 Mitigation Measures

6.4.5.1 The following measures adopted as part of the Offshore Transmission Infrastructure are relevant to the assessment for fish and shellfish. These measures may evolve (and be further clarified) as the design and EIA process progresses:

- The development of, and adherence to, an appropriate Code of Construction Practice (CoCP) (which applies to the DCO Application).
- The development of, and adherence to a Construction Method Statement (CMS) (which applies to the Marine Licence).
- The development of, and adherence to, an Environmental Management Plan (EMP).
- The development of, and adherence to, a Marine Pollution Contingency Plan (MPCP).
- The development of, and adherence to, a Cable Plan, informed by the findings of a Cable Burial Risk Assessment (CBRA).
- The development of, and adherence to, a Decommissioning Programme.

6.4.5.2 The likely significance of the effects of the Offshore Transmission Infrastructure on fish and shellfish ecology will determine the requirement and feasibility for any further mitigation requirements to be adopted and will be consulted upon with statutory consultees throughout the EIA process.

6.4.6 Proposed Scope of the Assessment

6.4.6.1 Potential impacts that are proposed to be scoped into the assessment for fish and shellfish ecology are set out in **Table 6.4.6**.

Table 6.4.6: Potential Impacts Proposed to be Scoped in for Fish and Shellfish Ecology

Impact	Project Phase[7]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Temporary habitat loss and disturbance of habitats (shellfish and marine species with a demersal life stage)	✓	×	✓	✓	✓	During construction and decommissioning there is potential for temporary habitat loss and disturbance of habitats to affect fish and shellfish receptors and/or spawning and nursery grounds. During construction, these impacts could arise from cable installation and site preparation activities in advance of cable installation, including anchor placements and pre-cabling seabed clearance. During decommissioning, these impacts could arise from decommissioning activities to remove cables, and cable protection.	No specific modelling is required to inform this impact assessment. The approach will be to clearly quantitatively present the maximum spatial scale of the impact, determined by the Maximum Design Scenario (MDS), which will be based on information in the Project Description chapter of the ES. The magnitude of the impact will be derived from the MDS; this applies to all impacts listed in this table. For temporary habitat loss and disturbance of habitats, the MDS will present the largest area of habitat potentially affected in the fish and shellfish ecology study area. As standard for EIAs, the significance of impacts will be determined by correlating magnitude of the impact with the sensitivity of receptor; this applies to all of the impacts listed in this table. During decommissioning, the impact is expected to be less than or equal to the impact arising during the construction phase. As such, the magnitude of impact will be assumed to be less than or equal to the construction phase.
Underwater sound from pre-construction site investigation surveys and removal of infrastructure impacting fish and shellfish receptors	✓	×	✓	✓	✓	During construction and decommissioning there is potential for underwater sound to affect sensitive fish and shellfish receptors (including mortality, injury and disturbance). During construction, these impacts could arise from pre-construction site investigation surveys. During decommissioning, these impacts could arise from the removal of cables and cable protection.	A detailed qualitative assessment will be undertaken to inform the assessment of effects arising from underwater sound on sensitive fish and shellfish receptors. Up to date scientific literature will be used to inform the consideration of the potential for injury and disturbance on fish and shellfish receptors. This will include consideration of disruption to spawning, disruption to migration of diadromous fish species and of the hearing abilities of fish species. During decommissioning, the impact is expected to be less than or equal to the impact arising during the construction phase. As such, the magnitude of impact will

[7] Construction (C), Operation and Maintenance (O), Decommissioning (D)

Impact	Project Phase[7]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
							be assumed to be less than or equal to the construction phase.
Increased suspended sediment concentrations (SSCs) and associated sediment deposition	✓	✗	✓	✓	✓	During construction and decommissioning, there is potential for increased SSCs and associated sediment deposition to affect fish and shellfish receptors. Potential impacts include smothering effects or impacts on spawning and/or nursery habitats and habitat-dependent species (e.g. spawning herring) due to localised changes in sediment type. Impacts could arise from construction activities including seabed preparation/clearance, and cable installation. During decommissioning, impacts could arise from the removal of cables and cable protection. Any such impacts are expected to be highly localised to the vicinity of the activities and temporary.	The physical processes assessment will be based upon a literature review of relevant offshore wind farm projects and other relevant projects in the vicinity of the Offshore and Intertidal Scoping Boundaries to provide an overview of the potential impacts to physical processes (as set out in **part 2, section 6.2**). This will include consideration of effects on spawning and/or nursery habitats (e.g. smothering of eggs) and disruption of migrations of diadromous fish, accounting for differing sensitivities of species and different life stages of receptors. During decommissioning, the impact is expected to be less than or equal to the impact arising during the construction phase. As such, the magnitude of impact will be assumed to be less than or equal to the construction phase.
Long-term habitat loss (shellfish and marine species with a demersal life stage)	✓	✓	✓	✓	✓	During construction, operation and maintenance and decommissioning, there is potential for long-term habitat loss to affect fish and shellfish receptors (e.g. displacement of receptors); for example, loss of habitat under cable infrastructure (e.g. cable protection). Permanent habitat loss may occur under any infrastructure that is decommissioned and left *in situ* at the end of the Offshore Transmission Infrastructure's lifetime. The species most sensitive to this impact will be those which are dependent on the seabed during all or some of their life cycle, notably sandeel and herring, especially if habitat loss occurs in spawning and/or nursery areas.	The approach will be to clearly quantitatively present the maximum spatial scale of impacts maximum spatial scale of the impact, determined by the MDS and will be based on information in the PDE. For long-term habitat loss, the MDS will present the largest areas of habitat potentially affected in the long-term, in the fish and shellfish ecology study area. During operation and maintenance, impacts are expected to differ from impacts arising during the construction phase. As such, the magnitude of impacts will be determined for these phases separately as part of the assessment in the ES, following the same approach as described above for the construction phase. During decommissioning, effects are expected to be less than or equal to effects arising during the construction phase. As such, the magnitude of impacts will be assumed to be less than those described for the construction phase, above.

Impact	Project Phase[7]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Release of sediment-bound contaminants	✓	✓	✓	✓	✓	During construction, operation and maintenance and decommissioning, there is potential for impacts arising from the release of sediment-bound contaminants on fish and shellfish receptors. Impacts may arise from seabed disturbance, such as from cable installation, seabed clearance and cable repairs, which has the potential to remobilise sediment-bound contaminants. During decommissioning, these impacts could arise from the removal of cables and cable protection.	Desktop sources including the Cefas Action Level viewer (Cefas, 2023) will be used to help determine the level of sediment contamination within the impact area and within the fish and shellfish ecology study area, if required. Data from other offshore wind farm surveys will also be used to inform this impact assessment. Targeted site-specific surveys are planned for 2025 to also help to characterise benthic ecology, which will include the collection of sediment samples for contaminant analysis. The physical processes assessment will be based upon a literature review of relevant offshore wind farm projects and other relevant projects in the vicinity of the Offshore and Intertidal Scoping Boundaries (to provide an overview of the potential impacts to physical processes (as set out in **part 2, section 6.2**). This will be used to inform the assessment of this impact by predicting the likely dispersal of contaminated sediment. During operation and maintenance and decommissioning, the impact is expected to be less than or equal to the impact arising during the construction phase. As such, the magnitude of impact will be assumed to be less than those described for the construction phase.
Colonisation of hard structures	×	✓	×	✓	✓	During operation and maintenance, there is potential for impacts arising from colonisation of hard structures on fish and shellfish receptors. Seabed infrastructure (e.g. cable protection) provides a surface which has the potential to be colonized by a variety of marine organisms.	The approach will be to clearly qualitatively present the maximum spatial scale of impacts maximum spatial scale of the impact, determined by the MDS and will be based on information in the PDE.
Electromagnetic Fields (EMF) from subsea electrical cabling	×	✓	×	✓	✓	During operation and maintenance, there is potential for impacts arising from EMF from subsea electrical cabling on fish and shellfish receptors. Subsea electrical cables (e.g. high voltage alternating current export cables) emit EMFs along their lengths, which may interfere with fish and shellfish behaviours and affect fish and shellfish prey/predator relationships. The potential impact will be reduced using techniques including cable burial to increase the distance between the cable and the seabed surface (and hence reducing EMF exposure).	No specific modelling is required to inform this impact assessment. The approach will be to qualitatively present the maximum spatial scale of the impact maximum spatial scale of the impact, determined by the MDS and will be based on information in the PDE and scientific literature on EMFs in the marine environment, including associated effects on fish and shellfish.

Impact	Project Phase[7]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
						The species most sensitive to this impact will be those which utilise or rely on EMFs during their lifecycle (e.g. for foraging and migratory behaviour).	

6.4.7 Impacts Proposed to be Scoped Out

6.4.7.1 Impacts that are proposed to be scoped out of the assessment for fish and shellfish ecology and the justification are set out in **Table 6.4.7**.

Table 6.4.7: Impacts Proposed to be Scoped out of the Assessment for Fish and Shellfish Ecology

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
All Phases			
Accidental release of pollutants	✓	✓	During all phases, there is potential for the accidental release of pollutants; for example, by vessels and other equipment associated with the Offshore Transmission Infrastructure. However, this risk will be mitigated by the implementation of measures adopted as part of the project, including an EMP and MPCP (see **paragraph 6.4.5.1**). These plans will follow best practice guidelines and will consider the potential for accidental spills, any additional potential contaminant releases and will present mitigation plans in case of an accidental release of pollutants. As such, the resulting likelihood of a release of pollutants occurring will be very low and any likely significant effects on fish and shellfish receptors in the occurrence of release of pollutants will be insignificant.
Underwater sound from Unexploded Ordinance (UXO) clearance	✓	✓	Should UXO clearance be required, it is expected that this will be covered by separate Marine Licence applications through the Marine Management Organisation (MMO) (for English waters) and MD-LOT (for Scottish waters) and is therefore not proposed to be assessed for fish and shellfish ecology via this EIA process for the Offshore Transmission Infrastructure. The Applicant intends to use low order deflagration techniques (preferentially, and where possible) and to implement soft start measures for UXO clearance. These measures will be further discussed and assessed in the separate Marine Licence application(s) for UXO clearance (should this activity be required).
Underwater sound from vessels	✓	✓	Subsea vessel noise is not likely to represent a significant change in the marine environment from baseline levels of noise from existing vessels including shipping, fishing vessels, tankers and cargo vessels. Underwater sound from vessels is likely to be low and potential likely significant effects are only likely to occur if fish and shellfish receptors remain within the immediate vicinity of vessels (i.e. within metres) for several hours/days. This is highly unlikely to occur in practice. Therefore, vessels are not considered to have a potential likely significant effect on fish and shellfish receptors.
Long-term habitat loss (for species with fully pelagic lifecycles)	✓	✓	Fish and shellfish species with fully pelagic lifecycles will not be significantly affected by long-term habitat loss to the seabed, owing to their habitation within the water column and therefore wide availability of alternative habitat.
All impacts on basking shark	✓	✓	There have been limited basking shark sightings within the fish and shellfish ecology study area in the last 10 years (NBN, 2024; see **paragraph 6.4.3.25**). As such, for **all phases** and impacts, this species has been scoped out of assessment due to a scarcity of the species within the fish and shellfish ecology study area.

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
Thermal emissions from operational cables	✓	✓	Thermal emissions from operational cables have the potential to affect fish and shellfish receptors. However, there is limited evidence to suggest that these cables significantly alter the temperature of the sea and the surrounding marine environment. For buried cables, temperature changes at the seabed surface are low, due to the increased distance of the cable to the seabed surface and increased dissipation of heat (Meißner *et al.*,2007). The anticipated target burial depth for the Offshore Transmission Infrastructure is between 1 and 3 m (subject to CBRA confirmation). A study conducted at Nysted Offshore Wind Farm in Denmark (Meißner *et al.*, 2007) found the temperature change in the top 30 cm of sediment above a high voltage cable (132 kV) to be a maximum of 2°C. Given the target burial depth, any temperature changes at the seabed surface are likely to be reduced and unlikely to affect fish and shellfish receptors. Cable burial will be achieved where possible or cable protection used where necessary. Due to any resulting impacts from thermal emissions from operational cables being highly localised and cables being buried or protected, no adverse likely significant effects on fish and shellfish receptors are anticipated.

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
Construction			
Colonisation of hard structures	✓	✓	During the construction phase, minor impacts associated with colonisation of hard structures are expected. This is due to hard structures only being installed during this phase and therefore limited time for animals to colonise these structures. Structures will provide a longer-term surface for subsequent colonisation during the operation and maintenance phase, for which this impact will be assessed. As such, during the construction phase, there is limited potential for animals to colonise hard structures.
Operation and Maintenance			
Temporary habitat loss and disturbance of habitats (for species with fully pelagic lifecycles)	✓	✓	During the operation and maintenance phase, only minor impacts associated with temporary habitat loss and disturbance of habitats are expected. Impacts may arise from minor repairs or cable reburial events only, which will be intermittent and of short-term duration, and therefore this impact will not be significant. Fish and shellfish species with fully pelagic lifecycles will not be significantly affected by temporary habitat loss and disturbance of habitats on the seabed.
Underwater sound impacting fish and shellfish receptors	✓	✓	During the operation and maintenance phase, minor impacts associated with underwater sound are expected. Impacts may arise from minor repairs or cable reburial events only. Therefore, this impact will not be significant.
Increased SSCs and associated sediment deposition	✓	✓	During the operation and maintenance phase, minor impacts associated with increased SSCs and associated sediment deposition are expected. Impacts may arise from minor repairs or cable reburial events only and therefore this impact will not be significant, as likely significant effects on fish and shellfish receptors will be minor.

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
Construction and Decommissioning			
EMFs from subsea electrical cabling	✓	✓	During construction and decommissioning phases, no likely significant effects on fish and shellfish receptors associated with EMFs from subsea electrical cabling are expected, since no EMFs are expected to occur during these phases when the cables are not in operation.

6.4.8 Proposed Assessment Methodology

6.4.8.1 The assessment methodology proposed to be used for the impacts proposed to be scoped in as set out in **Table 6.4.6** is described below.

Legislation and Policy

6.4.8.2 An overview of relevant legislation and policy is provided in **part 1, section 2** of this EIA Scoping Report. Further details of topic specific legislation and policy will be provided within the fish and shellfish ecology ES chapter.

Relevant Guidance

6.4.8.3 The following guidance documents relevant to the fish and shellfish ecology assessment will be considered in the ES:

- **General (applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to made to MD-LOT):**
  - Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (Chartered Institute of Ecology and Environmental Management, 2019);
  - Consenting, EIA, and Habitat Regulations Assessment Guidance for Marine Renewable Energy Developments in Scotland (European Marine Energy Centre and Xodus, 2010); and
  - Guidance on Environmental Considerations for Offshore Wind Farm Development (OSPAR Convention, 2008).

Assessment of Effects

6.4.8.4 The fish and shellfish ecology assessment will follow the methodology set out in **part 1, section 5** of this EIA Scoping Report.

6.4.8.5 Any potential likely significant effects on key forage fish species such as sandeel, herring and sprat will also be considered in the context of any resulting impacts on marine mammals and birds, which are known to forage these species (see part 2, **section 6.5** and 6.6, respectively). These assessments will be informed by the outputs of the fish and shellfish ecology chapter of the ES.

6.4.8.6 Habitat suitability assessments for sandeel and herring will be informed by the site-specific data collected as part of the benthic subtidal surveys planned for 2025. These assessments will be undertaken in line with best practice guidelines and informed by consultation with key stakeholders.

Cumulative Effects and Inter-related Effects

6.4.8.7 The Cumulative Effects Assessment (CEA) for fish and shellfish ecology will follow the general methodology set out in **part 1, section 5**. The physical processes chapter of the ES will also consider inter-related effects arising from the Offshore Transmission Infrastructure, including potential project lifetime and receptor-led effects. This assessment will be undertaken in accordance with the standard industry guidance and approach, as outlined in **part 1, section 5** of the EIA Scoping Report.

Transboundary Impacts

6.4.8.8 The approach to transboundary impacts is set out in **part 1, section 5.10** of the EIA Scoping Report. **Part 5, appendix 5.1** of this EIA Scoping Report presents the transboundary impacts screening which has been carried out for the Offshore Transmission Infrastructure. This screening exercise assessed the potential for transboundary impacts upon fish and shellfish ecology receptors (including consideration of impacts on Annex II migratory fish, which may pass through the fish and shellfish ecology study area at some point during their life cycle) from construction, operation and maintenance, and decommissioning phases of the Offshore Transmission Infrastructure. It is considered that any potential impacts associated with the Offshore Transmission Infrastructure will not affect fish and shellfish ecology receptors in any European Economic Area (EEA) state, due to the distance to other EEA states in relation to the potential scale over which effects could occur (i.e. elevations in underwater sound would be restricted to UK territorial waters and UK offshore waters; temporary/long term habitat loss would be localised to the area of the Offshore Scoping Boundary and Intertidal Scoping Boundary). As a result of this screening exercise, it is proposed that transboundary impacts and effects on fish and shellfish ecology are screened out from the EIA process.

Relevant Consultations

6.4.8.9 The Applicant has undertaken introductory consultation with selected consultees, including Natural England, Marine Management Organisation (MMO) and Joint Nature Conservation Committee. Topic specific consultation will be undertaken throughout the PEIR and ES phases via the Evidence Plan Process Steering Group and Expert Topic Group to inform the fish and shellfish ecology chapter in the ES.

The following stakeholders relevant to fish and shellfish ecology will be consulted via Expert Topic Group meetings:

- **English waters (applicable to the application for a DCO to be made to the Planning Inspectorate):**
  - Natural England;
  - MMO (and the Centre for Environment, Fisheries and Aquaculture Science (Cefas));
  - Environment Agency;
  - Lincolnshire Wildlife Trusts; and
  - Inshore Fisheries and Conservation Authorities (ICFAs) (e.g. Northumberland/North Eastern IFCAs).
- **Scottish waters (applicable to the application for a Marine Licence to be made to MD-LOT):**
  - NatureScot.

6.4.9 Next Steps

6.4.9.1 The next steps for the fish and shellfish ecology topic are:

- to agree with stakeholders on the approach for the assessment of fish and shellfish ecology (including presenting sensitivities of receptors, appropriate monitoring and mitigation);
- to agree with stakeholders on the potential impacts for assessment in the fish and shellfish ecology chapter of the ES; and
- to discuss the qualitative assessments with key stakeholders for impacts which cannot be assessed quantitatively.

6.5. Marine Mammals

6.5.1 Introduction

6.5.1.1 This section of the Environmental Impact Assessment (EIA) Scoping Report identifies the proposed scope of the assessment for marine mammals from construction, operation and maintenance and decommissioning of the proposed Offshore Transmission Infrastructure. This includes the key data sources used to characterise the baseline environment in the vicinity of the Offshore Transmission Infrastructure within Scottish and English waters, and the impacts proposed to be scoped in and out of the assessment for marine mammal receptors in the ES.

6.5.2 Proposed Study Area for the Assessment

6.5.2.1 Marine mammals are highly mobile, wide-ranging species, with varied behaviour and ecology between species. To account for this and provide wider geographic context, the marine mammal study area proposed for the purpose of baseline characterisation and subsequent ES has been defined at two spatial scales:

- the marine mammal study area; and
- the regional marine mammal study area.

6.5.2.2 The study areas are defined as follows:

- **Marine mammal study area**: is defined as the area encompassing the Offshore Scoping Boundary plus a buffer of 4 km (**Figure 6.5.1**). This 4 km buffer was informed using existing data that showed a 4 km displacement for harbour porpoise from construction vessels during offshore windfarm construction. Harbour porpoises *Phocoena phocoena* are the most common cetacean species in offshore energy development sites within the North Sea. Due to their high metabolic requirements, harbour porpoises are vulnerable to starvation and, therefore, could be especially vulnerable to anthropogenic disturbance (Benhemma-Le Gall *et. al.*, 2021). Therefore a 4 km displacement buffer is recommended. This captures the Zone of Influence (ZoI) of most of the impacts to marine mammals and also has been used for marine mammals for EIA for other projects, including the majority of commissioned windfarms in the United Kingdom (UK);
- **Regional marine mammal study area**: an area encompassing the wider boundaries of the Greater North Sea Management Unit (MU) and Coastal East Scotland MU for bottlenose dolphins *Tursiops truncatus*. This area encompasses a larger area to give wider context due to the highly mobile and wide-ranging nature of marine mammal species and is illustrated in **Figure 6.5.1**. The desktop review will consider the ecology, distribution, and abundance of marine mammals within the regional marine mammal study area and will inform the assessment where the wider potential ZoI for a given impact (e.g. underwater noise) may extend beyond the marine mammal study area.

6.5.2.3 Marine mammal MUs were also used to inform the regional marine mammal study area at appropriate scales for each species, with cetacean MUs defined by the Inter Agency Marine Mammal Working Group (IAMMWG) (IAMMWG, 2015; 2022) and seal MUs provided by the Special Committee on Seals (SCOS) (SCOS, 2023). The relevant MUs for the target species are presented in **Figure 6.5.2**. Abundance estimates within each marine mammal MU will be used as reference populations for the quantitative assessment (i.e. comparing the proportion of animals affected by a given impact against the species-specific MU reference population). The areas for the Small Cetaceans in European Atlantic Waters and the North Sea (SCANS) IV survey Blocks NS-C and NS-D (Gilles *et al.*, 2023) and the previous SCANS-III for survey Block R and for survey Block O (Hammond *et al*., 2017; 2021) are also shown on the map (**Figure 6.5.2**) for additional context as published data on densities and abundance of key species is available for these survey areas which overlap the Offshore and Intertidal Scoping Boundaries. Further details of the location and extent of the Intertidal Scoping Boundary can be found in **Figure 3.5.1** of **part 1, section 3**.

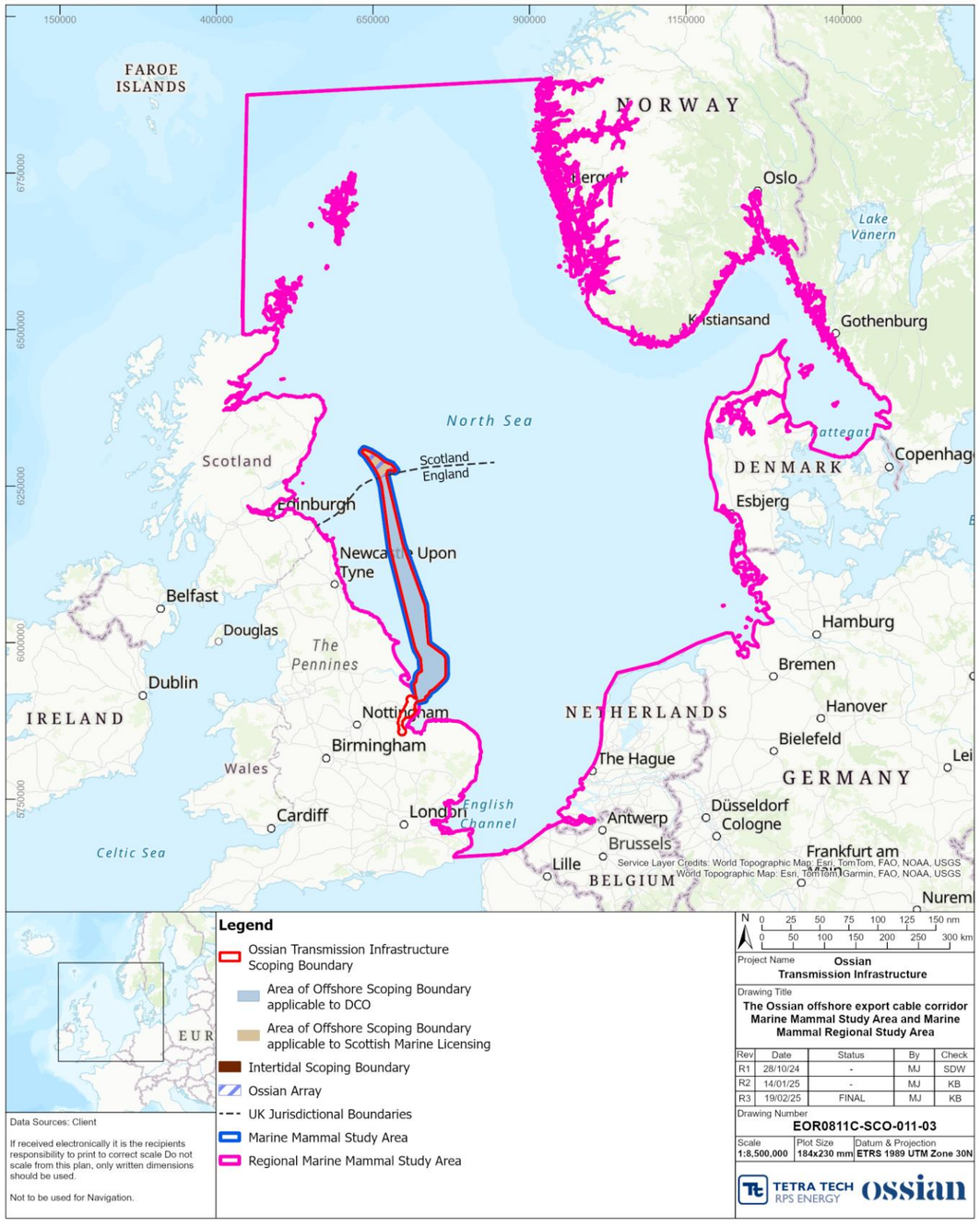

Figure 6.5.1: Marine Mammal Study Area and Regional Marine Mammal Study Area

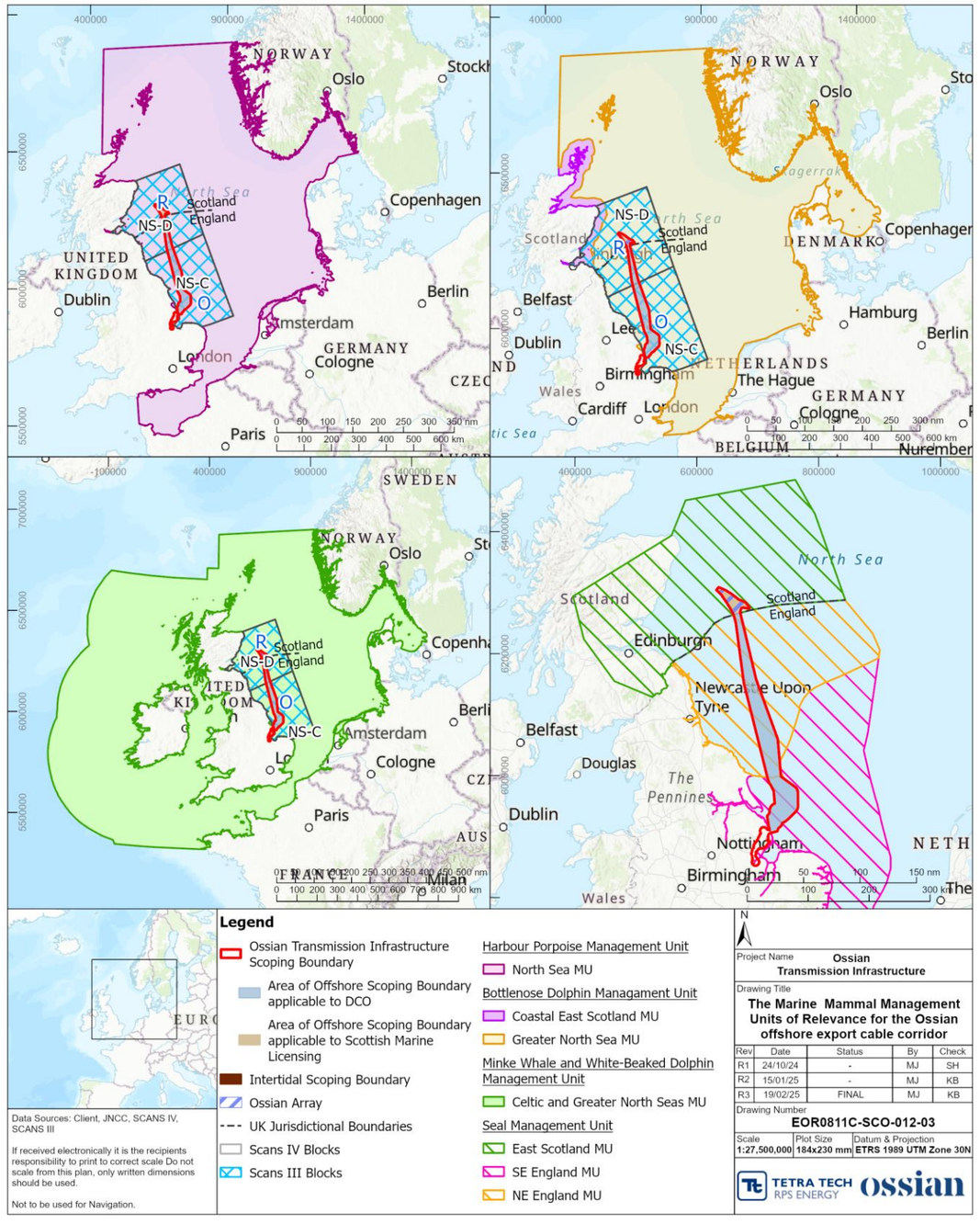

Figure 6.5.2: Marine Mammal Management Units of Relevance for the Regional Marine Mammal Study Area

6.5.3 Baseline Environment

6.5.3.1 An outline of the baseline environment for marine mammals based upon an initial review of key data sources is provided below. This baseline is informed through a desktop review of key datasets (**Table 6.5.2**), information from the site-specific aerial surveys undertaken within the Array Site Boundary and site-specific surveys for nearby offshore wind farms. Additional data sources (e.g. emerging research and relevant EIAs including for offshore wind and cable projects) will also be used to inform the assessment in the marine mammal ecology chapter of the ES.

- **General** – this subsection summarises baseline environment information across the entire marine mammals study area (i.e. both English and Scottish waters) and is therefore applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to be made to MD-LOT.
- **Scottish Waters** – this subsection summarises baseline environment information which specific to the portion of the marine mammals study area located within Scottish waters and is therefore applicable to the application for a Marine Licence to be made to MD-LOT.

Target Species

6.5.3.2 The following section summarises abundance and density estimates of the six key marine mammal species that that are likely to occur within the marine mammal study area and the regional marine mammal study area as identified by the desktop review and site-specific aerial surveys undertaken within the Array Site Boundary. Grey seals and harbour seals at haul-out sites are at risk of impacts landward of MLWS and therefore seal haul-out sites are important to consider in terms of potential impacts from activities relevant to the Offshore Transmission Infrastructure and Landfall.

General

Harbour Porpoise

6.5.3.3 The harbour porpoise has a large population and is extensively distributed throughout the North Sea, where it is the most abundant cetacean species (Joint Cetacean Data Programme (JCDP) 2023; Hammond *et al.*, 2021; Evans and Waggitt, 2020; Chevallard *et al.*, 2019).The marine mammal study area is located within the North Sea MU for harbour porpoise (IAMMWG, 2023), which has an estimated abundance of 346,601 individuals (Coefficient of Variation (CV): 0.09, 95% Confidence limits (CI): 289,498 to 419,967) based on estimates from the SCANS-III survey (Hammond *et al.*, 2017; 2021).

6.5.3.4 The most recent broadscale data, on harbour porpoise is that available from the SCANS-IV survey campaign (summer 2022). The SCANS-IV density estimate was 0.5985 individuals per km^2 (CV: 0.367, 95% CI: 18,017 to 76,361) for survey Block NS-D and 0.6027 individuals per km^2 (CV: 0.228, 95% CI: 23,346 to 56,118) for survey Block NS-C (Gilles *et al.*, 2023). The previous SCANS-III density estimate was 0.599 individuals per km^2 (CV: 0.287, 95% CI: 20,584 to 66,524) for survey Block R and for survey Block O the density estimate was 0.888 individuals per km^2 (CV: 0.209, 95% CI: 37,413 to 81,695) (Hammond *et al.*, 2017; 2021). The predicted mean density surface of harbour porpoise in the marine mammal study area is 1.16 (max: 1.55) animals per km^2, based upon modelling of SCANS-III densities by Lacey *et al.* (2022).

6.5.3.5 Sightings data between 1980 and 2018, collated by Waggitt *et al.* (2020), report year-round abundance of harbour porpoise, with increased density in the summer months. This is consistent with the results of the site-specific aerial surveys conducted for the nearby Berwick Bank Offshore Wind Farm, which reported higher densities during spring and summer than in autumn and winter (SSER, 2022). Additionally, harbour porpoise was the most abundant marine mammal recorded during the site-specific surveys for the Array Site Boundary, with a total of 825 individuals sighted between March 2021 to February 2023 (Ossian OWFL, 2024). They were observed each month except for January 2022, October 2022 and January 2023.

6.5.3.6 Given their recorded abundance in the literature and site-specific surveys of the Array Site Boundary and nearby offshore wind farms, harbour porpoises are considered likely to occur within the marine mammal study area and regional marine mammal study area year-round.

Minke Whale

6.5.3.7 The minke whale is the smallest, most abundant baleen whale *Mysticetes* species observed in UK waters (Robinson *et al.*, 2021; Evans and Waggitt, 2020). All minke whales in UK waters are part of the Celtic and Greater North Seas MU (IAMMWG, 2022). This MU has an estimated abundance of 20,118 individuals in the entire MU (CV: 0.18, 95% CI: 14,061 to 28,786) based on estimates from the SCANS-III survey (Hammond *et al.*, 2017, 2021) and ObSERVE survey (Rogan *et al.*, 2018).

6.5.3.8 For the SCANS-IV survey Block NS-C the density estimate was 0.0068 individuals per km^2 (CV: 0.881, 95% CI: 4 to 1,392) and for Block NS-D the density estimate was 0.0419 individuals per km^2 (CV: 0.594, 95% CI: 547 to 7,357) (Gilles *et al.*, 2023). The SCANS-III density estimate was 0.0387 individuals per km^2 (CV: 0.614, 95% CI: 604 to 6,791) for survey Block R, and 0.0100 individuals per km^2 (CV: 0.621, 95% CI: 109 to 1,670) for Block O (Hammond *et al.*, 2017; 2021). The predicted mean density surface of minke whale in the marine mammal study area is 0.02 (max: 0.03) animals per km^2 (Lacey *et al.*, 2022).

6.5.3.9 Minke whales are considered to be seasonal visitors to the northern North Sea, as they are mainly present in Scottish waters in the summer (Hague, *et al.*, 2020; Waggitt *et al.*, 2020). This is consistent with the results of the site-specific surveys for the Array Site Boundary (Ossian OWFL, 2024), which recorded minke whales in the summer only, with 12 individuals recorded across June and July in 2021 and 2022. Similarly, they were only observed in the summer months in site-specific aerial surveys for Berwick Bank Offshore Wind Farm and Firth of Forth Round 3 Zone surveys (Sparling, 2012; SSER, 2022). Therefore, minke whales are considered likely to occur regularly in the summer months within the marine mammal study area and the regional marine mammal study area.

White-Beaked Dolphins

6.5.3.10 The white-beaked dolphin is endemic to the North Sea, with an estimated population of nearly 36,000 individuals (Ijsseldijk *et al.*, 2018). The white-beaked dolphin is the second most common cetacean species present in the North Sea following the harbour porpoise (Schick *et al.*, 2020). All white-beaked dolphins in UK waters are part of the Celtic and Greater North Seas MU (IAMMWG, 2022). This MU has an estimated abundance of 43,951 individuals in the entire MU (CV: 0.22, 95% CI: 28,439 to 67,924) based on estimates from the SCANS-III survey (Hammond *et al.*, 2017; 2021) and ObSERVE survey (Rogan *et al.*, 2018).

6.5.3.11 For the SCANS-IV survey Block NS-C the density estimate was 0.0149 individuals per km^2 (CV: 0.758, 95% CI: 12 to 2,387) and 0.0799 individuals per km^2 (CV: 0.481, 95% CI: 961 to 10,586) for Block NS-D (Gilles *et al*., 2023). The SCANS-III density estimate was 0.243 individuals per km^2 (CV: 0.484, 95% CI: 3,022 to 33,340) for survey Block R and 0.002 individuals per km^2 (CV: 0.970, 95% CI: 0 to 490) for Block O (Hammond *et al.*, 2017; 2021). The predicted mean density surface of white-beaked dolphin in the marine mammal study area is 0.03 (max: 0.14) animals per km^2 (Lacey *et al.*, 2022).

6.5.3.12 Waggitt *et al.* (2020) reported year-round abundance of white-beaked dolphins in the regional marine mammal study area, with an increase in abundance in the summer months. This is consistent with the results of the site-specific surveys for the Array Site Boundary (Ossian OWFL, 2024), as individuals were observed between March to October, with highest numbers recorded in July (n=12). White-beaked dolphins were the second most abundant marine mammal observed during the site-specific surveys for the Array Site Boundary thus far, with a total of 30 individuals sighted across the surveys.

6.5.3.13 Given the literature and observations during recent site-specific surveys for the Array Site Boundary, white-beaked dolphins are considered likely to occur within the marine mammal study area and regional marine mammal study area.

Grey Seal

6.5.3.14 Grey seals have a wide distribution in the seas around UK, with the largest pupping sites located in the Inner and Outer Hebrides, Orkney, Isle of May, Farne Islands and Donna Nook (JNCC, 2022b). The regional marine mammal study area is situated within the East Scotland Seal Management Unit (SMU), Northeast England, Southeast England SMUs, with potential overlap with Moray Firth SMU (SCOS, 2022). This overlap with the further away Moray Firth SMU is due to extensive offshore foraging trips undertaken by grey seals (McConnell *et al.*, 2012; Jones *et al.*, 2015; SCOS, 2022).

6.5.3.15 The most recent August population estimate of grey seals in Scotland at the start was 24,640 individuals in 2021, and 41,135 in the UK (SCOS, 2022). The most recent estimated pup production from 2022 was 129,100 pups in Scotland and 162,000 in the UK (SCOS, 2022). The overall pup production for the North Sea colonies is increasing at a rate of 7% per year (SCOS, 2022).

6.5.3.16 August haul out counts for the East Scotland Seal Management Areas (SMA) have increased from 2,328 individuals during the 1996-1997 survey to 3,683 in the 2016-2019 survey (Morris *et al.*, 2021). August haul out counts for the Moray Firth SMA population increased from 551 individuals in the 1996-1997 survey to 1,917 in the 2011-2015 survey, with a decrease to 1,657 in the 2016-2019 survey (Morris *et al.*, 2021). There are infrequent counts over the years, for the Northeast England SMU and Southeast England SMU, with grey seals primarily more present in the Southeast England SMU. These counts show a significant increase from 613 individuals in the 1996-1997 period to 6,457 in the 2018-2021 period for the Northeast England SMU, and an increase from 417 in the 1996-1997 period to 7,665 individuals in 2021 for the Southeast England SMU (SMRU, 2022b).

6.5.3.17 Grey seals were recorded only eighteen times between March 2021 to February 2023, during the site-specific surveys for the Array Site Boundary. They were mainly observed during April and June (Ossian OWFL, 2024). During Berwick Bank Offshore Wind Farm surveys grey seal was recorded 180 times, from year-round (SSER, 2022).

6.5.3.18 At sea distribution (relative density) of grey seal derived from high-resolution GPS tracking data across the UK and Ireland reveals that the mean density across the marine mammal study area are likely to be 16 per 5 km x 5 km grid cells, with a max density of 131 per 5 km x 5 km grid cells (**Figure 6.5.3**) (Carter *et al.*, 2022).

6.5.3.19 Given their recorded abundance in the literature and recent site-specific surveys for the Array Site Boundary, grey seals are considered likely to occur year-round within the marine mammal study area and regional marine mammal study area.

Harbour Seal

6.5.3.20 Harbour seals are present around the UK with a higher abundance around Scotland; approximately 80% of the UK population resides around the Scottish coast. Low numbers are also encountered along the south and west coast of England and along the coasts of Wales (JNCC, 2019f). The regional marine mammal study area is situated within the East Scotland SMU, Northeast England and Southeast England SMU (SCOS, 2022).

6.5.3.21 The most recent August population estimate of harbour seal in Scotland at the start was 26,378 individuals in 2021, and 30,855 in the UK (SCOS, 2022). The most recent estimated pup production from 2016-2021 was 5,100 pups in Scotland and 42,900 in the UK (SCOS, 2022). Counts of harbour seals in East Scotland and Southeast England were all substantially lower than counts in recent years (SCOS, 2022). August haul out counts for the East Scotland SMA have decreased from 764 individuals during the 1996-1997 survey to 343 in the 2016-2019 survey (Morris *et al.*, 2021). There are infrequent counts over the years, for the Northeast England and Southeast England, with harbour seals primarily more present in Southeast England. Northeast England shows a slight increase from 54 individuals in the 1996-1997 period to 89 in the 2018-2021 period, and an increase from 3,093 in the 1996-1997 period to 3,419 individuals in 2021 for Southeast England (SMRU, 2022b).

6.5.3.22 Harbour seal was recorded only two times between March 2021 to February 2023, during the site-specific survey for the Array Site Boundary. They were observed during April 2021 and May 2022 (OWFL, 2024). During Berwick Bank Offshore Wind Farm surveys harbour seal was recorded three times, from January 2021 to April 2021 (SSER, 2022).

6.5.3.23 At sea distribution (relative density) of harbour seal derived from high-resolution GPS tracking data across the UK and Ireland reveals that mean density across the marine mammal study area are likely to be two, with a max density of 50 per 5 km x 5 km grid cells (**Figure 6.5.4**) (Carter *et al.*, 2022).

6.5.3.24 Given their recorded abundance in the literature harbour seals are considered likely to occur year-round within the marine mammal study area and regional marine mammal study area.

Other Marine Mammal Species

6.5.3.25 A number of other marine mammal species have been recorded occasionally (or in very low numbers) within, or in proximity to, the marine mammal study areas during historic surveys.

6.5.3.26 There were low number of Atlantic white-sided dolphins *Lagenorhynchus acutus* and common dolphin *Delphinus delphis* recorded within the regional marine mammal study area the most recent SCANS-IV survey (Gilles *et al.*, 2023). Estimated density maps (at 10 km^2 resolution) based on compiled data for the Northeast Atlantic between 1980 and 2018 suggest that, in the waters off the east coast of Scotland, Atlantic white-sided dolphin may occur in very low numbers between late spring and early autumn. Risso's dolphin *Grampus griseus* may occur seasonally in low numbers from July to November along the east coast of Scotland and England (Waggitt *et al.*, 2020). One sighting of a group of ten white-sided dolphins was observed during site specific boat-based surveys conducted during Firth of Forth Round 3 surveys for the nearby Seagreen Offshore Wind Farm (Sparling, 2012).

6.5.3.27 Killer whale *Orcinus orca*, common dolphin, long-finned pilot whales *Globicephala melas* and pygmy sperm whale *Kogia breviceps* have been recorded as rare or occasional visitors within the regional marine mammal study area (Reid *et al.*, 2003). One common dolphin, one killer whale and a group of eight long-finned pilot whales, were observed in aerial surveys within the Firths of Forth and Tay (Grellier and Lacey, 2012). Waggitt *et al.* (2020) suggest that, in the east coast of the UK, there were very low predicted densities of common dolphin in summer months. Whilst there are accounts that common dolphin may have expanded its range northward in UK waters (MacLeod *et al.*, 2005; van Weelden *et al.*, 2021), given its preference for warmer temperate and tropical seas, it is still regarded as an occasional visitor within the northern North Sea. Waggitt *et al.* (2020) also found low estimated densities of killer whale in all months and long-finned pilot whales are more likely to occur further north in the offshore waters of the Moray Firth.

6.5.3.28 The Forth Marine Mammal Project has mapped inshore sightings of marine mammals (from coastal vantage points) within the Firth of Forth (west of the Array Site Boundary and Offshore Scoping Boundary) between April 2021 to April 2023, although noting that there is a high probability that the same individuals were recorded by multiple observers. The interactive map shows that common dolphin has been only sighted occasionally, mostly in summer months; a single killer whale was sighted in June 2021; several sightings of humpback whale were recorded in December 2022 and January/February 2023; and several sightings of sei whale *Balaenoptera borealis* were recorded in spring/summer 2021.

6.5.3.29 In the Ossian Array EIA Scoping Opinion (MD-LOT, 2023), it was advised that humpback whale is added to the list of receptors and further information should be sought on the occurrence and presence of this species within the marine mammal study area and regional marine mammal study area (Marine Scotland, 2023).

6.5.3.30 Due to low likelihood of occurrence and/or their rarity in the regional marine mammal study area most species reported above are not considered to require further assessment for the Offshore Scoping Boundary. The exception is humpback whale which, based on the recent increase in sightings around the Firth of Forth, will be taken forward for consideration in the assessment qualitatively, as robust sources of abundance and density estimates are not available for humpback whale.

Marine Turtles

6.5.3.31 Six species of marine turtle have been sighted in UK waters, including the green turtle *Chelonia mydas*, hawksbill turtle *Eretmochelys imbricata*, Kemp's ridley turtle *Lepidochelys kempii*, leatherback turtle *Dermochelys coriacea*, loggerhead turtle *Caretta caretta* and olive ridley turtle *Lepidochelys olivacea*. However, as the majority of strandings, sightings and captures of marine turtle species occur on the south and western aspects of the UK and Ireland (Botterell *et al.,* 2020), it is proposed to scope marine turtles out of the EIA process due to their rare occurrence on the eastern aspect of the UK. Therefore, marine turtles are not discussed further in this EIA Scoping Report.

6.5.3.32 Designated sites which are located within the marine mammals study area related to English waters are listed in **Table 6.5.1** and shown in **Figure 6.5.5**.

Scottish waters

Bottlenose Dolphin

6.5.3.33 The Moray Firth hosts the only year-round resident population of bottlenose dolphin in the North Sea (Robinson *et al.*, 2017). The Moray Firth Special Area of Conservation (SAC) is designated for bottlenose dolphins (Cheney *et al.,* 2018; JNCC, 2022a). Important areas include the Moray Firth, the Tay Estuary and the Firth of Forth. In recent years the range of bottlenose dolphin has expanded further south along the Scottish coast, and into north-east England (Arso Civil *et al.*, 2023). Bottlenose dolphins have also been recorded off the Western Isles of Scotland and are commonly found in inshore and deep coastal waters (Avant, 2008), where they form separate inshore and offshore populations. The marine mammal study area is located within the Greater North Sea MU for bottlenose dolphin (IAMMWG,

2023), which has an estimated abundance of 2,022 individuals (CV: 0.75, 95% CI: 548 to 7,453) based on estimates from the SCANS-III survey (Hammond *et al.*, 2017; 2021). The Coastal East Scotland MU, which consists of 224 individuals (CV: 0.02, 95% CI: 214 to 234), lies 60 km west of the Offshore Scoping Boundary. Whilst the Coastal East Scotland MU does not extend to the Offshore Scoping Boundary, bottlenose dolphins within this MU could cross into the Greater North Sea MU and should therefore be included in the assessment. The number of reported sightings of bottlenose dolphin along the north-east coast of England has increased over the last decade (IAMMWG, 2023).

6.5.3.34 For the SCANS-IV survey Block NS-C, the density estimate was 0.0419 individuals per km^2 (CV: 0.683, 95% CI: 57 to 6,616) with an abundance of 2,520 individuals, no density numbers were available for Block NS-D (Gilles *et al.*, 2023). The SCANS-III density estimate was 0.0298 individuals per km^2 (CV: 0.861, 95% CI: 0 to 5,048) for survey Block R whilst for survey Block O, no densities were available (Hammond *et al.*, 2017; 2021). The predicted mean density surface of bottlenose dolphin from Lacey *et al.* (2022) in the marine mammal study area is 0.002 (max: 0.004) animals per km^2.

6.5.3.35 Sightings data between 1980 and 2018, collated by Waggitt *et al.* (2020), report low abundance of bottlenose dolphin in the regional marine mammal study area year-round. This is consistent with the results of the site-specific aerial surveys conducted for the nearby Berwick Bank Offshore Wind Farm, which reported low-density numbers (SSER, 2022). They were only sighted eight times during two years of surveys, in October 2019 and April 2021. Additionally, bottlenose dolphins were not recorded during the site-specific surveys for the Array Site Boundary (Ossian OWFL, 2024).

6.5.3.36 Given their recorded abundance in the literature and site-specific surveys of nearby offshore wind farms, bottlenose dolphin may occur in low numbers. However, the most recent studies, both Gilles *et al*. (2023) and IAMMWG (2023), indicate that bottlenose dolphin abundance along the north-east coast of England has increased therefore there is the potential that they will be within the regional marine mammal study area.

Summary of Key Species

6.5.3.37 The key species that are likely to occur in the marine mammal study area and that are proposed to be taken forward to the impact assessment for a detailed assessment are:

- harbour porpoise;
- bottlenose dolphin;
- minke whale;
- white-beaked dolphin;
- grey seal;
- harbour seal; and
- humpback whale (qualitative assessment only).

6.5.3.38 Species that may be rare or occasional visitors and/or occur in very low numbers in the marine mammal study area and, therefore, will be scoped out:

- common dolphin;
- Atlantic white-sided dolphin;
- Risso's dolphin;
- killer whale;
- long finned pilot whale;
- pygmy sperm whale; and
- sei whale.

6.5.3.39 The species listed above are afforded protection under various legislation, including species protected under Annex II of the Habitats Regulations. Updated data on species densities and abundances will be included as it becomes available.

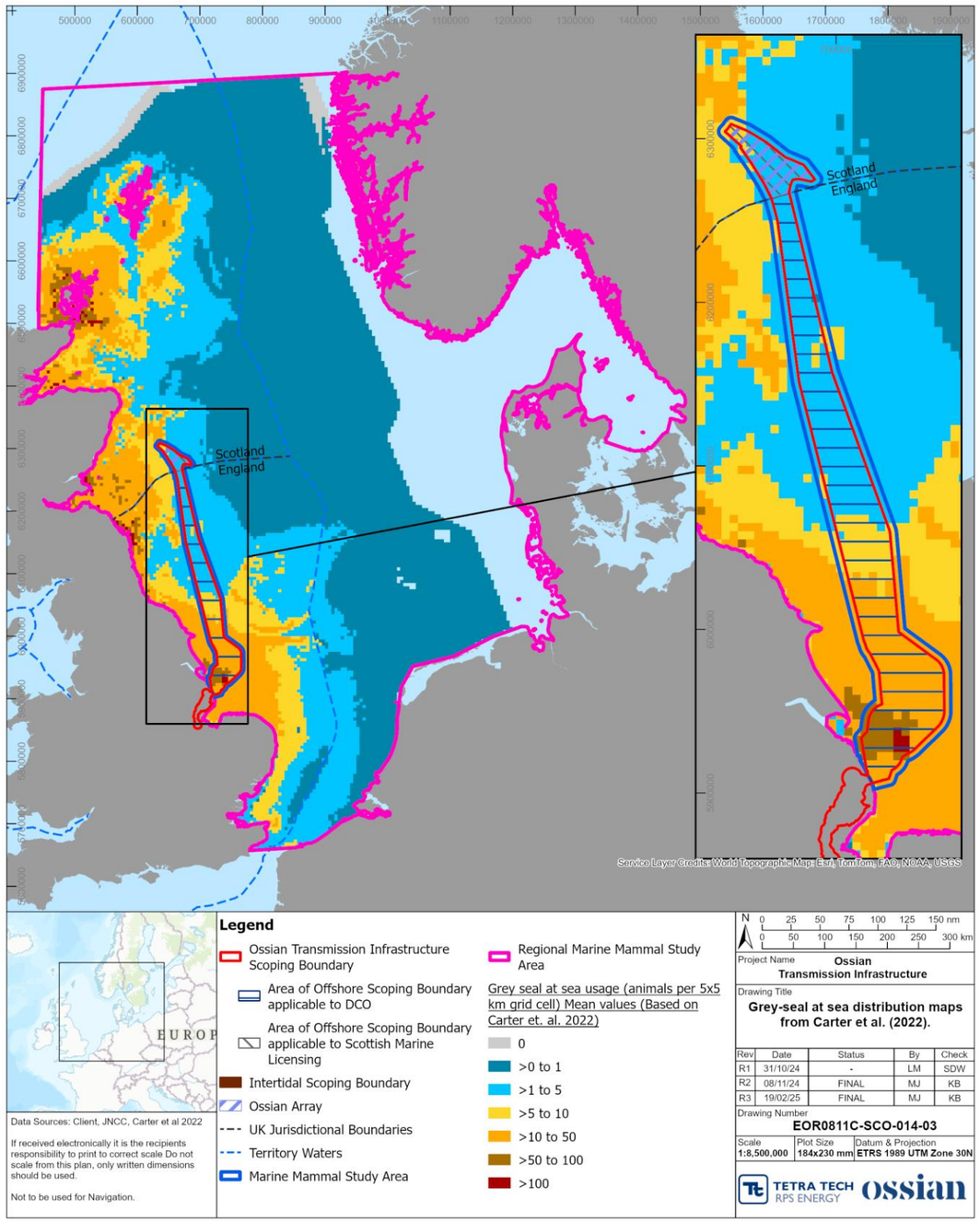

Figure 6.5.3: Grey Seal at Sea Distribution Maps from Carter *et al.* (2022)

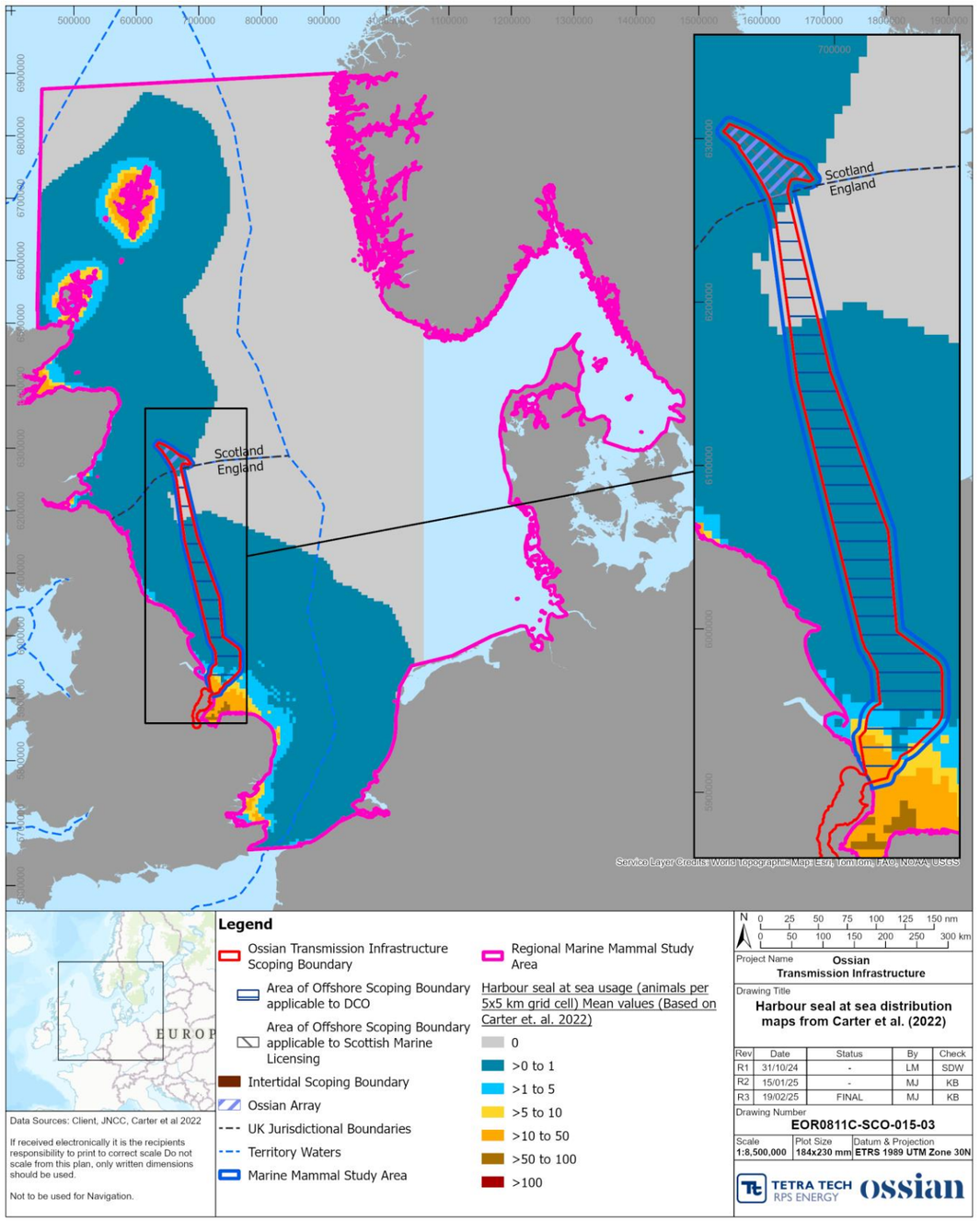

Figure 6.5.4: Harbour Seal at Sea Distribution Maps from Carter *et al.* (2022)

Designated Sites

6.5.3.40 The marine mammal study area overlaps with three protected sites that have been designated for marine mammal features (see **Table 6.5.1** and **Figure 6.5.5**). For the purposes of the EIA Scoping Report, only UK waters have been included; however, the Likely Significant Effects (LSE) Screening Report will consider waters of adjacent member states.

6.5.3.41 A Stage 1 Likely Significant Effect (LSE) Screening Report has been produced to inform the Habitats Regulations Assessment for the Ossian Transmission Infrastructure, which will assess the potential for the Offshore Transmission Infrastructure (and Onshore Transmission Infrastructure) to result in a LSE on European designated sites (including SACs designated for marine mammal features). It is noted that that European sites located in the UK are no longer part of the Natura 2000 network and are now included as part of the National Site Network. Further detail on the Habitats Regulations process is provided in the Stage 1 LSE Screening Report (Ossian OWFL, 2025).

6.5.3.42 Relevant marine mammal features of designated sites will be fully considered and assessed within the marine mammal chapter of the ES. The information to support the assessment on European designated sites will be provided within the Information to Support Appropriate Assessment (ISAA), which will accompany the ES.

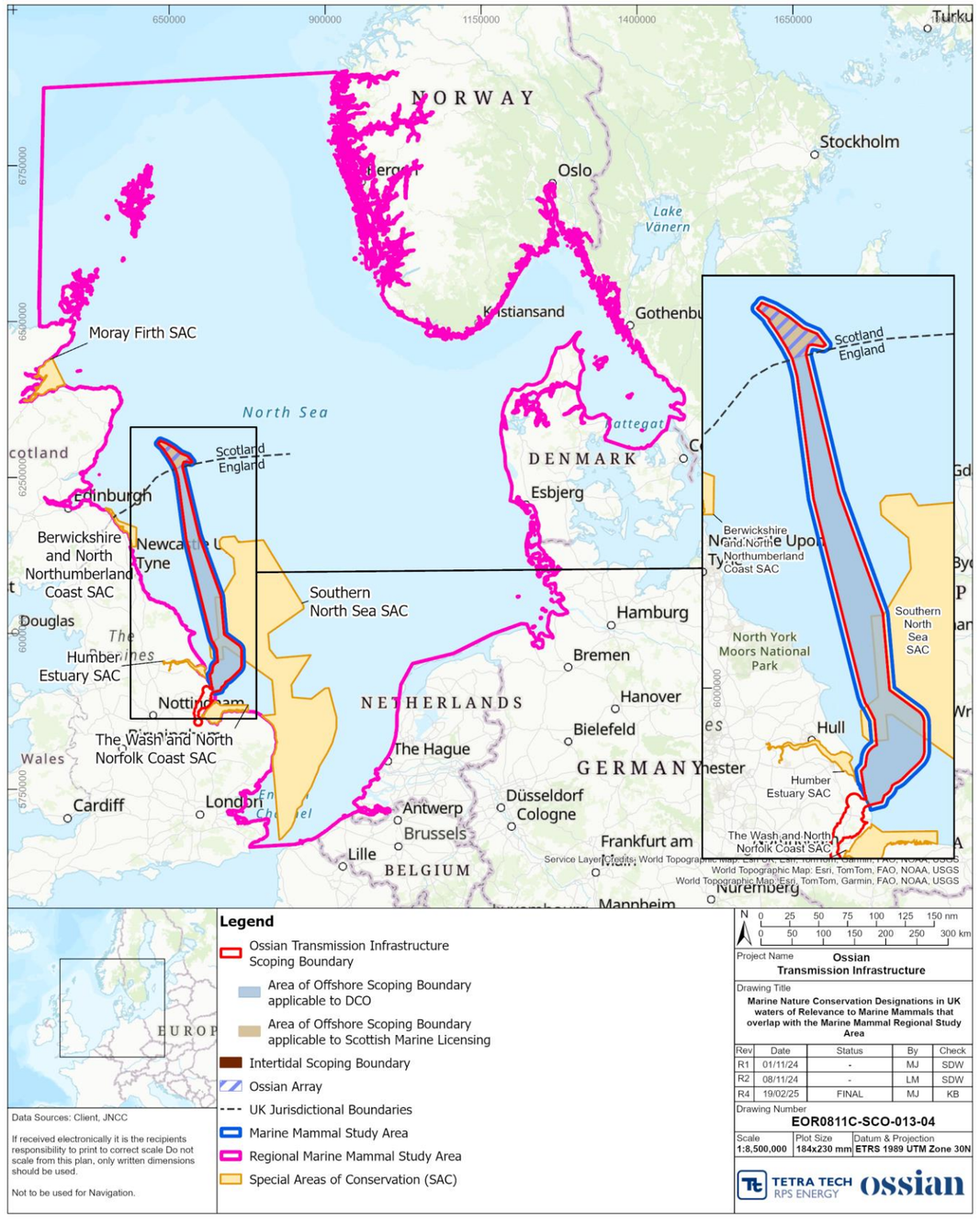

Figure 6.5.5: Marine Nature Conservation Designations in UK waters of Relevance to Marine Mammals that overlap with the Regional Marine Mammal Study Area

Table 6.5.1: Summary of Designated Sites with Relevant Qualifying Features Located within the Regional Marine Mammal Study Area Which May Be Scoped In For Further Assessment, Upon Review of Potential Impacts

Designated site	Distance to Offshore/Intertidal Scoping Boundaries (km)	Relevant qualifying features
English waters		
Marine Protected Area (MPA)		
Southern Trench MPA	81.3	• Minke whale
Special Area of Conservation (SAC)		
Humber Estuary SAC	2.7	• Grey seal
Southern North Sea SAC	0 - overlaps with the Offshore Scoping Boundary (extent of overlap: 1524.7 km^2)	• Harbour porpoise
The Wash and North Norfolk Coast SAC	3.61	• Harbour seal
Berwickshire and North Northumberland Coast SAC	79.9	• Grey seal
Scottish waters		
Moray Firth SAC	198.4	• Bottlenose dolphin
Mousa SAC	344.9	• Harbour seal
Yell Sound Coast SAC	399.7	• Harbour seal

Future Baseline Conditions

6.5.3.43 The EIA process will consider the existing baseline conditions within the marine mammal study area and regional marine mammal study area, however, it will also evaluate the future baseline conditions as far as reasonably practicable. The baseline environment is not static, therefore, even if the Ossian Transmission Infrastructure does not come forward, the environment will exhibit some degree of natural change. These changes may occur due to naturally occurring cycles and processes and any potential changes resulting from climate change.

6.5.3.44 During construction, operation and maintenance and decommissioning of Offshore Transmission Infrastructure, changes in distribution of marine mammals in the North Sea are likely to occur due to climate change and the associated effects on temperature and ocean acidification. Even where direct effects do not occur, climate change may affect prey resources which will in turn drive changes in marine mammal distribution. There are indications, for example, that the range of bottlenose dolphins is extending more southwards along the English east coast (IAMMWG, 2023).

6.5.3.45 However, such changes are not predictable. Given the long-term nature of such processes, such changes are not likely to be significant between now and the commencement of construction of the Offshore Transmission Infrastructure. It is therefore considered that an assessment based on the current baseline is an appropriate representation of the conditions pertaining at the commencement of construction.

6.5.4 Proposed Data Sources

6.5.4.1 **Table 6.5.2** presents the data sources proposed for the marine mammals assessment.

6.5.4.2 The marine mammal baseline environment of the ES will be characterised through an extensive desktop review of key datasets. As well as desk-based sources, the results from the site-specific aerial surveys undertaken for the Array Site Boundary (which overlaps with the majority of the Offshore Scoping Boundary in Scottish waters) (Ossian OWFL, 2024) will provide an important source of data to inform the marine mammal baseline the ES (**Table 6.5.3**).

6.5.4.3 Additional data sources (e.g. emerging research and offshore wind EIAs) will also be used to inform the assessment in the marine mammal chapter of the ES. Note that, in addition to these data sources, relevant output of the consultation process will also be considered.

6.5.4.4 Information on UXO presence within the marine mammal study area will be collected during a UXO Desktop Assessment and will be used to inform the marine mammal chapter of the ES.

Table 6.5.2: Summary of Key Desktop Datasets and Reports

Title	Year	Author	Citation
General (applicable to both English and Scottish waters)			
Analysis of The Crown Estate aerial survey data for marine mammals for the FTOWDG region	2012	SMRU Limited	Grellier and Lacey (2012)
Atlas of Cetacean distribution in northwest European waters	2003	JNCC	Reid *et al.* (2003)
August Seal Counts – England	2023	NERC and SMRU	SMRU (2023)
Background information on marine mammals for Strategic Environmental Assessment (SEA) 6.	2005	Sea Mammal Research Unit (SMRU), University of St Andrews	Hammond *et al.* (2005)
Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys.	2021	SMRU, University of St Andrews	Hammond *et al.* (2021)
Estimates of cetacean abundance in European Atlantic waters in summer 2022 from the SCANS-IV aerial and shipboard surveys.	2023	Institute for Terrestrial and Aquatic Wildlife Research, University of Veterinary Medicine Hannover	Gilles *et al.* (2023)
Distribution maps of Cetacean and seabird populations in the North-East Atlantic.	2020	Journal of Applied Ecology	Waggitt *et al.* (2020)
Revised Phase III Data Analysis of Joint Cetacean Protocol Data Resource.	2016	JNCC	Paxton *et al.* (2016)
Scientific advice on matters related to the management of seal populations: 2022.	2023	SMRU, University of St Andrews	Special Committee on Seals (SCOS) (2023)
Sympatric Seals, Satellite Tracking and Protected Areas: Habitat-Based Distribution Estimates for Conservation and Management	2022	Frontiers in Marine Science	Carter *et al.* (2022)
English waters			
Dogger Bank Teesside A and B Environmental Statement Chapter 14 Appendix B DMP Analysis Report	2014	Forewind	Forewind (2014)
Hornsea Project Four: Environmental Statement	2021	Orsted	Orsted (2021)
JNCC Report 734: Review of Management Unit boundaries for cetaceans in UK waters (2023)	2023	JNCC	Inter-Agency Marine Mammal Working Group (IAMMWG) (2023)
Joint Nature Conservation Committee (JNCC) Report 544: Harbour Porpoise Density.	2015	JNCC	Heinänen and Skov (2015)
Map view – inventory of the Cetaceans database sightings and effort.	2023	JCDP	JCDP (2023)
Modelled density surfaces of Cetaceans in European Atlantic waters in summer 2016 from the SCANS-III surveys.	2022	SMRU, University of St Andrews	Lacey *et al.* (2022)

Title	Year	Author	Citation
Outer Dowsing Offshore Wind Environmental Statement	2024	Outer Dowsing Offshore Wind	Outer Dowsing Offshore Wind (2024)
Scottish waters			
Berwick Bank Wind Farm Offshore EIA Report	2022	SSE Renewables (SSER)	SSER (2022)
Cetacean Baseline Characterisation for the Firth of Tay based on existing data: Bottlenose dolphins	2011	SMRU Consulting	Quick and Cheney (2011)
Forth and Tay Offshore Wind Developers Group cetacean survey data analysis report	2012	SMRU	Mackenzie *et al.* (2012)
Improving understanding of bottlenose dolphin movements along the east coast of Scotland	2021	SMRU Consulting	Arso Civil *et al.* (2021)
Integrating multiple data sources to assess the distribution and abundance of bottlenose dolphins *Tursiops truncatus* in Scottish waters	2013	Mammal review	Cheney *et al.* (2013)
NatureScot Research Report 1256 - Aerial surveys of seals in Scotland during the harbour seal moult, 2016-2019	2021	NatureScot	Morris *et al.* (2021)
Regional baselines for marine mammal knowledge across the North Sea and Atlantic areas of Scottish waters. Scottish Marine and Freshwater Science.	2020	Marine Scotland Science	Hague *et al.* (2020)
Seagreen Firth of Forth Round 3 Zone Marine Mammal Surveys	2012	Royal Haskoning and Seagreen Wind Energy Ltd	Sparling (2012)

6.5.5 Mitigation Measures

6.5.5.1 The following measures adopted as part of the Offshore Transmission Infrastructure are relevant to the assessment for marine mammals. These measures may evolve (and be further clarified) as the design and EIA process progresses:

- The development of, and adherence to, an appropriate Code of Construction Practice (CoCP) (which applies to the DCO Application).
- The development of, and adherence to, a Construction Method Statement (CMS) (which applies to the Marine Licence).
- The development of, and adherence to, an Environmental Management Plan (EMP).
- The development of, and adherence to, a Marine Pollution Contingency Plan (MPCP).
- The development of, and adherence to, a Vessel Management Plan (VMP); or equivalent to be consulted upon with stakeholders post-consent.
- The development of, and adherence to, a Decommissioning Programme.

6.5.5.2 All cetaceans are European Protected Species (EPS) and should any potential disturbances occur to the species, a licence to disturb will be sought to follow the appropriate legal requirements. Separate EPS licences may be required for English and Scottish waters.

6.5.5.3 The likely significance of effects of the Offshore Transmission Infrastructure on marine mammal receptors may result in the requirement for additional mitigation measures. This will be consulted upon with the statutory consultees throughout the EIA process.

6.5.6 Proposed Scope of the Assessment

6.5.6.1 Potential impacts that are proposed to be scoped into the assessment for marine mammals are set out in **Table 6.5.3**.

6.5.6.2 It should be noted that injury and disturbance from subsea noise generated during unexploded ordnance (UXO) clearance is listed as an impact in **Table 6.5.3** for the pre-construction and decommissioning phases. Should UXO clearance be required, it is expected that this will be covered by a separate Marine Licence applications via the Marine Management Organisation (MMO[1]) and Marine Directorate and is therefore not proposed to be quantitatively assessed for marine mammals via this EIA process for the Offshore Transmission Infrastructure. Instead, the potential for injury and disturbance to marine mammals from UXO clearance will be presented qualitatively based on existing evidence.

6.5.6.3 It should be noted that should UXO clearance be required, the Applicant intends to develop and adhere to a Marine Mammal Mitigation Plan (MMMP) based on quantitative modelling performed using information on any confirmed potential UXO targets; and, by default, the use of low noise methods of clearance *e.g.,* deflagration. These measures will be further discussed and assessed in the separate Marine Licence applications for UXO clearance (should this activity be required).

Table 6.5.3: Potential Impacts Proposed to be Scoped In for Marine Mammals

Impact	Project Phase[8]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Injury and disturbance from subsea noise generated during UXO clearance	✓	×	✓	✓	✓	Marine mammals are sensitive to increased subsea noise generated during UXO clearance. UXO clearance is typically associated with the pre-construction phase; however, there is also a low, but possible, potential that UXOs may migrate into the Offshore Export Cable Corridor(s) over the course of the lifetime of the Offshore Transmission Infrastructure and, therefore, result in further UXO clearance in the decommissioning phase. Although UXO detonation works will be consented under a separate Marine Licence (if required), potential impacts from the works are scoped in here to ensure a pragmatic holistic assessment of impacts to marine mammals is carried out.	A detailed qualitative assessment will be undertaken to assess the risk of auditory injury and disturbance due to UXO clearance. This will be based on the best available and most recent modelled and measured information. Detailed subsea noise modelling is best employed once potential UXO targets are identified, and this detail will be included in the separate Marine Licence application and Risk Assessment (if required). The separate license application (if required) will include mitigation measures, proportionate to the risk posed by the chosen clearance tool, and the development of a MMMP that is informed by the most recent guidance (JNCC,2025) and the outcomes of subsea noise modelling. Within the MMMP, additional mitigation will be outlined as required, such as the use of a defined mitigation zone, Marine Mammal Observers (MMOs[2]), Passive Acoustic Monitoring (PAM) and Acoustic Deterrent Devices (ADDs) (JNCC, 2023).
Disturbance due to geophysical surveys	✓	✓	✓	✓	✓	Geophysical surveys in the pre-construction phase and operation and maintenance and decommissioning phase may result in behavioural disturbance/displacement of marine mammals. It is anticipated that geophysical surveys during the operation and maintenance phase will involve 1x survey vessel (or Unmanned Surface Vessel (USV)) annually for the first three years, and then every 24 months following.	A qualitative assessment will be undertaken to cover all typical geophysical equipment planned for use. This will be based on the best available and most recent literature at the time of writing.
Disturbance due to vessel use and other activities	✓	✓	✓	✓	✓	The impact of vessel use and vessel activities (such as cable installation and burial, and rock placement within the construction phase, cable repairs within the operation and maintenance phase, and decommissioning activities) may result in behavioural disturbance and/or displacement of marine mammals including the potential for Landfall activities to result in disturbance to seals at haul-out sites.	A qualitative assessment will be undertaken to cover all noise producing activities, such as rock placement and vessel movement. This will be based on the best available and most recent literature at the time of writing.
Injury due to collision with vessels	✓	✓	✓	✓	✓	There is likely to be increased vessel traffic during all phases, which could increase the risk of collisions with marine mammals.	A qualitative assessment will be undertaken, based on the best available and most recent literature at the time of writing.

[8] Construction (C), Operation and Maintenance (O), Decommissioning (D)

Impact	Project Phase[8]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Effects on marine mammals due to altered prey availability	✓	✓	✓	✓	✓	Changes in abundance and distribution of prey species (such as fish, crustaceans, cephalopods, etc.) may occur due to activities in the construction phase and decommissioning phase. These changes may affect the ability of marine mammals to forage. During the operation and maintenance phase, there is potential for impacts arising from Electro-Magnetic Fields (EMFs) from subsea electrical cabling on prey species. Subsea electrical cables (e.g. high voltage alternating current export cables) emit EMFs along their lengths, which may alter prey availability.	The physical processes assessment will be based upon a literature review of relevant offshore wind farm projects and other relevant projects in the vicinity of the Offshore and Intertidal Scoping Boundaries to provide an overview of impacts arising from increased SSCs and associated sediment deposition carried out for fish and shellfish receptors. The assessment of likely significant effects arising from EMFs will be carried out qualitatively for the fish and shellfish ecology assessment, presenting the maximum spatial scale of the impact, determined by the Maximum Design Scenario and will be based on the Project Design Envelope and available scientific literature on EMFs in the marine environment, including associated effects on fish and shellfish.

6.5.7 Impacts Proposed to be Scoped Out

6.5.7.1 There are no impacts proposed to be scoped out of the assessment for marine mammals.

6.5.8 Proposed Assessment Methodology

6.5.8.1 The assessment methodology proposed to be used for the impacts proposed to be scoped in for marine mammals as set out in **Table 6.5.3** is described below.

Legislation and Policy

6.5.8.2 An overview of relevant legislation and policy is provided in **part 1, section 2** of this EIA Scoping Report. Further details of topic specific legislation and policy will be provided within the marine mammal ES chapter.

Relevant Guidance

6.5.8.3 The following guidance documents relevant to the marine mammal assessment will be considered in the ES:

- **General (applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to made to MD-LOT):**
  - JNCC DRAFT guidelines for minimising the risk of injury to marine mammals from unexploded ordnance clearance in the marine environment (JNCC, 2023);
  - JNCC Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (JNCC, DAERA and Natural England, 2020);
  - JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys (seismic survey guidelines) (JNCC, 2017); and
  - Updated abundance estimates for cetacean Management Units in UK waters (Revised 2022) (JNCC, 2022).
- **English waters (applicable to the application for a DCO to be made to the Planning Inspectorate):**
  - Natural England and JNCC advice on key sensitivities of habitats and Marine Protected Areas in English Waters to offshore wind farm cabling within Proposed Round 4 leasing areas (JNCC and Natural England, 2019a);
  - Nature Conservation Considerations and Environmental Best Practice for subsea cable for English Inshore and UK Offshore Waters (Natural England and JNCC, 2022);
  - Harbour Porpoise (*Phocoena phocoena*) Special Area of Conservation: Southern North Sea Conservation Objectives and Advice on Operations (JNCC and Natural England, 2019b); and
  - The Protection of Marine European Protected Species (EPS) From Injury and Disturbance: Draft Guidance for the Marine Area in England and Wales and the UK Offshore Marine Area (JNCC, Natural England and Countryside Council for Wales, 2010).
- **Scottish waters (applicable to the application for a Marine Licence to be made to MD-LOT):**
  - Priority Marine Features (PMF) (NatureScot, 2014) (Scottish waters only);
  - Guidance Seals (MMO, 2021);
  - PMFs, as described in NatureScot Commissioned Report 388 (Howson *et al.*, 2012);
  - Guidance on the Offence of Harassment at Seal Haul-out Sites (Marine Scotland, 2014); and
  - The Protection of Marine EPS from Injury and Disturbance for the marine Area in Scottish Inshore Waters (Scottish Government and NatureScot, 2020);

Assessment of Effects

6.5.8.4 The marine mammal assessment will follow the methodology set out in **part 1, section 5** of this EIA Scoping Report.

6.5.8.5 The marine mammal baseline will be informed by available data and information sources (**Table 6.5.3**). The potential impacts of the Offshore Transmission Infrastructure on marine mammals will be informed by the input of expert judgement and consultation with relevant stakeholders prior to the submission of the ES. Consultation with key stakeholders will be ongoing throughout the EIA process.

6.5.8.6 The direct and indirect impacts of the Offshore Transmission Infrastructure on marine mammals will be assessed. Direct pathways will include those that relate to a direct interaction between a marine mammal and infrastructure, or operations associated with the Offshore Transmission Infrastructure, including exposure to underwater noise.

6.5.8.7 Indirect impacts include those produced as a result of a direct impact pathway, including habitat loss and disturbance. The assessment of direct and indirect impacts on marine mammals will be assessed against the Maximum Design Scenario.

6.5.8.8 Publicly available data from other neighbouring offshore wind farm projects within the vicinity of the Offshore Scoping Boundary, will be used to inform potential sources and anticipated noise levels associated with construction, operation and maintenance and decommissioning activities of relevance to the Offshore Transmission Infrastructure.

6.5.8.9 European sites that are designated for the conservation of marine mammal features will be considered within the Stage 1 LSE Screening Report, which has been produced to inform the HRA for the Offshore Transmission Infrastructure. This assesses the potential for the Offshore Transmission Infrastructure (and Onshore Transmission Infrastructure) to result in an LSE on European designated sites.

Cumulative Effects and Inter-related Effects

6.5.8.10 The Cumulative Effects Assessment (CEA) for marine mammals will follow the general methodology set out in **part 1, section 5**. The marine mammals chapter of the ES will also consider inter-related effects arising from the Offshore Transmission Infrastructure, including potential project lifetime and receptor-led effects. This assessment will be undertaken in accordance with the standard industry guidance and approach, as outlined in **part 1, section 5** of this EIA Scoping Report.

Transboundary Impacts

6.5.8.11 The approach to transboundary impacts is set out in **part 1, section 5.10** of this EIA Scoping Report. **Part 5,** a**ppendix 5.1** of this EIA Scoping Report presents the transboundary impacts screening which has been carried out for the Offshore Transmission Infrastructure. This screening exercise identified that there is potential for transboundary impacts upon marine mammals from the construction, operation and maintenance, and decommissioning phases of the Offshore Transmission Infrastructure.

Relevant Consultations

6.5.8.12 The Applicant has undertaken introductory consultation with selected consultees, including Natural England, Marine Management Organisation (MMO) and Joint Nature Conservation Committee. Topic specific consultation will be undertaken throughout the PEIR and ES phases via the Evidence Plan Process Steering Group and Expert Topic Group to inform the marine mammals chapter in the ES. The following stakeholders relevant to marine mammals will be consulted via Expert Topic Group meetings:

- **English waters (applicable to the application for a DCO to be made to the Planning Inspectorate):**
  - Natural England;
  - MMO; and
  - The Wildlife Trusts.
- **Scottish waters (applicable to the application for a Marine Licence to be made to MD-LOT):**
  - NatureScot.

6.5.9 Next Steps

6.5.9.1 The next steps for the marine mammal topic are:

- to agree with stakeholders upon the approach for the assessment of marine mammals (including presenting sensitivities of receptors, appropriate monitoring and mitigation);
- to agree with stakeholders upon the potential impacts for assessment in the marine mammals chapter of the ES; and
- to discuss the qualitative assessments with key stakeholders for impacts which cannot be assessed quantitatively.

6.6. Offshore Ornithology

6.6.1 Introduction

6.6.1.1 This section of the Environmental Impact Assessment (EIA) Scoping Report identifies the proposed scope of the assessment for offshore ornithological receptors from the construction, operation and maintenance, and decommissioning of the proposed Offshore Transmission Infrastructure. This includes the key data sources used to characterise the baseline environment in the vicinity of the Offshore Transmission Infrastructure within Scottish and English waters, and the impacts proposed to be scoped in and out of the assessment for offshore ornithology in the ES.

6.6.2 Proposed Study Area for the Assessment

6.6.2.1 The EIA Scoping Report and subsequent ES will consider impacts to marine ornithological features within the offshore ornithology study area shown in **Figure 6.6.1**. Further details of the location and extent of the Intertidal Scoping Boundary can be found in **Figure 3.5.1** of **part 1, section 3**.

6.6.2.2 The offshore ornithology study area is illustrated in **Figure 6.6.1**. It encapsulates the Offshore Scoping Boundary, plus a 10 km buffer due to the presence of red throated diver *Gavia stellata* as recommended by the Joint SNCB Interim Advice on the Treatment of Displacement for Red-Throated Diver (2022), as this species is highly sensitive to vessel movement and displacement (Brabant *et al.,* 2015). It should be noted that the Intertidal Scoping Boundary is assessed as part of the onshore and intertidal ornithology section of this EIA Scoping Report (see **part 3, section 7.7**).

6.6.2.3 Digital Aerial Surveys (DAS) covered the Array Site Boundary (and therefore the majority of the Offshore Scoping Boundary in Scottish waters). They did not extend to the Offshore Scoping Boundary (in English waters); therefore, baseline data for this area will be obtained from desk-based literature sources.

6.6.2.4 Consideration is given to Special Protection Areas (SPAs) situated outside the offshore ornithology study area due to the often-extensive foraging ranges of some seabird species and therefore the potential for indirect impacts from the Offshore Transmission Infrastructure. When considering connectivity between the offshore ornithology study area and a SPA the foraging range of the specific species will be used (Woodward *et al.*, 2019). In addition to breeding colony SPAs there are also marine SPAs, which are designed to protect foraging or aggregation areas.

6.6.2.5 All identified SPAs and Ramsar sites will be fully assessed as part of the Habitats Regulations Assessment (HRA) for the Ossian Transmission Infrastructure, and full details of the SPAs (and Ramsar sites) and their qualifying features screened in for further consultation at the Appropriate Assessment stage are provided in the Stage 1 Likely Significant Effect (LSE) Screening Report (Ossian OWFL, 2025).

6.6.2.6 Consideration will also be given to other designated sites for birds, including Marine Conservation Zones (MCZs), and Sites of Special Scientific Interest (SSSIs) both within and out with the offshore ornithology study area, as it is acknowledged that the majority of SPAs are underpinned by MCZs and/or SSSIs and are assessed as part of SPAs for the HRA.

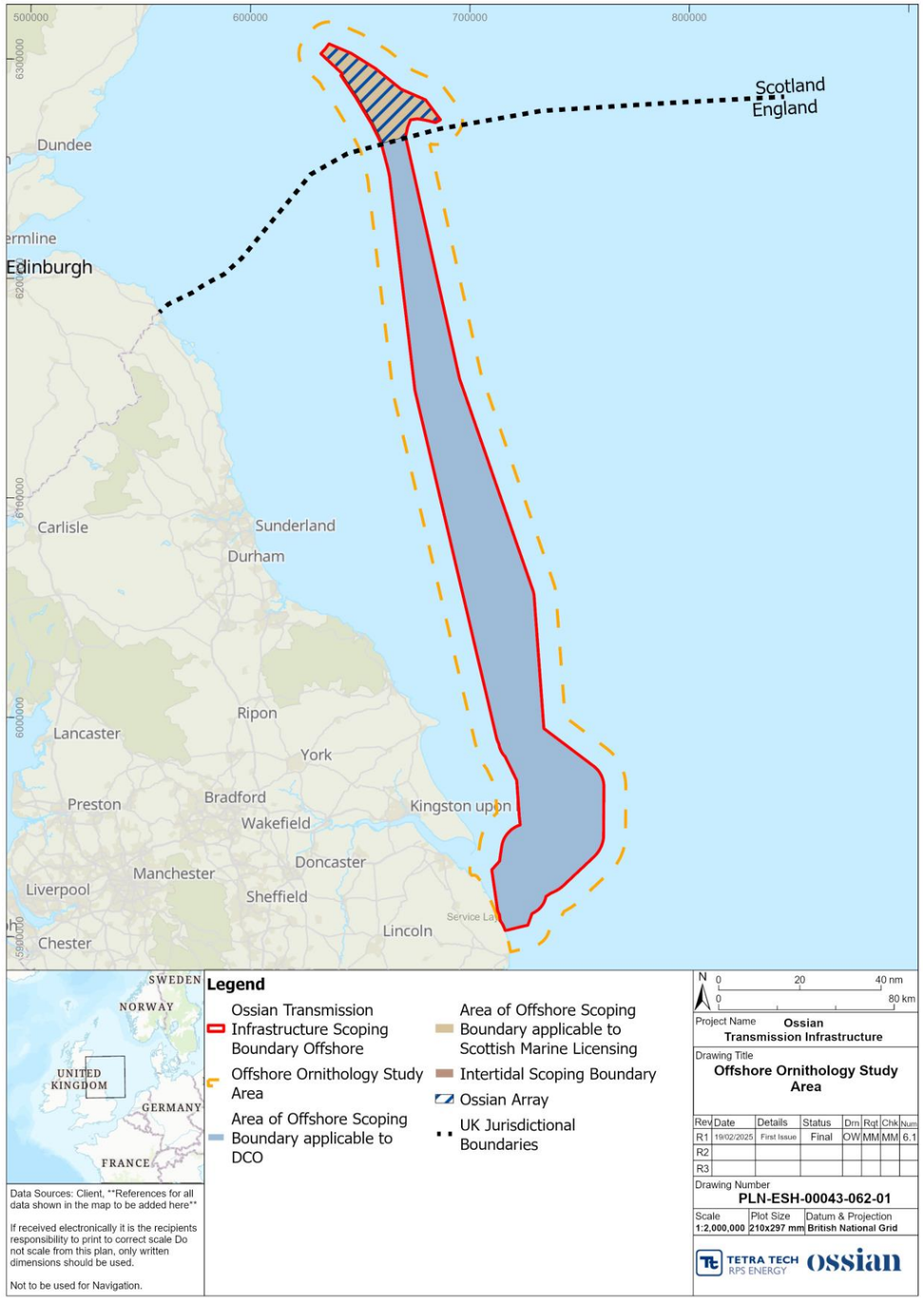

Figure 6.6.1: Offshore Ornithology Study Area

6.6.3 Baseline Environment

6.6.3.1 An outline of the baseline environment for offshore ornithology based upon an initial review of data sources is provided below. This baseline environment section is split into the following subsections to allow the reader to distinguish between information relevant to specific jurisdictions:

- **General** – this subsection summarises baseline environment information across the entire offshore ornithology study area (i.e. both English and Scottish waters) and is therefore applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to be made to MD-LOT.
- **English Waters** – this subsection summarises baseline environment information which is specific to the portion of the offshore ornithology study area located within English waters and is therefore applicable to the application for a DCO to be made to the Planning Inspectorate.
- **Scottish Waters** – this subsection summarises baseline environment information which specific to the portion of the offshore ornithology study area located within Scottish waters and is therefore applicable to the application for a Marine Licence to be made to MD-LOT.

General

6.6.3.2 Extensive ornithological surveys (e.g. Carter *et al.,* 1993; Stone *et al.,* 1995), associated reviews (e.g. Stienen *et al.,* 2007; Kober *et al.,* 2010; Bradbury *et al.,* 2014 and Waggitt *et al.,* 2019) as well as data collected to support previous environmental assessments for offshore wind farms have shown that the North Sea serves as a crucial wintering destination for migratory seabirds originating from regions to the north and east, including Scandinavia, Siberia and the Arctic.

6.6.3.3 In the breeding season, seabirds present primarily comprise of species that breed in the North Sea region, namely the northern fulmar *Fulmarus glacialis* (hereafter referred to as fulmar), northern gannet *Morus bassanus* (hereafter referred to as gannet), Arctic tern *Sterna paradisaea*, black-legged kittiwake *Rissa tridactyla* (hereafter referred to as kittiwake), European herring gull *Larus argentatus* (hereafter referred to as herring gull), common guillemot *Uria aalge* (hereafter referred to as guillemot), razorbill *Alca torda*, Manx shearwater *Puffinus puffinus*, cormorant *Phalacrocorax carbo*, European shag *Phalacrocorax aristotelis* (hereafter referred to as shag), lesser black-backed gull *Larus fuscus*, common tern *Sterna hirundo*, sandwich tern *Sterna sandvicensis* and Atlantic puffin *Fratercula arctica* (hereafter referred to as puffin). These species have large foraging ranges to offshore feeding grounds and may originate from breeding colonies along the north and east coasts of Scotland or north-east coast of England.

6.6.3.4 Outside of the breeding season, most of the same species use the North Sea, with many of the individuals likely to originate from colonies further afield which have migrated into the North Sea to overwinter (Furness, 2015). Several species have much larger non-breeding populations due to the species migrating away from the breeding colony such as common gull *Larus canus* and great black-backed gull

Larus marinus. Overall, the mix of birds present indicates that the offshore ornithology study area is likely to be used at different times by birds (i) overwintering in the area; (ii) foraging from nearby breeding coastal colonies; and (iii) on post-breeding dispersal, migration and pre-breeding return.

English Waters

6.6.3.5 The southern North Sea off the coast of north-east England has also been documented as an important habitat for numerous bird species throughout the year. Critical evidence includes offshore wind farm baseline surveys (e.g. Hornsea 1, 2, 3 and 4); evaluations conducted for their Environmental Statements and monitoring reports; extensive ornithological surveys (Stone *et al.,* 1995); bird tracking studies (Woodward *et al.,* 2019); biogeographic population reviews (Stienen *et al.,* 2007; Furness, 2015); and the analysis of population distribution (Bradbury *et al.,* 2014; Wakefield *et al.,* 2017).

6.6.3.6 Research shows that the area is subject to pronounced passages of birds during spring and autumn with species such as gannets, skuas, gulls, terns and auks (defined for this EIA Scoping Report as puffin, guillemot and razorbill) travelling to and from mainland Europe and further afield (Stienen *et al.,* 2007). Red-throated diver is also a prominent feature of the Greater Wash SPA, which overlaps with the offshore ornithology study area.

6.6.3.7 During the breeding season, this area provides foraging, loafing and preening habitat for a range of seabirds, including (but not limited to) gannet, kittiwake and various species of auk. For example, the Flamborough and Filey Coast SPA extending 2 km offshore hosts the only mainland colony of gannet in England and the largest population of kittiwakes in the UK.

6.6.3.8 Due to the mix of birds present, it is probable that the offshore ornithology study area is used at different times of the year by birds (i) overwintering in the area; (ii) foraging from nearby breeding coastal colonies; and (iii) on post-breeding dispersal, migration and pre-breeding return.

6.6.3.9 During the non-breeding season, the region supports a similar species composition. However, divers and seaducks typically reside in more inshore waters, whilst auks are notably found further offshore (Stienen *et al.,* 2007).

6.6.3.10 In recent years, there has been a decline in the population of immigrant seabirds in the southern North Sea, possibly attributed to milder winters. This decline implies that the flocks that traditionally reached the area in winter are now staying closer to their breeding grounds (Woodward *et al.,* 2024). Key impacts to seabird populations arise from climate change (Wanless *et al.,* 2007), fishing activities (involving bird bycatch and competition for prey items) (Žydelis *et al.,* 2013) and disruptions caused by shipping (Brabant *et al.,* 2015; Welcker and Nehls, 2016). Furthermore, there is already a significant element of displacement from existing near-shore and offshore renewables, including Inner and Outer Dowsing, Race Bank and Triton Knoll Offshore Wind Farms.

6.6.3.11 Based upon the literature reviewed, it is apparent that the following species comprise the vast majority of birds occurring within the offshore ornithology study area during both the breeding and non-breeding periods:

- fulmar;
- gannet;
- kittiwake;
- guillemot;
- razorbill;
- red-throated diver; and
- puffin.

6.6.3.12 Additional species tend be recorded sporadically in a lower abundance, therefore it is highly likely that the key species for the assessment will be included amongst the six species listed above, however no species are specifically ‘scoped out’ due to low usage.

6.6.3.13 The following EIA processes will consider these key species, alongside the existing baseline conditions within the offshore ornithology study area and future baseline conditions as far as reasonably practicable.

6.6.3.14 Designated sites which are located within the offshore ornithology study area related to English waters are listed in **Table 6.6.1** and **Figure 6.6.2**.

Scottish Waters

6.6.3.15 The south-east of Scotland has been well documented in the literature as an internationally important area for at least 13 breeding seabird species, including gannet, Manx shearwater, cormorant, shag, herring gull, lesser black-backed gull, kittiwake, common tern, Arctic tern, sandwich tern, guillemot, razorbill and puffin Harris et al. (2024).

6.6.3.16 As part of the Ossian Array EIA Report (Ossian OWFL, 2024), a series of monthly baseline DAS were conducted for offshore ornithology in the Array Site Boundary (which overlaps with the majority of the Offshore Scoping Boundary in Scottish waters) between March 2021 and February 2023 (Ossian OWFL, 2024). This information provides an indication of seabird populations present in the Offshore Scoping Boundary (in Scottish waters) (**Figure 6.6.1**).

6.6.3.17 In the breeding season, seabird populations are primarily composed of guillemot, kittiwake, gannet, puffin, fulmar and razorbill. Colonies of particular importance include the Forth Islands SPA (JNCC, 2018c), which includes the Isle of May and Bass Rock, the Outer Firth of Forth and St Andrews Bay Complex SPA (JNCC, 2020), and Fowlsheugh SPA (JNCC, 2022).

6.6.3.18 The Array DAS revealed that the most numerous species within the Offshore Scoping Boundary (in Scottish waters) during the breeding season (defined here as April to August) are (in descending order) guillemot, kittiwake, gannet, puffin, fulmar and razorbill (Ossian OWFL, 2024). Comparison to published sea utilisation distributions revealed that a high proportion of guillemot, kittiwake and razorbill within the Offshore Scoping Boundary (in Scottish waters) were estimated to be non-breeding birds, with densities decreasing from the north-west to the south-east, whilst gannet were likely to be breeding populations from the Forth Islands SPA. Other species, including herring gull, lesser black-backed gull, Manx shearwater and puffin were recorded occasionally (less than five records) and

distributed relatively uniformly across the Offshore Scoping Boundary (in Scottish waters) at low densities.

6.6.3.19 Outside of the breeding season, the commonly recorded species include guillemot, fulmar, kittiwake, gannet, razorbill and gulls. Research has also identified that the shallow sand banks of Wee Bankie and Marr Bank, which are both located approximately 40 km to the west of the offshore ornithology study area, are important as feeding areas for seabirds in the region, with aggregations of guillemot and puffin during the non-breeding season (Daunt *et al.,* 2011; Wanless *et al.,* 1998). Furthermore, reviews of available tracking data suggest that the area may be utilised by gannet from the Forth Islands SPA (Wakefield *et al.,* 2017), kittiwake from Fowlsheugh SPA (Bogdanova *et al.,* 2022) and other local colonies to a moderate extent (overlap with 50-75% utilisation distribution contours) and guillemot and razorbill from local colonies to a lesser extent (overlap with the 95% utilisation distribution contour) (Cleasby *et al.,* 2020).

6.6.3.20 The Array DAS revealed that over half of the birds recorded during the non-breeding season (defined here as September to March), were guillemot (Ossian OWFL, 2024). Other frequently recorded species (in descending order of frequency) were fulmar, puffin, kittiwake, gannet, razorbill and great black-backed gull. Species were evenly distributed over the Offshore Scoping Boundary (in Scottish waters), as birds are not constrained by requirements to visit nests to incubate eggs or provision chicks, ranging more widely to mix with birds from breeding colonies in the United Kingdom (UK) and further afield.

6.6.3.21 Species recorded infrequently (less than ten occasions) during the non-breeding season were herring gull and little auk (*Alle alle*). Very small numbers of migratory species were also recorded, with observations limited to Arctic tern and Manx shearwater. However, it is possible that other seabird species, such as storm petrels *Hydrobates pelagicus,* may use the Offshore Scoping Boundary (in Scottish waters) during passage, but were not detected during the DAS due to movements occurring at high altitudes and/or at night when detection is difficult.

Designated Sites

6.6.3.22 Nature conservation designations with relevance to seabirds comprise SPAs within the National Site Network in the UK and the Natura 2000 network of European sites, Ramsar sites, national and regional designations. The impact assessment will consider potential connectivity of the project with statutory designated sites for breeding seabirds, wintering birds and terrestrial, coastal or marine bird interests (typically migratory and/or non-breeding aggregations).

6.6.3.23 The offshore ornithology study area directly overlaps with the Greater Wash SPA which has offshore ornithological designations for breeding terns and overwintering red-throated diver and common scoter.

6.6.3.24 As breeding and migratory seabirds can travel significant distances it is necessary to consider potential connectivity with breeding seabird colonies and designated sites beyond the offshore ornithology study area, particularly those on the eastern British coastline. It is recognised that there will be many colonies, including designated sites, that could be impacted by both project alone impacts and cumulative and in-combination impacts with other developments (e.g. Inner and Outer Dowsing, Race Bank and Triton Knoll Offshore Wind Farms).

6.6.3.25 The extent of connectivity and impact severity between seabird relevant designated sites and offshore windfarms during the breeding season is largely a function of distance and species-specific foraging ranges (Woodward *et al.,* 2019). Outside the breeding season patterns of migration are used to infer the origins of species recorded.

6.6.3.26 A full screening of the National Site Network and European sites with relevant qualifying ornithological features (SPAs and Ramsar sites) will be undertaken in the LSE Screening Report (Ossian OWFL, 2025). **Table 6.6.1** provides an early indication of the designated sites that lie within or in close proximity to the offshore ornithology study area. However, as previously stated, all SPA and Ramsar sites with connectivity will be considered via the HRA processes.

Table 6.6.1: Summary of Designated Sites with Relevant Qualifying Features Located Within or Likely to have Connectivity with the Offshore Ornithology Study Area which may be Scoped in for Further Assessment, upon Review of Potential Impacts

Protected area	Distance to Offshore/Intertidal Scoping Boundaries (km)	Summary of relevant qualifying features
English waters		
Special Protected Area		
Greater Wash SPA	0 - overlaps with the Offshore Scoping Boundary (extent of overlap: 32.4 km^2)	• Coastal and marine habitat • Non-breeding red-throated diver • Common scoter • Little gull • Breeding sandwich tern • Breeding common tern • Breeding little tern
Flamborough and Filey Coast SPA	128.7	• Encompasses terrestrial, coastal and marine habitats supporting breeding seabirds including gannet, razorbill, guillemot, kittiwake, cormorant, shag, herring gull and puffin.

Protected area	Distance to Offshore/Intertidal Scoping Boundaries (km)	Summary of relevant qualifying features
The Wash SPA	18.0	• Designated for 21 species of waterbird which pass through in high numbers each year • Breeding common tern • Breeding little tern
Humber Estuary SPA	2.7	• Designated for 23 species of waterbird that pass through in high numbers (c. 154,000) each year.
Scottish waters		
Special Protected Area		
Fowlsheugh SPA	20.9	• Designated for five species of breeding waterbird, including guillemot, kittiwake, herring gull, fulmar and razorbill.
Outer Firth of Forth and St Andrews Bay Complex SPA	87.4	• Provides breeding and feeding grounds for 35% of common eider *Somateria mollissima mollissima*, 23% of velvet scoter *Melanitta fusca* in the UK and the largest Scottish concentrations of red-throated diver.
Forth Islands SPA	91.2	• Designated for 13 species of breeding waterbird, including large populations of gannet, puffin and guillemot.

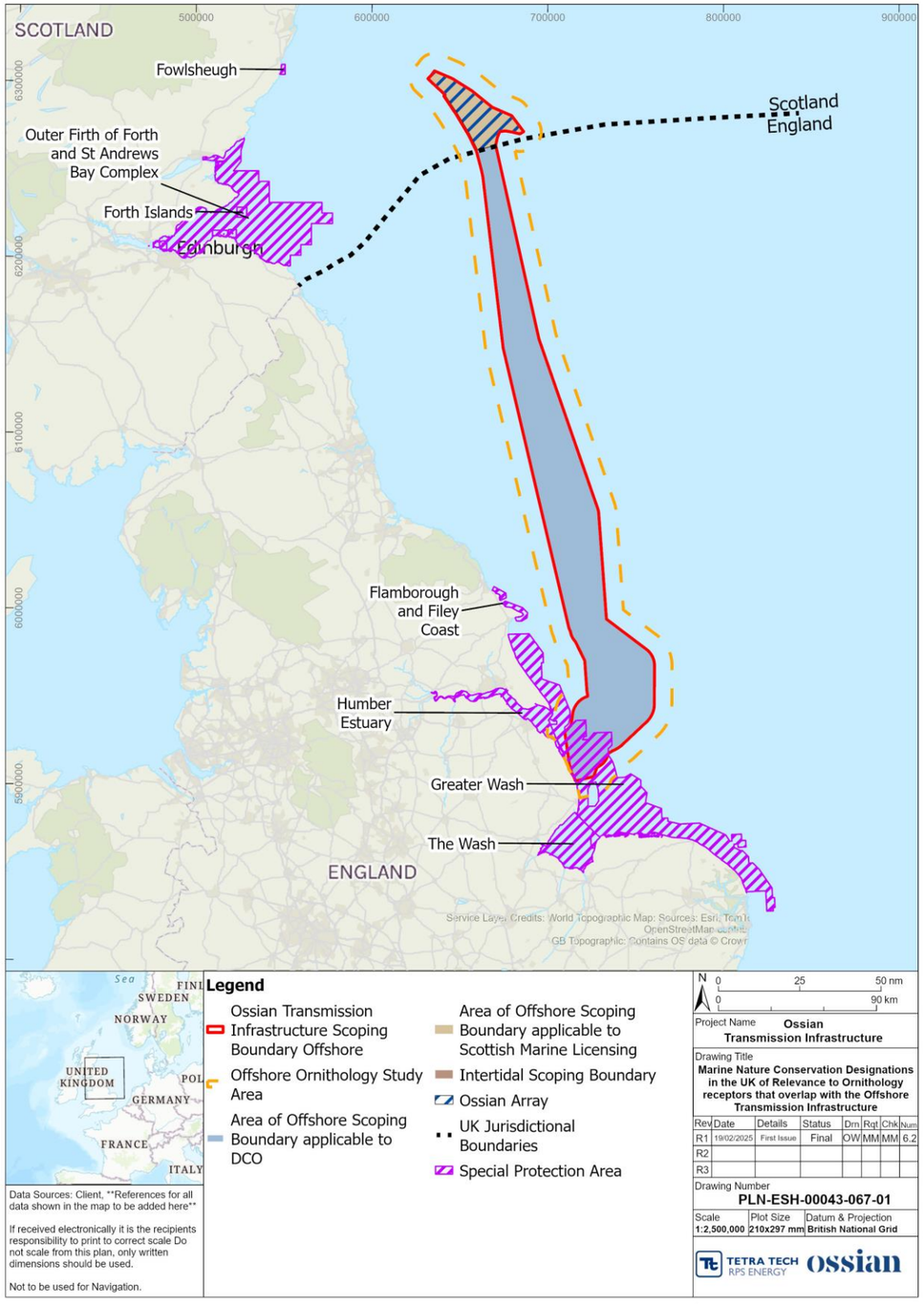

Figure 6.6.2: Relevant Designated Sites within the Offshore Ornithology Study Area

Future Baseline Conditions

6.6.3.27 The EIA process will consider the existing baseline conditions within the offshore ornithology study area, however, it will also evaluate the future baseline conditions as far as reasonably practicable. The baseline environment is not static, therefore, even if the Ossian Transmission Infrastructure does not come forward, the environment will exhibit some degree of natural change. These changes may occur due to naturally occurring cycles and processes and any potential changes resulting from climate change.

6.6.3.28 For example, severe weather, in part due to climate change, can directly impact seabirds at the regional North Sea scale and can also indirectly amplify other pressures such as reduced prey availability for puffin, guillemot and razorbill (Davies *et al.,* 2023).

6.6.3.29 Where accepted methodologies for identifying the likely significant effects of climate change are available, these will be considered in the assessment. Recent published research will also be reviewed to inform judgements on whether specific receptors are susceptible to the effects of climate change.

6.6.3.30 The offshore ornithology chapter of the ES will ensure to place any potential impacts on receptors into the context of the envelope of change that may occur over the timescale of the Ossian Transmission Infrastructure.

6.6.4 Proposed Data Sources

6.6.4.1 **Table 6.6.2** presents the data sources proposed for the offshore ornithology assessment. Note that, in addition to these data sources, relevant output of the consultation process will also be considered.

Table 6.6.2: Summary of Key Desktop Datasets and Reports

Title	Year	Source	Citation
General (applicable to both English and Scottish waters)			
Seabird abundances projected to decline in response to climate change in Britain and Ireland	2023	British Trust for Ornithology (BTO)	Davies *et al.* (2023)
Distribution maps of cetacean and seabird populations in the North-East Atlantic	2019	Journal of Applied Ecology	Waggitt *et al.* (2019)
Seabird Mapping and Sensitivity Tool (SeaMAST)	2024	Natural England GOV.UK	Natural England (2024)
	2014		Bradbury *et al.* (2014)
Seabird concentrations in the North Sea: an atlas of vulnerability to surface pollutants.	1993	Joint Nature Conservation Committee (JNCC)	Carter *et al.* (1993)
An atlas of seabird distribution in northwest European waters.	1995	JNCC	Stone *et al.* (1995)
Black-legged kittiwakes as indicators of environmental change in the North Sea: evidence from long-term studies.	2007	Progress in Oceanography	Wanless *et al.* (2007)
Trapped within the corridor of the southern North Sea: the potential impact of offshore wind farms on seabirds.	2007	Institute of Nature Conservation.	Stienen *et al.* (2007)
An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs	2010	JNCC	Kober *et al.* (2010)
The incidental catch of seabirds in gillnet fisheries: a global review	2013	Biological Conservation	Žydelis *et al.* (2013)
Towards a Cumulative Collision Risk Assessment of Local and Migrating Birds in North Sea Offshore Wind Farms.	2015	Hydrobiologia	Brabant *et al.* (2015)
Non-breeding season populations of seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS).	2015	Natural England	Furness *et al.* (2015)
Displace of seabirds by an offshore wind farm in the North Sea.	2016	Marine Ecology Progress Series	Welcker & Nehls (2016)

Title	Year	Source	Citation
Breeding density, fine-scale tracking, and large-scale modelling reveal the regional distribution of four seabird species	2017	Ecological Applications	Wakefield *et al.* (2017)
Desk-based revision of seabird foraging ranges used for Habitats Regulation Assessment (HRA) screening	2019	BTO Research Report	Woodward *et al.* (2019)
Identifying important at-sea areas for seabirds using species distribution models and hotspot mapping	2020	Biological Conservation	Cleasby *et al.* (2020)
Seabird Population Trends and Causes of Change	2024	JNCC	Harris *et al.* (2024)
Waterbirds in the UK 2022/23: The Wetland Bird Survey and Goose & Swan Monitoring Programme.	2024	BTO	Woodward *et al.* (2024)
Scottish waters			
Literature Review of Foraging Distribution, Foraging Range and Feeding Behaviour of Common Guillemot, Razorbill, Atlantic Puffin, Black Legged Kittiwake and Northern Fulmar in the Forth/Tay Region	2011	Centre for Ecology and Hydrology	Daunt *et al.* (2011)
Summer Sandeel Consumption by Seabirds Breeding in the Firth of Forth, southeast Scotland.	1998	International Council for the Exploration of the Sea (ICES) Journal for Marine Sciences	Wanless *et al.* (1998)
Seabird GPS tracking on the Isle of May, Fowlsheugh and St Abb's Head in 2021 in relation to offshore wind farms in the Forth/Tay region.	2022	Marine Scotland	Bogdanova *et al.* (2022)
Ossian Array EIA Scoping Report	2023	Ossian Offshore Wind Farm Ltd. (OWFL)	Ossian OWFL (2023)

6.6.5 Mitigation Measures

6.6.5.1 The following measures adopted as part of the Offshore Transmission Infrastructure are relevant to the assessment for offshore ornithology. These measures may evolve (and be further clarified) as the design and EIA process progresses:

- The development of and adherence to a Vessel Management Plan (VMP), which will include measures to reduce the disturbance/displacement of seabirds.
- The development of, and adherence to, an Environmental Management Plan (EMP).
- The development of, and adherence to, a Marine Pollution Contingency Plan (MPCP).
- Optimisation the design of the Offshore Export Cable Corridor(s) to reduce impacts.
- The development of, and adherence to, a Decommissioning Programme.

6.6.6 Proposed Scope of the Assessment

6.6.6.1 Potential impacts that are proposed to be scoped into the assessment for offshore ornithological receptors are set out in **Table 6.6.3**.

Table 6.6.3: Potential Impacts Proposed to be Scoped in for Offshore Ornithological Receptors

Impact	Project Phase[9]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Disturbance and displacement from airborne noise, underwater noise, and the presence of vessels.	✓	✓	✓	✓	✓	The presence of vessels and airborne and underwater noise during construction, operation and maintenance and decommissioning activities may temporarily disturb birds and displace them from their foraging and resting areas.	Quantified assessment (e.g. modified displacement matrix) based on area disturbed and the impacts from vessels on birds. The extent of disturbance from vessels and the species' sensitivities will be based on published literature, (e.g. Furness *et al.,* 2013 and Wade *et al.,* 2016). The abundance and density of birds will be estimated using the best available data (e.g. Waggitt *et al.*, 2019) or outputs from the Poseidon project if available in time.
Indirect impacts from underwater noise affecting prey species.	✓	×	✓	✓	✓	Mortality, injury and/or disturbance to sensitive fish and shellfish species is possible as a result of construction and decommissioning activities such as pre-construction geophysical surveys. This may cause reduced energy intake affecting the productivity or survival of birds.	The assessment of likely significant effects on birds will draw upon the results from the fish and shellfish ecology chapter of the ES and a qualitative assessment will be undertaken based on predicted extent of impact and known behaviour of fish to noise using the latest published literature.
Indirect impacts from habitat loss or habitat disturbance which results in increased suspended sediment concentration (SSCs)	✓	✓	✓	✓	✓	Seabed preparation and cable installation during construction, repair and reburial of infrastructure during operation and maintenance and the removal of infrastructure during decommissioning could cause direct loss to the benthic habitats and disturbance to sediments, affecting the foraging efficiency of diving birds as well as effects from impacts on fish and shellfish prey.	The assessment of likely significant effects on birds will draw upon the results from the benthic subtidal and intertidal ecology and fish and shellfish ecology chapters of the ES and a qualitative assessment will be undertaken based on predicted extent of impact on habitats.

[9] Construction (C), Operation and Maintenance (O), Decommissioning (D)

6.6.7 Impacts Proposed to be Scoped Out

6.6.7.1 Impacts that are proposed to be scoped out of the assessment for offshore ornithological receptors and the justification are set out in **Table 6.6.4**.

Table 6.6.4: Impacts Proposed to be Scoped out of the Assessment for Offshore Ornithological Receptors

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
All Phases			
Impacts due to the accidental release of pollutants.	✓	✓	Pollution impacts (accidental oil/fuel spills) during all phases of the Offshore Transmission Infrastructure are scoped out on the basis that the implementation of a MPCP will avoid the risk of significant pollution events. Consequently, seabirds and shorebirds are extremely unlikely to be significantly affected by any such pollution impacts. As such, no significant effects would occur and it is proposed that this is scoped out of the EIA process.
Injury due to collision with infrastructure or vessels.	✓	✓	None of the Offshore Transmission Infrastructure will be on the water surface and therefore there is no potential for collisions to occur. The number of vessels during the construction phase is currently unknown, however due to the high visual capacity of birds the potential to collide with a slow moving vessel is very low. As such, no significant effects would occur and it is proposed that this is scoped out of the EIA process.
Barriers to movement.	✓	✓	None of the Offshore Transmission Infrastructure will be on the water surface therefore there is no potential for barriers to movement for all bird species.

6.6.8 Proposed Assessment Methodology

6.6.8.1 The assessment methodology proposed to be used for the impacts proposed to be scoped in as set out in **Table 6.6.3** is described below.

Legislation and Policy

6.6.8.2 An overview of relevant legislation and policy is provided in **part 1, section 2** of this EIA Scoping Report. Further details of topic specific legislation and policy will be provided within the offshore ornithology ES chapter.

Relevant Guidance

6.6.8.3 The following guidance documents relevant to offshore ornithological receptors will be considered in the ES (ordered chronologically):

- **General (applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to made to MD-LOT):**
  - Natural England best practice guidance on offshore wind marine environmental assessments (Parker *et al.*, 2022a-d).
  - Guidelines for Ecological Impact Assessment (EcIA) in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2022).
- **Scottish waters (applicable to the application for a Marine Licence to be made to MD-LOT):**
  - NatureScot guidance on marine renewable developments (Guidance Notes 1 to 9) (NatureScot, 2023).

Assessment of Effects

6.6.8.4 The offshore ornithology chapter of the ES will follow the Impact Receptor Pathway (IRP), where likely impacts will be identified on offshore ornithology receptors resulting from the construction, operation and maintenance and decommissioning of the Offshore Transmission Infrastructure. Further detail of the offshore ornithology assessment is outlined in **part 1, section 5** of this EIA Scoping Report.

Cumulative Effects and Inter-related Effects

6.6.8.5 The Cumulative Effects Assessment (CEA) for offshore ornithology will follow the general methodology set out in **part 1, section 5**. The offshore ornithology chapter of the ES will also consider inter-related effects arising from the Offshore Transmission Infrastructure, including potential project lifetime and receptor-led effects. This assessment will be undertaken in accordance with the standard industry guidance and approach, as outlined in **part 1, section 5** in this EIA Scoping Report.

Transboundary Impacts

6.6.8.6 The approach to transboundary impacts is set out in **part 1, section 5.10** of this EIA Scoping Report. **Part 5,** a**ppendix 5.1** in this EIA Scoping Report presents the transboundary impacts screening which has been carried out for the Offshore Transmission Infrastructure. This screening exercise identified that there is the potential for transboundary impacts upon offshore ornithology due to construction, operation and maintenance, and decommissioning impacts of the Offshore

Transmission Infrastructure. The potential for transboundary effects will be scoped in for further consideration within the ES.

Relevant Consultations

6.6.8.7 The Applicant has undertaken introductory consultation with selected consultees, including Natural England, Marine Management Organisation (MMO) and Joint Nature Conservation Committee. Topic specific consultation will be undertaken throughout the PEIR and ES phases via the Evidence Plan Process Steering Group and Expert Topic Group to inform the physical processes chapter in the ES. The following stakeholders relevant to physical processes will be consulted via Expert Topic Group meetings:

- **English waters (applicable to the application for a DCO to be made to the Planning Inspectorate):**
  - Natural England;
  - MMO;
  - Royal Society for the Protection of Birds (RSPB); and
  - Lincolnshire Wildlife Trust.
- **Scottish waters (applicable to the application for a Marine Licence to be made to MD-LOT):**
  - RSPB; and
  - NatureScot.

6.6.9 Next Steps

6.6.9.1 The next steps for the offshore ornithology topic are:

- to discuss with stakeholders whether the existing data and literature available is sufficient to describe the offshore ornithological baseline environment in relation to the Offshore Transmission Infrastructure;
- to discuss with stakeholders whether the proposed assessment approach adequately captures the requirements expected by NatureScot and Natural England for such an assessment;
- to discuss with stakeholders whether they have any suggestions for key changes that may be required to the approaches outlined by this EIA Scoping Report section;
- to discuss with stakeholders whether the assessment of ornithological receptors should be scoped out of the ES; and
- to discuss with stakeholders whether the approach proposed in relation to measures adopted as part of the project provides a suitable means for managing and mitigating the potential effects of the Offshore Transmission Infrastructure on the offshore ornithology receptors.

6.7. Commercial Fisheries

6.7.1 Introduction

6.7.1.1 This section of the EIA Scoping Report identifies the proposed scope of the assessment for commercial fisheries from construction, operation and maintenance and decommissioning of the proposed Offshore Transmission Infrastructure. This includes the key data sources used to characterise the baseline environment in the vicinity of the Offshore Transmission Infrastructure within Scottish and English waters, and the impacts proposed to be scoped in and out of the assessment for commercial fisheries in the ES.

6.7.2 Proposed Study Area for the Assessment

6.7.2.1 The Offshore Transmission Infrastructure extends from the International Council for the Exploration of the Seas (ICES) Division 4b into Division 4c, Central North Sea. Each ICES Division is divided up into statistical rectangles, allowing fisheries data to be presented on a finer scale.

6.7.2.2 As discussed in **part 1, section 4**, Offshore Export Cables will transfer power from the OSPs located within the Array Site Boundary to the Landfall. The Ossian Transmission Infrastructure Scoping Boundary encompasses a small corridor to the west of the Array Site Boundary within which the Offshore Export Cables will run south into English waters and onward to Landfall. Further details can be found in **part 1, sections 1 and 4**.

6.7.2.3 The commercial fisheries study area (**Figure 6.7.1**) has been defined with respect to the ICES statistical rectangles through which the Offshore Scoping Boundary and Intertidal Scoping Boundary pass. Where relevant, rectangles adjacent to the Offshore and Intertidal Scoping Boundaries have also been included in the commercial fisheries study area to provide a spatially robust assessment. Further details of the location and extent of the Intertidal Scoping Boundary can be found in **Figure 3.5.1** of **part 1, section 3**.

6.7.2.4 As shown in **Figure 6.7.1**, the commercial fisheries study area (outlined by the blue solid line) comprises ICES rectangles 42E9, 42F0, 41E9, 41F0, 40E9, 40F0, 39E9, 39F0, 38E9, 38F0, 37F0, 36F0, 36F1 and 35F0.

6.7.2.5 The commercial fisheries study area will be used to identify fisheries activity in the vicinity of the Offshore Transmission Infrastructure. Where relevant, however, data and information from wider areas (i.e. North Sea ICES Divisions 4a, 4b and 4c) will be analysed to provide wider context to the fisheries included in the assessment.

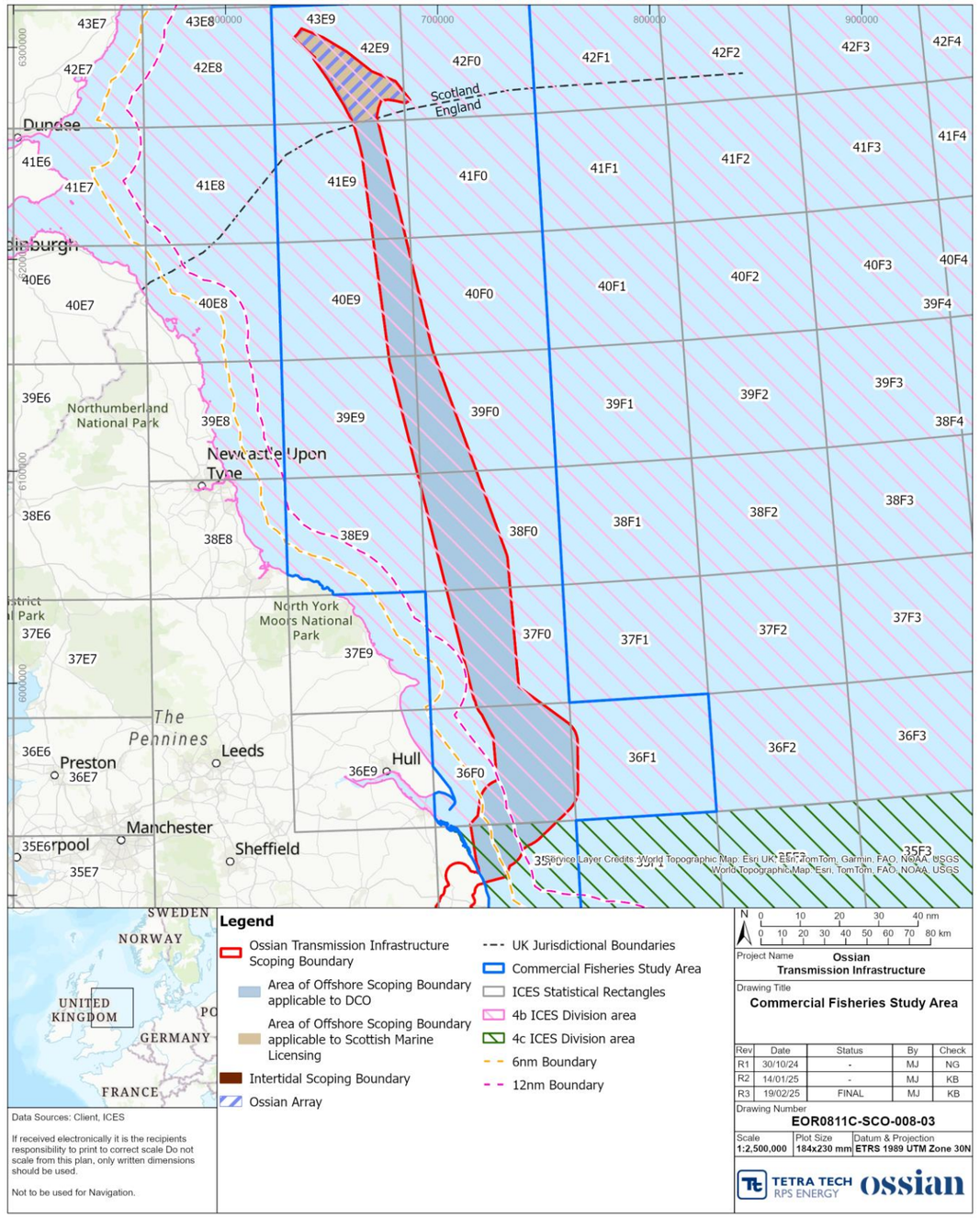

Figure 6.7.1: Commercial Fisheries Study Area

6.7.3 Baseline Environment

6.7.3.1 An outline of the baseline environment for commercial fisheries based upon an initial review of key data sources is provided below.

6.7.3.2 This baseline environment section is split into the following subsections to allow the reader to distinguish between information relevant to specific jurisdictions:

- **General** – this subsection summarises baseline environment information across the entire commercial fisheries study area (i.e. both English and Scottish waters) and is therefore applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to be made to MD-LOT.
- **English Waters** – this subsection summarises baseline environment information which is specific to the portion of the commercial fisheries study area located within English waters and is therefore applicable to the application for a DCO to be made to the Planning Inspectorate.
- **Scottish Waters** – this subsection summarises baseline environment information which specific to the portion of the commercial fisheries study area located within Scottish waters and is therefore applicable to the application for a Marine Licence to be made to MD-LOT.

General

6.7.3.3 Commercial fisheries data are presented for the last 10 years of available data, between 2014 and 2023 to provide a comprehensive baseline which ensures accurate representation of fishing activity prior to the Covid-19 pandemic and to incorporate historical data. This temporal range is applied during analysis of all ICES rectangles considered within this section of the EIA Scoping Report to provide a uniform assessment.

6.7.3.4 The commercial fisheries baseline for this EIA Scoping Report has been mainly characterised by publicly available MMO data for the relevant ICES rectangles (MMO, 2017; MMO, 2018; MMO, 2023). These MMO data are presented below and provide a sufficient representation of the fisheries activity within the ICES rectangles which overlap with the Offshore and Intertidal Scoping Boundaries as they include information on various parameters, such as gear type and species caught.

6.7.3.5 Site-specific benthic surveys were undertaken within ICES rectangle 42E9 for the Ossian Array EIA Report in July 2022 as noted in **paragraph 6.7.4.4**. This data remains relevant and provides an insight into the species of commercial importance which are present within the Offshore Scoping Boundary (in Scottish waters). Species recorded included queen scallop *Aequipecten opercularis*, plaice *Pleuronectes platessa*, lemon sole *Microstomus kitt*, long rough dab *Hippoglossoides platessoides*, common dab *Limanda limanda*, Norway pout *Trisopterus esmarkii* and grey gurnard *Eutrigla gurnardus*.

6.7.3.6 The sale of fish and the fisheries supply chain will be included in the socio-economic impact assessments undertaken during the EIA process and will be considered if any potential impacts to commercial fisheries are concluded to be significant. The commercial fisheries chapter of the ES will only cover the impacts to commercial fisheries up to the point of first sale by commercial fishers. Supply chain effects of suppliers and processors will be discussed in greater detail within the socio-economic chapter within the ES.

Fisheries Data Between 2014 and 2018

6.7.3.7 The total landed weight and first sales values between 2014 and 2018 show some variation as illustrated in **Table 6.7.1**. The average landed weight from ICES rectangles within the commercial fisheries study area (as outlined in **paragraph 6.7.2.4** and **Figure 6.7.1**) across the five-year period was 13,444 tonnes, with an average first sales value of £23,666,276. Shellfish was the dominant species group, with first sales values increasing each year and averaging £21,408,869.

6.7.3.8 Lobsters *Homarus gammarus* contributed the highest first sales value from 2014 to 2017 with an average value of £7,117,301 over the four-year period. In 2018, crabs *Cancer pagurus* (Mixed Sexes) dominated with a first sales value of £11,402,356. However, in terms of landed weight, in 2014, herring *Clupea harengus* contributed the largest landed weight, and crabs from 2015 to 2018. Other key species captured during this five-year period include cockles *Cardiidae* and scallops *Pectinidae*.

6.7.3.9 Seven different gear types were recorded during this period: beam trawl, demersal trawl/seine, dredge, drift and fixed nets, gears using hooks, other mobile gears, and pots and traps. In 2014, demersal trawl/seine contributed the highest landings, recording 6,665 tonnes. From 2015 to 2018, pots and traps dominated, averaging 6,400 tonnes over the four-year period. For every year from 2014 to 2018, pots and traps contributed the highest first sales value, with an average of £14,931,125.

Fisheries Data Between 2019 and 2023

6.7.3.10 The total landed weight and first sales values varied significantly between 2019 and 2023 as displayed in **Table 6.7.1**, with an average of 14,395 tonnes and average value of £31,139,047 over the five-year period, a clear increase from the values recorded in the period 2014 to 2018. Shellfish dominated the first sales value every year, averaging £27,125,897, followed by pelagic species at £3,051,427 and demersal species at £961,723.

6.7.3.11 Crabs and lobsters were the top two species by value from 2019 to 2023, contributing £10,428,332 and £9,347,783 respectively. Additional key species during the period from 2019 to 2023 include scallops and nephrops (Norway lobster *Nephrops norvegicus*) which averaged £2,095,954 first sales value and 1,046 tonnes landed weight, and £3,332,884 first sales value and 658 tonnes landed weight, respectively.

6.7.3.12 Eleven different gear types were recorded: drift and fixed nets, pelagic seine, beam trawl, demersal seine, other mobile gears, dredge, demersal trawl, pelagic trawl, pots and traps, longlines, and handlines. Pots and traps contributed the highest landings every year with an average of 6,431 tonnes, except in 2021 when pelagic trawls dominated with 16,899 tonnes. However, pots and traps contributed the

highest first sales value for every year from 2019 to 2023, with an average value of £20,699,972 over the period.

6.7.3.13 The total combined landed weight and first sales value for each year within the commercial fisheries study area are presented in **Table 6.7.1.** Both landed weight and first sales value have seen variation, particularly in 2021.

Table 6.7.1 Key Summary Statistics for 2014 to 2023 within the Commercial Fisheries Study Area

Year	Sum of Landed Weight (tonnes)	Sum of First Sales Value (GBP)
2014	17,141.47	£21,817,880
2015	14,527.87	£21,642,398
2016	9,958.85	£21,359,449
2017	11,339.36	£25,384,354
2018	14,251.04	£28,127,301
2019	12,740.68	£31,881,487
2020	13,526.27	£23,776,368
2021	27,048.90	£41,69,967
2022	9,525.43	£28,368,646
2023	9,133.75	£30,008,767.58

English waters

Vessel Presence and Fishing Intensity

6.7.3.14 As illustrated in **Figure 6.7.2**, the total fishing effort is relatively low throughout the northern half of the Offshore Scoping Boundary (in English waters). Fishing effort becomes more intense within ICES rectangles 37F0, 36F0, 36F1 and 35F0, as the Offshore Transmission Infrastructure approaches the Landfall. This is also observed in **part 2, section 6.8** of this scoping report which found the majority of fishing vessels were located in the southern half of the shipping and navigation study area, 34% of which were engaged in active fishing.

6.7.3.15 From 2017 to 2020, the total fishing effort for all gears (Kw/h) has increased, particularly within the southern half of the Offshore Scoping Boundary in English waters, and along the east coast of the UK in general (**Figure 6.7.2**).

6.7.3.16 It is acknowledged that fishers from other European jurisdictions such as Norway, Denmark, Germany and the Netherlands may also access the ICES Rectangles within the commercial fisheries study area and, therefore, there may be potential for impacts upon international fisheries. Information in the form of landings statistics, sightings data and fishing activity levels will be requested and consultation with these jurisdictions will be undertaken and presented in the commercial fisheries chapter of the ES.

Scottish waters

Vessel Presence and Fishing Intensity

6.7.3.17 As illustrated in **Figure 6.7.2**, the total fishing effort is relatively low within the commercial fisheries study area in Scottish waters, with higher effort reported for ICES Rectangle 42F0, the portion of the commercial fisheries study area in English waters, and elsewhere in the North Sea.

Future Baseline Conditions

6.7.3.18 The EIA process will consider the existing baseline conditions within the commercial fisheries study area, however, it will also evaluate the future baseline conditions as far as reasonably practicable. The baseline environment is not static, therefore, even if the Ossian Transmission Infrastructure does not come forward, the environment will exhibit some degree of natural change. These changes may occur due to naturally occurring cycles and processes and any potential changes resulting from climate change.

6.7.3.19 It is unlikely that the future baseline conditions will see either sudden or large-scale changes based on the extensive temporal range of the data already analysed within this EIA Scoping Report. Should any changes be foreseeable, such as seasonal or yearly changes due to regulations imposed by the MMO or Marine Directorate they will be highlighted within the commercial fisheries chapter of the ES.

6.7.3.20 The commercial fisheries chapter of the ES will ensure to place any potential impacts on receptors into the context of any changes to future baseline conditions which may occur over the timescale of the Offshore Transmission Infrastructure.

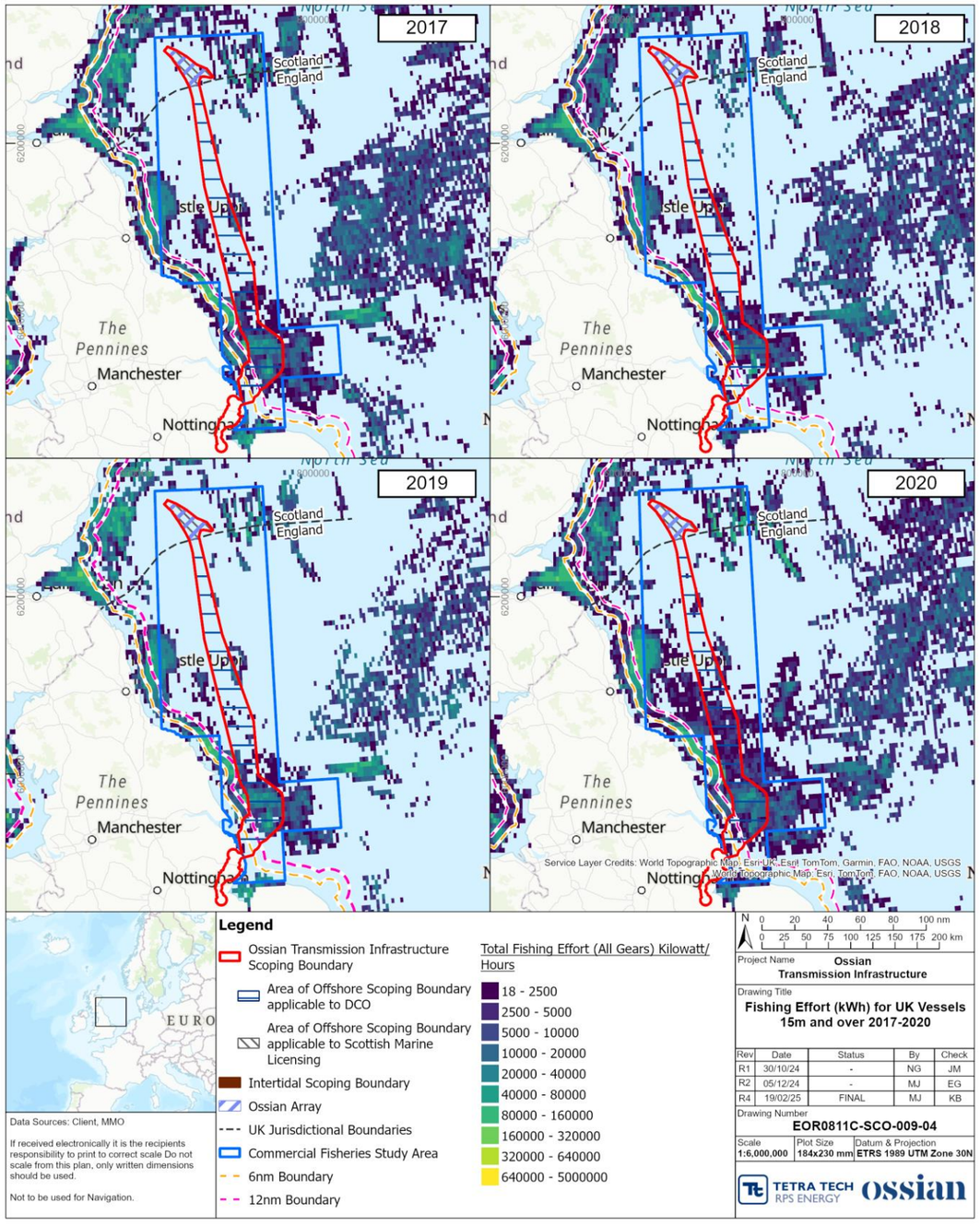

Figure 6.7.2: Total Fishing Effort of UK Vessels (>15 m) from 2017 to 2020 (kW/h) (Source: Marine Scotland, 2021)

6.7.4 Proposed Data Sources

6.7.4.1 **Table 6.7.2** presents the key data sources proposed for the commercial fisheries assessment.

6.7.4.2 Available Vessel Monitoring System (VMS) data from UK registered vessels will be utilised within the ES. Additionally, data from vessels registered in European Union (EU) and non-EU countries (e.g. Norway) which operate within the North Sea which are not included in UK VMS data from the Marine Management Organisation (MMO) will be requested and included as part of the baseline for commercial fisheries in the ES.

6.7.4.3 Additional data sources will also be used to inform the assessment in the commercial fisheries chapter of the ES, for example, published data from any relevant organisation such as the MMO, publicly available offshore wind EIAs or reports from adjacent developments, any surveillance sightings data, and I-VMS data should it become available. Extensive consultation with relevant stakeholders within the commercial fisheries sector will be undertaken throughout the EIA process, to help inform the commercial fisheries baseline within the ES, particularly to capture details for those vessels not included within VMS or AIS datasets (i.e. vessels <10 m length). This is further discussed in **paragraph 6.7.8.10**.

Table 6.7.2: Summary of Key Desktop Data Sources for Commercial Fisheries

Title	Source	Survey Years	Reference
General (applicable to both English and Scottish waters)			
2019 to 2023 United Kingdom (UK) Fleet Landings by ICES Rectangle Stock and Exclusive Economic Zone (EEZ)	MMO	2019 to 2023	MMO (2024)
2014 to 2018 UK Fleet Landings by ICES Rectangle	MMO	2014 to 2018	MMO (2019)
Scottish waters			
Fishing Activity for UK Vessels 15 m and over 2017 to 2020	Marine Scotland	2017 to 2020	Marine Scotland (2021)
English waters			
None			

Site-Specific Data

6.7.4.4 Site-specific benthic surveys were undertaken within ICES rectangle 42E9 for the Ossian Array EIA Report, in July 2022 (Ossian Offshore Wind Farm Limited (Ossian OWFL), 2024), the results of which have informed the baseline characterisation of the Offshore Scoping Boundary (in Scottish waters) within this EIA Scoping Report section where applicable.

6.7.4.5 Vessel Traffic Surveys were also undertaken to characterise vessel traffic movements within 10 nm of the Array Site Boundary (which overlaps with the majority of the Offshore Scoping Boundary in Scottish waters) for the Array Application (Ossian OWFL, 2024). These took place in winter 2022 (07 December 2022 to 21 December 2022) and summer 2023 (02 July 2023 to 18 July 2023). These surveys have informed the baseline characterisation of this EIA Scoping Report section where applicable. Further information on these surveys, and shipping and navigation in general, is detailed in **part 2, section 6.8** of this EIA Scoping Report.

6.7.4.6 Site-specific surveys were also undertaken to identify the location of fishing gear in and around the southern section of the cable route as the Ossian Transmission Infrastructure approaches Landfall. These took place in February 2024 (02 February 2024 to 24 February 2024). These surveys will inform the baseline characterisation in the ES.

6.7.4.7 In addition, site-specific surveys for benthic ecology for the Offshore Transmission Infrastructure are planned for 2025 (including an intertidal and subtidal survey). The site-specific surveys will include grab sampling and seabed imagery sampling, as well as intertidal surveys. The benthic subtidal survey will take place across the Offshore Scoping Boundary, and the intertidal survey will take place across the Intertidal Scoping Boundary. This site-specific data will be used to inform the commercial fisheries chapter of the ES where relevant.

6.7.5 Mitigation Measures

6.7.5.1 The following measures adopted as part of the Offshore Transmission Infrastructure are relevant to the assessment for commercial fisheries. These mitigation measures may evolve (and be further clarified) as the design and EIA process progresses:

- Cables will be buried wherever possible (particularly in high-risk zones such as shipping lanes, and to avoid interaction with fishing gear); external cable protection will be used where minimum burial depths cannot be achieved and Ossian will seek to minimise the extent and quantity of any external cable protection laid.
- The development of, and adherence to, an Operation and Maintenance Programme (OMP) which will detail the programme of routine inspections of the Offshore Export Cables (e.g. post-lay and cable burial inspection surveys and monitoring) to confirm minimum burial depth is maintained.
- The development of, and adherence to, a Cable Plan, informed by the findings of a Cable Burial Risk Assessment (CBRA) which will confirm the cable protection methods to be implemented, including target burial depths and external cable protection types/locations.
- Ongoing consultation with the fishing industry and appointment of a Fisheries Liaison Officer (FLO), who will produce a Commercial Fisheries Coexistence Plan (CFCP) and liaise with stakeholders as appropriate.
- The development of, and adherence to, a Fisheries Management and Mitigation Strategy (FMMS) within which mitigation measures will be proposed to reduce any likely significant effects on commercial fisheries.
- Adherence to good practice guidance with regards to fisheries liaison (e.g. Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW), 2014, 2015).
- Timely and efficient distribution of Notices to Mariners (NtM), Kingfisher notifications and other navigational warnings of the position and nature of works associated with the Offshore Transmission Infrastructure.
- The development of, and adherence to, a Vessel Management Plan (VMP).
- The development of, and adherence to, a Navigational Safety Plan (NSP).
- Notification to the UK Hydrographic Office (UKHO) of the proposed works to facilitate the promulgation of maritime safety information and updating of nautical charts and publications.
- Liaison with Fisheries Industry Representatives (FIRs), as appropriate.

6.7.5.2 The significance of effects of the Offshore Transmission Infrastructure on commercial fisheries may result in the requirement for additional mitigation measures. This will be consulted upon with the statutory consultees throughout the EIA process.

6.7.6 Proposed Scope of the Assessment

6.7.6.1 Potential impacts that are proposed to be scoped into the assessment for commercial fisheries are set out in **Table 6.7.3**.

Table 6.7.3: Potential Impacts Proposed to be Scoped In for Commercial Fisheries

Impact	Project Phase[10]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Temporary loss or restricted access to fishing grounds	✓	✓	✓	✓	✓	The implementation of any advisory safety zones and physical construction and decommissioning activities may result in temporary loss and/or restricted access to fishing grounds. The Offshore Export Cables configuration may temporarily prohibit specific gear types particularly mobile towed gears; cause deviation to navigation, gear deployment and recovery. The completion of any necessary maintenance upon the Offshore Export Cables may also result in temporary loss and/or restricted access to fishing grounds due to the presence of any potential maintenance vessels.	No site-specific modelling is proposed for this impact. Instead, a qualitative assessment will be undertaken to assess potential impacts upon commercial fisheries receptors. This qualitative assessment will be based on a quantitative and qualitative analysis of fisheries data, utilising the sources listed in **Table 6.7.2** in addition to data requested from stakeholders.
Displacement of fishing activity into other areas	✓	✓	✓	✓	✓	Fishing activity may be temporarily displaced to other areas due to temporary loss of grounds and/or restricted access to grounds during the construction and decommissioning phases (e.g. within any advisory vessel safety zones) and throughout operation and maintenance. Fishing activity may be temporarily displaced to other areas due to restricted access to grounds during maintenance activities (e.g. within any advisory vessel safety zones).	
Interference with fishing activity	✓	✓	✓	✓	✓	There is potential for transiting vessels associated with the construction, operation and maintenance, and decommissioning phases to cause interference or conflict with fishing activity and gears.	
Increased snagging risk, with potential damage to gear	✓	✓	✓	✓	✓	The presence of infrastructure associated with construction (e.g. cables awaiting burial), operation and maintenance (e.g. external cable protection), decommissioning (e.g. accidentally dropped objects) and other seabed obstacles, may pose a snagging risk to fishing vessels, which could result in loss or damage to fishing gear. It should be noted that this may also have impacts regarding the safety of the fishing vessels and their crew. Safety risks associated with snagging will be assessed with navigational risks, within the shipping and navigation chapter of the ES.	

[10] Construction (C), Operation and Maintenance (O), Decommissioning (D)

Impact	Project Phase[10]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Increased steaming/vessel transit times	✓	✓	✓	✓	✓	The presence of any advisory safety zones and physical construction, maintenance and decommissioning activities may result in temporary increases in steaming times and routes to and from fishing grounds for fishing vessels.	
Impacts to commercially exploited species populations	✓	✓	✓	✓	✓	Impacts of the Offshore Transmission Infrastructure on fish and shellfish receptors are presented in **part 2, section 6.4** of this EIA Scoping Report. These involve the following impacts: temporary habitat loss and disturbance, underwater sound, increased suspended sediment concentrations (SSCs) and associated sediment deposition, long term habitat loss, release of sediment bound contaminants, colonisation of hard structures, and effects to fish and shellfish ecology arising from Electromagnetic Fields (EMFs) from subsea cabling.	Further detail is provided in **part 2, section 6.4** on the proposed approach to assessment for each impact to commercially exploited species populations.

6.7.7 Impacts Proposed to be Scoped Out

6.7.7.1 The impact that is proposed to be scoped out of the assessment for commercial fisheries and the justification are set out in **Table 6.7.4.**

Table 6.7.4: Impacts Proposed to be Scoped out of the Assessment for Commercial Fisheries

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
All Phases			
Long term loss of access to fishing grounds	✓	✓	There is not expected to be long term loss to fishing grounds as a result of the construction, operation and maintenance or decommissioning of the Offshore Transmission Infrastructure. Implementation of the measures described in **paragraph 6.7.5.1** will ensure the continuation of fishing activities throughout the lifetime of the Offshore Transmission Infrastructure.

6.7.8 Proposed Assessment Methodology

6.7.8.1 The assessment methodology proposed to be used for the impacts proposed to be scoped in as set out in **Table 6.7.3** is described below.

Legislation and Policy

6.7.8.2 An overview of relevant legislation and policy is provided in **part 1, section 2** of this EIA Scoping Report. Further details of topic-specific legislation and policy will be provided within the commercial fisheries ES chapter.

Relevant Guidance

6.7.8.3 The following guidance documents relevant to the commercial fisheries assessment will be considered in the ES:

- **General guidance (applicable to both English and Scottish waters):**
  - Good Practice Guidelines for Assessing Fisheries Displacement by other Licensed Marine Activities (Marine Scotland, 2022);
  - Spatial Squeeze in Fisheries Final Report (ABPmer, 2022);
  - FLOWW Best Practice Guidance for Offshore Renewables Development: Recommendations for Fisheries Liaison (FLOWW 2014);
  - FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW 2015);
  - Best Practice Guidelines for fishing industry financial and economic impact assessments (Sea Fish Industry Authority and United Kingdom Fisheries Economic Network (UKFEN), 2012);
  - Options and Opportunities for Marine Fisheries Mitigation Associated with Wind Farms (Blyth-Skyrme 2010); and
  - Fishing and Submarine Cables – Working Together (International Cable Protection Committee (International Cable Protection Committee 2009).

Assessment of Effects

6.7.8.4 The commercial fisheries chapter of the ES will follow the methodology set out in **part 1, section 5** of this EIA Scoping Report.

6.7.8.5 The baseline will be expanded upon within the commercial fisheries technical report and chapter of the ES, using additional data which will be requested via liaison with stakeholders. This will include greater detail on EU vessels (e.g., Belgium, France, Denmark, Netherlands) and non-EU (Norwegian) fishing activity within the vicinity of the commercial fisheries study area. A FLO will be responsible for leading the stakeholder engagement.

6.7.8.6 Information and data gathered from site-specific benthic surveys planned for 2025 may be utilised to inform and expand the baseline environment for commercially important fish and shellfish species, as noted in **paragraph 6.7.4.7.**.

6.7.8.7 The commercial fisheries chapter of the ES will consider the relevant guidance listed below, in addition to any new guidance or updates to existing guidance where applicable.

Cumulative Effects and Inter-related Effects

6.7.8.8 The Cumulative Effects Assessment (CEA) for commercial fisheries will follow the general methodology set out in **part 1, section 5**. The commercial fisheries chapter of the ES will also consider the inter-related effects arising from the Offshore Transmission Infrastructure, including potential project lifetime and receptor-led effects. This assessment will be undertaken in accordance with the standard industry guidance and approach, as outlined in **part 1, section 5** in this EIA Scoping Report.

Transboundary Effects

6.7.8.9 The approach to transboundary impacts is set out in **part 1, section 5.10** of this EIA Scoping Report. **Part 5,** a**ppendix 5.1** in this EIA Scoping Report presents the transboundary impacts screening which has been carried out for the Offshore Transmission Infrastructure. As a result of this screening exercise, it is proposed that transboundary impacts and effects on commercial fisheries are screened out from the EIA process.

Relevant Consultations

6.7.8.10 The Applicant has undertaken early consultation with fisheries organisations and representatives associated with the area of the Offshore Scoping Boundary. Consultation with these stakeholders will continue throughout the PEIR and ES phases to inform the commercial fisheries chapter in the ES, as relevant. The following stakeholders relevant to commercial fisheries will be consulted via these meetings:

- **English waters (applicable to the application for a DCO to be made to the Planning Inspectorate):**
  - Inshore Fisheries and Conservation Authorities (IFCAs); and
  - National Federation of Fishermen's Organisation.
- **Scottish waters (applicable to the application for a Marine Licence to be made to MD-LOT):**
  - Scottish Fishermen's Federation;
  - Scottish White Fish Producers Association; and
  - Scottish Pelagic Fishermen's Association.

6.7.9 Next Steps

6.7.9.1 The next steps for the commercial fisheries topic are:

- to acquire and agree with stakeholders any additional data sources relevant to commercial fisheries receptors via consultation (including those which were not available at the time of writing);
- to agree with stakeholders upon the approach for the assessment of commercial fisheries (including presenting sensitivities of receptors and appropriate mitigation);
- to agree that all receptors relevant to commercial fisheries have been identified and scoped in or out accurately; and
- to agree with stakeholders upon the potential impacts for assessment in the commercial fisheries chapter of the ES.

6.8. Shipping and Navigation

6.8.1 Introduction

6.8.1.1 This section of the EIA Scoping Report identifies the proposed scope of the assessment for shipping and navigation from construction, operation and maintenance and decommissioning of the proposed Offshore Transmission Infrastructure. This includes the key data sources used to characterise the baseline environment in the vicinity of the Offshore Transmission Infrastructure within Scottish and English waters, and the impacts proposed to be scoped in and out of the assessment for shipping and navigation in the ES.

6.8.1.2 The shipping and navigation topic considers navigational safety risk posed to surface-based vessels that may arise during the construction, operation and maintenance, and decommissioning phases.

6.8.1.3 The outputs of the scoping process will feed into the Navigation Risk Assessment (NRA) process which will be undertaken in line with Maritime and Coastguard Agency (MCA) requirements under Marine Guidance Note (MGN) 654 (MCA, 2021).

6.8.1.4 This includes assessment of navigational risk to all vessel types however it is noted that commercial risk to fishing vessels is considered separately in **part 2, section 6.7**.

6.8.2 Proposed Study Area for the Assessment

6.8.2.1 A shipping and navigation study area has been defined for the purposes of characterising the baseline for shipping and navigation, as shown in **Figure 6.8.1**. Details of the location and extent of the Intertidal Scoping Boundary can be found in **Figure 3.5.1** of **part 1, section 3**.

6.8.2.2 The shipping and navigation study area encompasses the Offshore Scoping Boundary and Intertidal Scoping Boundary plus a minimum 5 nm buffer, extending to at most 13 nm near the Landfall[11]. This buffer has been used for the preliminary assessment within this EIA Scoping Report, as this is a standard buffer radius for shipping and navigation cable scoping assessments; however, this is likely to be refined to a 2 nm buffer of the refined Offshore Export Cable Corridor at NRA stage in line with a more detailed assessment.

[11] Automatic Identification System (AIS) data was originally obtained for a larger study area based upon a previous iteration of the Offshore Scoping Boundary and Intertidal Scoping Boundary prior to refinement of the Landfall (see section 3).

Figure 6.8.1: Overview of Shipping and Navigation Study Area

6.8.3 Baseline Environment

6.8.3.1 An outline of the baseline environment for shipping and navigation based upon an initial review of data sources is provided below. This baseline environment section is split into the following subsections to allow the reader to distinguish between information relevant to specific jurisdictions:

- **General** – this subsection summarises baseline environment information across the entire shipping and navigation study area (i.e. both English and Scottish waters) and is therefore applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to be made to MD-LOT.
- **English Waters** – this subsection summarises baseline environment information which is specific to the portion of the shipping and navigation study area located within English waters and is therefore applicable to the application for a DCO to be made to the Planning Inspectorate.
- **Scottish Waters** – this subsection summarises baseline environment information which specific to the portion of the shipping and navigation study area located within Scottish waters and is therefore applicable to the application for a Marine Licence to be made to MD-LOT.

General

Vessel Traffic

6.8.3.2 As per **Table 6.8.1**, seasonal vessel traffic data (14 days winter and 14 days summer) has been collected via AIS to characterise vessel traffic movements within the shipping and navigation study area. This data is colour-coded by vessel type and presented in **Figure 6.8.5**. Vessel activity of a temporary nature (e.g. vessels engaged in surveys or involved in projects under construction) has been excluded on the basis that such activity is not representative of the baseline.

6.8.3.3 During the winter period, there was an average of:

- 129 vessels per day within the shipping and navigation study area;
- one vessel per day within the Offshore Scoping Boundary (in Scottish waters); and
- 106 vessels per day within the Offshore Scoping Boundary (in English waters).

6.8.3.4 During the summer period, there was an average of:

- 161 vessels per day within the shipping and navigation study area;
- three vessels per day within the Offshore Scoping Boundary (in Scottish waters); and
- 131 vessels per day within the Offshore Scoping Boundary (in English waters).

6.8.3.5 The increase in traffic numbers during the summer period was associated with a variety of vessel types (i.e. fishing vessels, dredgers, passenger vessels, cargo vessels, recreational vessels, oil and gas vessels and wind farm support vessels).

6.8.3.6 The most common vessel type recorded within the shipping and navigation study area during the 28-day period was cargo, accounting for 42% of the traffic. This

was followed by tanker (21%), wind farm vessels (9%), oil and gas vessels (8%) and fishing vessels (6%). Cargo vessels and tankers were also the most common vessel types within the Offshore Scoping Boundary (in Scottish waters) (accounting for 36% and 25% respectively) and within the Offshore Scoping Boundary (in English waters) (accounting for 47% and 24% respectively).

6.8.3.7 Cargo vessels were largely seen routing between ports in the Humber (such as Immingham and Hull) and a variety of destinations in continental Europe (such as ports in Denmark, Belgium, Germany and the Netherlands). A prominent north-west/south-east route was also seen within the southern portion of the shipping and navigation study area, with common destinations being Teesport (United Kingdom (UK)), Rotterdam (the Netherlands) and Zeebrugge (Belgium). Roll-on/Roll-off (RoRo) vessels were seen on each of these routes. East/west routeing was also seen within the central portion of the shipping and navigation study area.

6.8.3.8 Tankers displayed similar patterns: north-west/south-east routeing between UK ports (e.g. Immingham) and destinations in continental Europe (e.g. ports in the Netherlands and Belgium) was noted as well as east/west routeing within the central portion of the shipping and navigation study area.

6.8.3.9 Passenger vessels were mainly seen either on a south-east/north-west route between Humber ports (e.g. Hull or Killingholme) and Rotterdam (the Netherlands) or on a south-east/north-west route further north, between Newcastle upon Tyne (UK) and IJmuiden (the Netherlands). The former route was mainly composed of four Roll-on/Roll-off Passenger (RoPax) vessels, two operated by P&O Ferries and the other two operated by StenaLines. The latter route was composed of two RoPax vessels operated by DFDS Seaways.

6.8.3.10 The majority of fishing vessels were seen in the southern half of the shipping and navigation study area (in English waters). A proportion (approximately 34%) appeared to be engaged in active fishing based on average speeds and track behaviour.

6.8.3.11 Recreational traffic was highly seasonal due to the more favourable weather of the summer season, with only 3% of recreational vessels recorded during the winter period.

6.8.3.12 Anchoring activity was primarily demonstrated among cargo vessels and tankers. The majority were seen using a designated anchorage area within the Offshore Scoping Boundary (in English waters), approximately 7.3 nm from the coast, near the approaches to the Humber (shown in **Figure 6.8.4**). A significant proportion were also seen in an area approximately 5 nm north of the designated anchorage area noting there is no designated anchorage area charted at the location of these vessels. Other anchoring activity, by cargo vessels and tankers, was indicated within 2 nm to 4 nm from the Landfall. There was an average of 21 vessels per day identified as at anchor within the shipping and navigation study area during the 28-day period.

6.8.3.13 **Figure 6.8.6** presents a detailed view of those vessels approaching or departing the Humber. The majority of the vessels approaching/departing the Humber via one of the TSSs were cargo vessels. The deepest draught broadcast via AIS by a vessel using the north-east/south-west TSS (New Sand Hole) was 14 m, the deepest within the east/west TSS (Sea Reach) was 10.4 m and the deepest within the south-east/north-west TSS (Rosse Reach) was 9.4 m.

Maritime Incidents

6.8.3.14 The marine incident datasets assessed indicate that the majority of incidents within the shipping and navigation study area occurred within 30 nm of the Landfall.

6.8.3.15 The Royal National Lifeboat Institution (RNLI) reported a total of 548 lifeboat responses within the shipping and navigation study area during the ten-year period assessed. The majority (approximately 56%) of lifeboat responses occurred within 1 nm of the Landfall (mostly of unspecified type). Excluding unspecified casualty types and “Person in Danger”, the most common casualty type was powered recreational which accounted for 36%. Excluding unspecified incident types, the most common type of incident was “Person in Danger” which accounted for 41%. There was a single incident within the Offshore Scoping Boundary (in Scottish waters); a recreational vessel experiencing machinery failure in 2016. There was a total of 350 lifeboat responses within the Offshore Scoping Boundary (in English waters).

6.8.3.16 The Marine Accident Investigation Branch (MAIB) data reported a total of 142 incidents involving 150 vessels within the shipping and navigation study area during the ten-year period assessed. The most common casualty type was fishing vessels, accounting for 33%. The most common incident type was machinery failure, accounting for 36%. There were two incidents within the Offshore Scoping Boundary (in Scottish waters), one involving an accident on board a fishing vessel in 2015 and the other involving a dredger colliding with a buoy in 2018. There were 63 incidents within the Offshore Scoping Boundary (in English waters) involving 66 vessels.

6.8.3.17 A review of the previous 10 years of MAIB data indicated that incident rates have decreased, with 181 incidents involving 207 casualties occurring within the shipping and navigation study area during this period.

English Waters

Navigational Features

6.8.3.18 The key charted navigational features within the shipping and navigation study area are presented in **Figure 6.8.2**. Following this, a detailed view of key charted navigational features in the vicinity of the Landfall is presented in **Figure 6.8.3** and a detailed view of key charted port related facilities at the approaches to the Humber is presented in **Figure 6.8.4**.

6.8.3.19 In the vicinity of the shipping and navigation study area (in English waters), navigational features are heavily concentrated within 40 nm of the Landfall. This includes charted wrecks and obstructions, aids to navigation, subsea cables, oil and gas infrastructure (including platforms, subsea wells and pipelines), extraction areas and spoil grounds. The majority of each of these were within the Offshore Scoping Boundary itself.

6.8.3.20 The Triton Knoll, Lynn, Inner Dowsing and Humber Gateway Offshore Wind Farms intersect the shipping and navigation study area; the Triton Knoll Offshore Wind Farm intersects the Offshore Scoping Boundary itself, as does the north-western extent of Inner Dowsing Offshore Wind Farm. It should also be noted that aids to navigation mark the boundaries of these offshore wind farms. Subsea cables intersect the shipping and navigation study area, a significant proportion of which are export cables for offshore wind farms (e.g. Triton Knoll, the Hornsea projects and the Dogger Bank projects). Subsea pipelines also intersect the shipping and navigation study area, mainly connecting to platforms located within the shipping and navigation study area. Further information on infrastructure and other sea users is provided in **part 2, section 6.10**. A total of 185 charted wrecks and obstructions were identified within the shipping and navigation study area (note that only wrecks of navigational significance are charted; wrecks are discussed further from a marine archaeology perspective in **part 2, section 6.9**).

6.8.3.21 Routeing measures at the approach to the Humber are seen to intersect the shipping and navigation study area and Offshore Scoping Boundary. This includes three Traffic Separation Schemes (TSSs): New Sand Hole, which is north-east/south-west and has a minimum charted water depth of 10.8 m below Chart Datum (CD); Sea Reach, which is east/west and has a minimum water depth of 8.6 m; and Rosse Reach, which is south-east/north-west and has a minimum water depth of 6.9 m.

6.8.3.22 A precautionary area connects these TSSs and four pilot boarding stations (outside of the Offshore Scoping Boundary itself) are located within it. The Humber Deep Water Anchorage, a designated anchorage area recommended for large vessels bound for the Humber, is also located within the Offshore Scoping Boundary.

Scottish Waters

Navigational Features

6.8.3.23 In the vicinity of the shipping and navigation study area (in Scottish waters), navigational features are relatively minimal; however, there are two metocean buoys within the Offshore Scoping Boundary deployed by the Applicant.

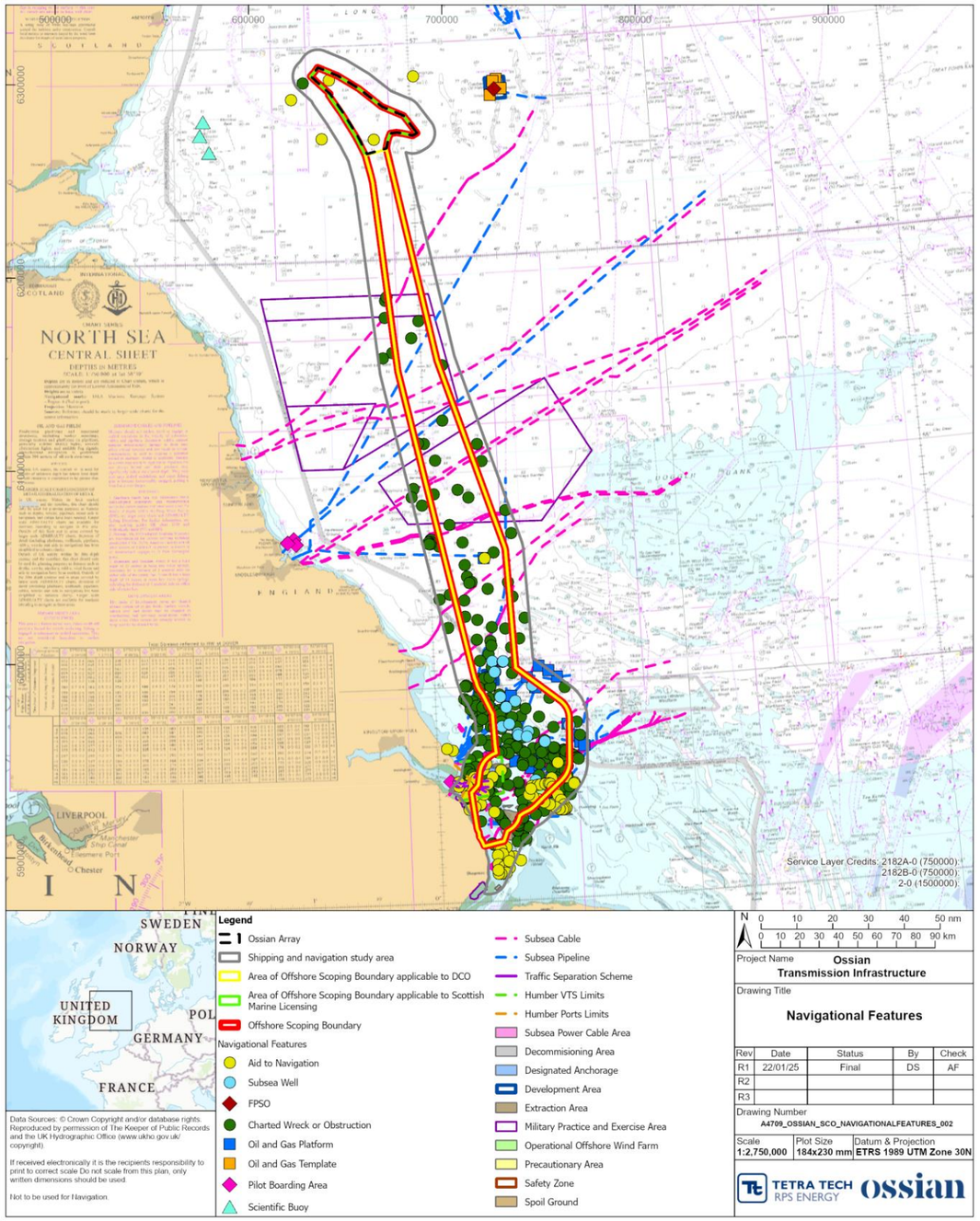

Figure 6.8.2:Navigational Features Within the Shipping and Navigation Study Area

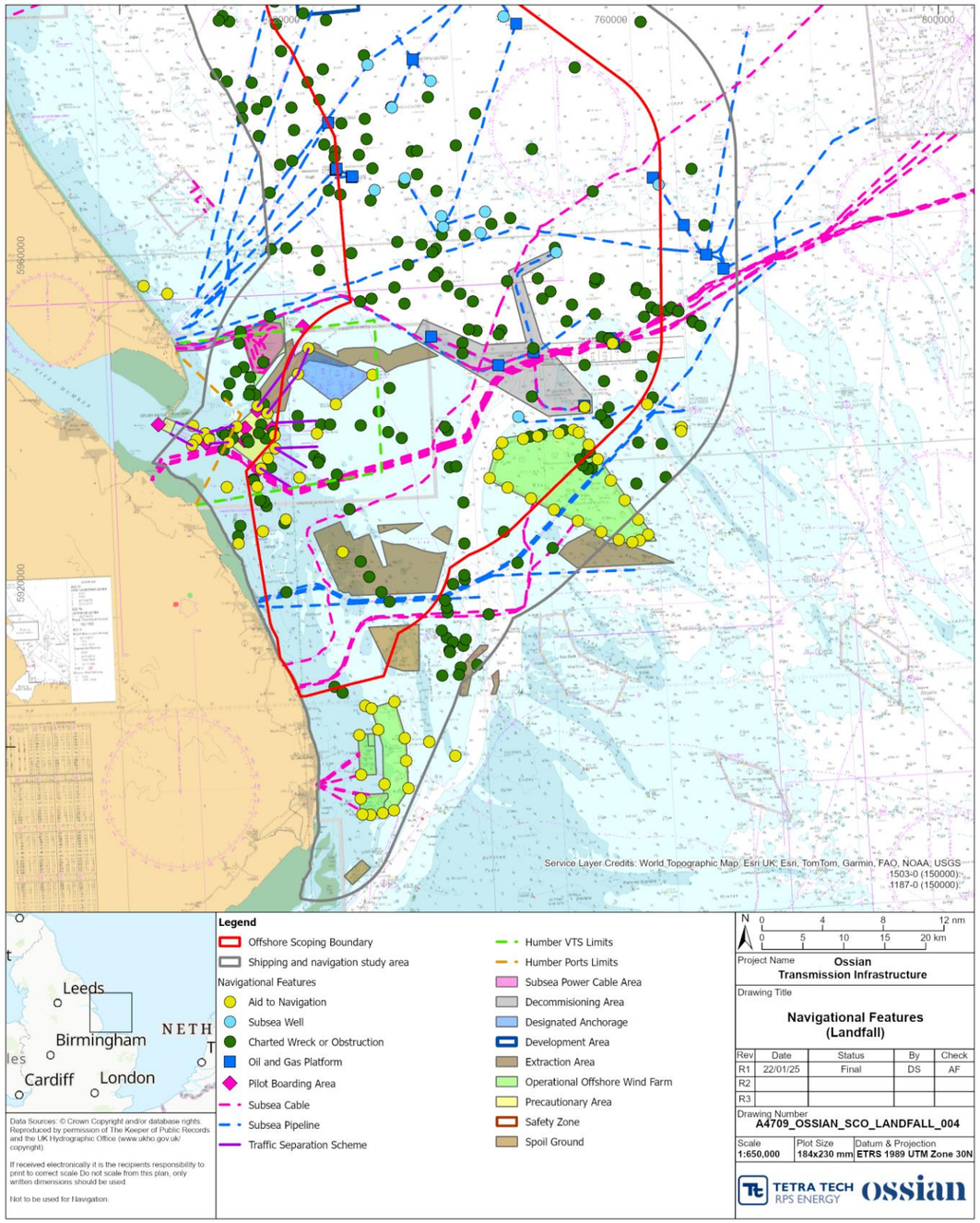

Figure 6.8.3: Navigational Features Within the Shipping and Navigation Study Area (Landfall)

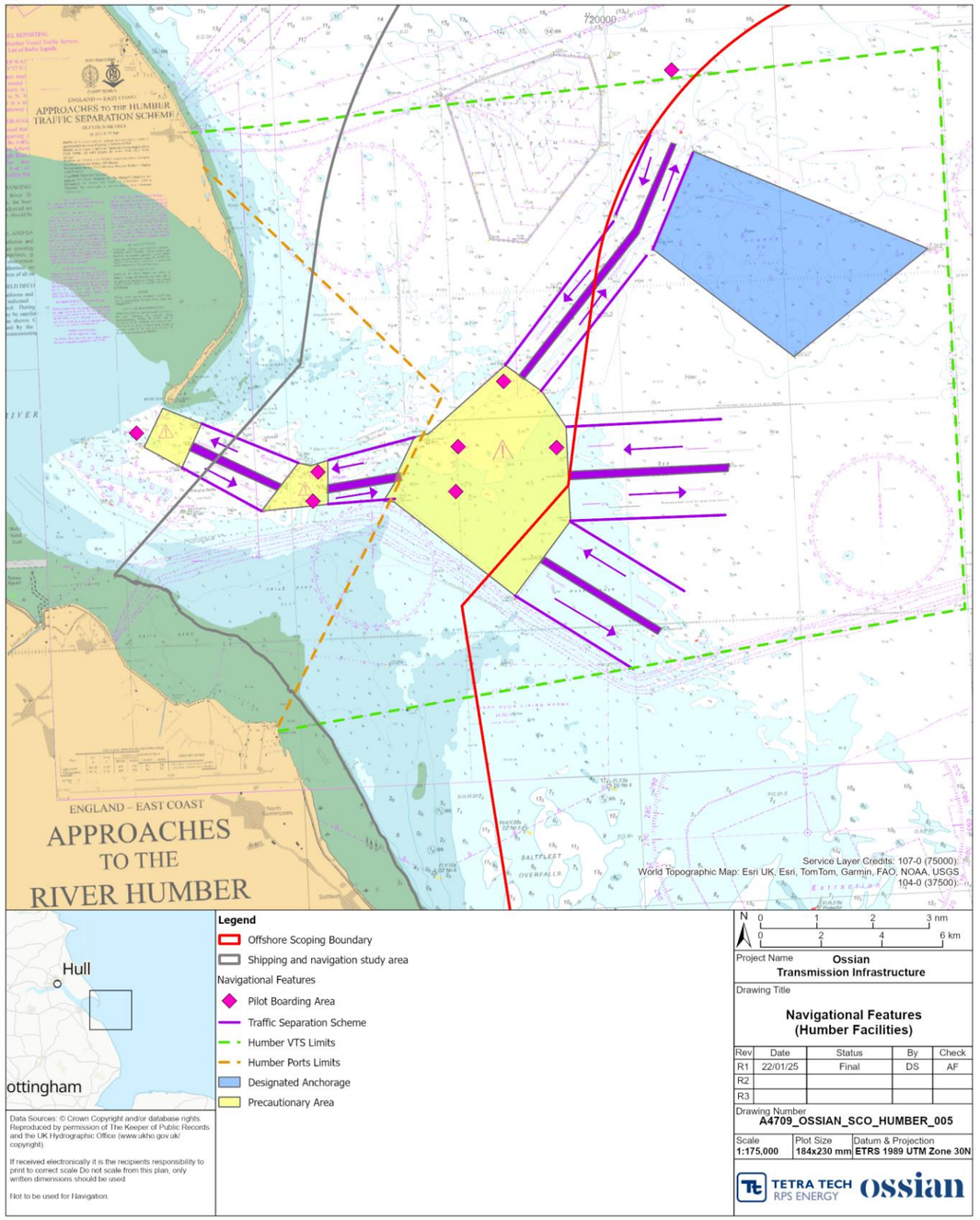

Figure 6.8.4: Navigational Features Within the Shipping and Navigation Study Area (Humber Port Facilities)

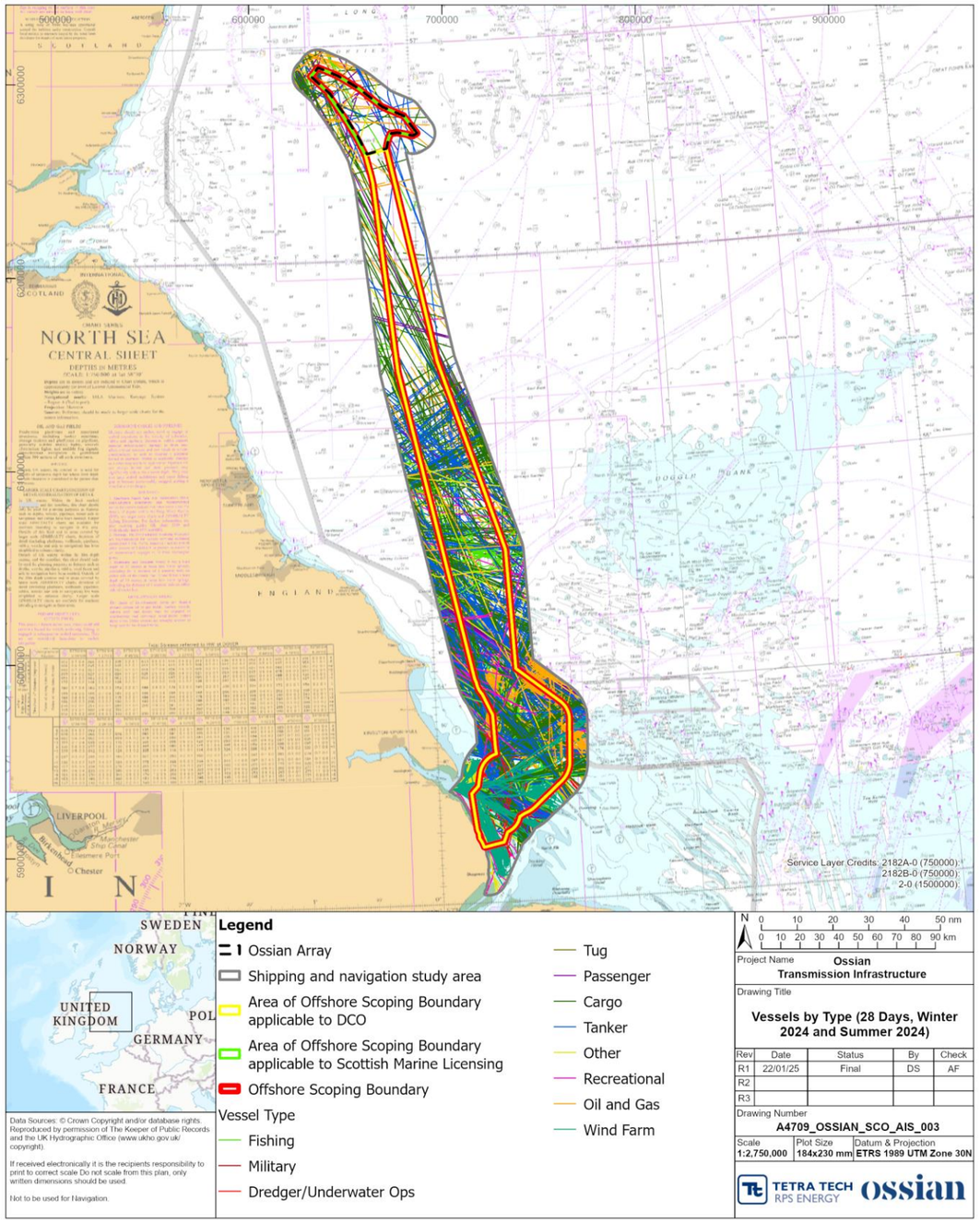

Figure 6.8.5: Vessels by Type within the Shipping and Navigation Study Area (28 Days, Winter 2024 and Summer 2024)

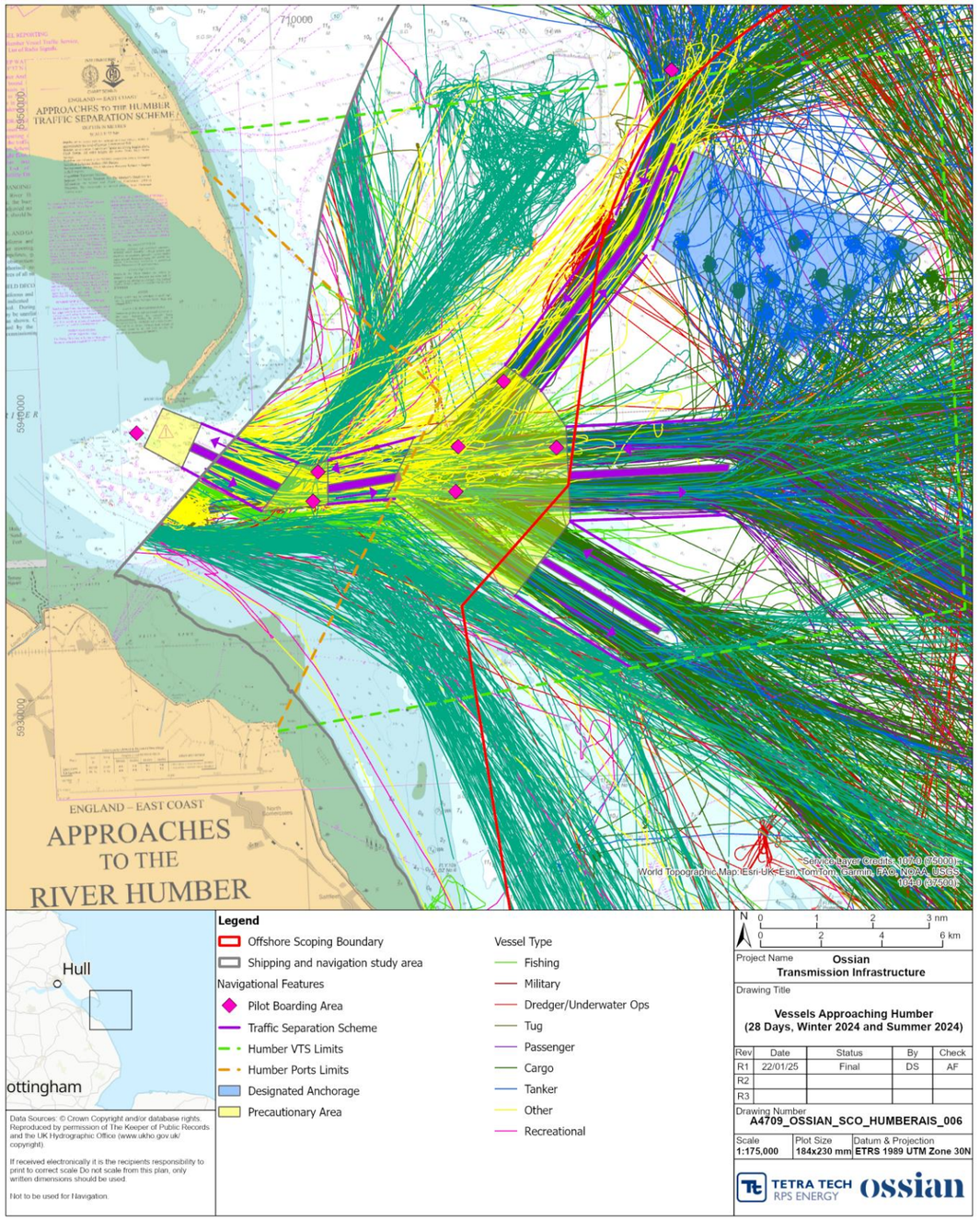

Figure 6.8.6: Vessels Approaching Humber within the Shipping and Navigation Study Area (28 Days, Winter 2024 and Summer 2024)

Future Baseline Conditions

6.8.3.24 There is the potential for traffic volumes, compositions, sizes and/or patterns to change during the lifetime of the Offshore Transmission Infrastructure.

6.8.3.25 Changes in routeing could be caused by the future development of other offshore wind farms; such developments could alter routeing (although these developments would likely be sufficiently far offshore that substantial alterations to routeing in the approach to the Humber would be unlikely) or affect traffic volumes (via the presence of project vessels).

6.8.3.26 Changes in commercial traffic volumes and compositions are complex to predict and are linked to a variety of factors including market conditions and port expansions or upgrades, however increases in number of vessels are possible.

6.8.4 Proposed Data Sources

6.8.4.1 **Table 6.8.1** presents the key data sources proposed for the shipping and navigation assessment. Note that, in addition to these data sources, relevant output of the consultation process will also be considered.

Table 6.8.1: Summary of Data Sources Proposed for Assessment

Title/Dataset	Year(s)	Author	Citation
General (applicable to both English and Scottish waters)			
28 days of AIS data within the shipping and navigation study area for the period 1 January 2024 – 14 January 2024 (14 days) and 1 July 2024 – 14 July 2024 (14 days) collected from onshore and offshore receivers	2024 data has been used for scoping. It is intended that the same datasets will be used for NRA stage.	Anatec in-house data collected from onshore and offshore receivers	Anatec in-house data collected from onshore and offshore receivers
UKHO Admiralty Charts 104, 107, 108, 121, 129, 1190, 1191, 1192, 1407, 268, 273, 1187, 2182A	2024 charts have been used for scoping. The latest available will be used for NRA stage.	UKHO	UKHO, 2024
Admiralty Sailing Directions NP54 12th Edition	2021 edition has been used for scoping. The latest available will be used for NRA stage.	UKHO	UKHO, 2021
MAIB incident data	2013 to 2022 has been used for scoping. The latest 20 year dataset available will be used at NRA stage.	MAIB	MAIB, 2023
RNLI incident data	2013 to 2022 has been used for scoping. The latest 10 year dataset available will be used at NRA stage.	RNLI	RNLI, 2023
RYA Coastal Atlas	Dataset not considered at scoping stage. The latest available version will be used for NRA stage (current version is from 2019).	RYA	RYA, 2019b
Vessel Monitoring System (VMS) data	Dataset not considered at scoping stage. The latest available data will be used for NRA stage.	Marine Management Organisation (MMO) and Marine Directorate	MMO (2020) and Marine Directorate (2023)
English waters			
None			
Scottish waters			
None			

6.8.4.2 Vessel traffic surveys have also been undertaken as part of the Array Application to characterise vessel traffic movement within 10 nm of the Array Site Boundary (which overlaps with the majority of the Offshore Scoping Boundary in Scottish waters) and therefore these surveys also characterised movements in vicinity of the Offshore Scoping Boundary (in Scottish waters). These took place in winter 2022 (07 December 2022 to 21 December 2022) and summer 2023 (02 July 2023 to 18 July 2023). These surveys indicated minimal non-AIS traffic, with only a single non-AIS vessel recorded.

6.8.4.3 It is noted that AIS carriage and broadcast is not compulsory for fishing vessels less than 15 m in length, or vessels of less than 300 gross tonnes (GT). Therefore, such traffic may be under-represented within the characterisation of the baseline. However, it is noted that smaller vessels are increasingly observed to utilise AIS voluntarily, given the associated safety benefits. Consultation with relevant stakeholders will also be undertaken to validate and complement the data characterisation of the vessel traffic baseline.

6.8.5 Mitigation Measures

6.8.5.1 The following measures adopted as part of the Offshore Transmission Infrastructure are relevant to the assessment for shipping and navigation. These measures may evolve (and be further clarified) as the design and EIA process progresses:

- The development of, and adherence to, a Cable Plan, informed by the findings of a Cable Burial Risk Assessment (CBRA). The CaP will confirm planned cable routing, burial, and any additional protection, and will set out methods for cable monitoring post-installation.
- A detailed CBRA will be undertaken where Offshore Export Cables are proposed to be buried to determine the minimum burial depth. The burial depths may vary and will be dependent on project design, risk and ground conditions. The CBRA will also highlight locations where adequate burial cannot be achieved, and alternative protection is needed.
- Any damage, destruction, or decay of cables will be notified to the MCA, the relevant General Lighthouse Authority (Northern Lighthouse Board (NLB)) or Trinity House), Kingfisher, and United Kingdom Hydrographic Office (UKHO).
- Appropriate marking of all Offshore Transmission Infrastructure on UKHO Admiralty charts.
- Ongoing liaison with fishing fleets will be maintained during construction, and as required during operation and decommissioning, via an appointed Fisheries Liaison Officer (FLO).
- A risk assessment will be undertaken to determine the need for guard vessels.
- Advisory passing distances will be used and promulgated where appropriate.
- Project vessels will display appropriate lights and marks at all times, and where possible, broadcast their status on AIS.
- Project vessels will be managed via marine coordination implemented throughout construction, operation and maintenance, and decommissioning periods.
- Project vessels will ensure compliance with international marine regulations as adopted by the Flag State, including the Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) (International Maritime Organization (IMO), 1972/77) and International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974).
- Development of, and adherence to, a Marine Pollution Contingency Plan (MPCP) outlining the approach for managing and reducing risk of pollution and procedures to protect personnel, and to be followed in the event of a pollution incident.
- A Navigational Safety Plan (NSP), to describe measures relating to navigational safety, will be developed post-consent.
- A Vessel Management Plan (VMP), to confirm the types and numbers of project vessels and to consider vessel coordination including indicative transit route planning, will be developed post-consent.
- The Applicant will ensure compliance with MGN 654 and its annexes, where applicable, including the post-consent completion of an Emergency Response Cooperation Plan (ERCoP) and Search and Rescue (SAR) Checklist in consultation with the MCA.
- Promulgation of information in the form of advance warning and accurate location details of project operations and associated advisory passing distances, provided via notifications to mariners (NtMs) and Kingfisher Bulletins.

6.8.6 Proposed Scope of the Assessment

6.8.6.1 Potential impacts that are proposed to be scoped into the assessment for shipping and navigation are set out in **Table 6.8.2**.

Table 6.8.2: Potential Impacts Proposed to be Scoped in for Shipping and Navigation

Impact	Project Phase[12]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Increased vessel to vessel collision risk (third party to third party)	✓	✓	✓	✓	✓	Vessels may be displaced due to the presence of project vessels engaged in cable installation, maintenance or decommissioning activities and, as such, collision risk between third-party vessels may increase.	Risk assessment will be informed by outputs of the characterisation of the baseline, consideration of proposed mitigation measures, lessons learned from other offshore wind farm developments, level of stakeholder concern, consultation output and expert opinion.
Increased vessel to vessel collision risk (third party to project vessel)	✓	✓	✓	✓	✓	The increased levels of project vessel traffic in the area associated with cable installation, maintenance or decommissioning activities may lead to increased collision risk between a third party and project vessel.	
Reduced access to local ports and harbours	✓	✓	✓	✓	✓	The increased levels of project vessel traffic in the area associated with cable installation, maintenance or decommissioning activities may lead to disruptions in vessel schedules or difficulties in arriving at local ports.	
Reduction in under-keel clearance	×	✓	×	✓	✓	The presence of external cable protection may increase under-keel interaction risk via reduction of water depth.	
Anchor interaction with subsea cables	×	✓	×	✓	✓	The presence of the Offshore Export Cables may lead to an increase in the risk of anchor interaction.	
Interference with navigation, communications, and position-fixing equipment	×	✓	×	✓	✓	The Offshore Export Cables may impact equipment onboard vessels, including potential effects of electromagnetic interference from cables.	

[12] Construction (C), Operation and Maintenance (O), Decommissioning (D)

6.8.7 Impacts Proposed to be Scoped Out

6.8.7.1 All relevant impacts have been scoped into the assessment as required under MGN 654 (MCA, 2021) i.e. no relevant impacts are proposed to be scoped out of the assessment.

6.8.8 Proposed Assessment Methodology

6.8.8.1 The assessment methodology proposed to be used for the impacts proposed to be scoped in as set out in **Table 6.8.2** is described below.

Legislation and Policy

6.8.8.2 An overview of relevant legislation and policy is provided in **part 1, section 2** of this EIA Scoping Report. Further details of topic specific legislation and policy will be provided within the shipping and navigation ES chapter.

Relevant Guidance

6.8.8.3 The following guidance documents relevant to shipping and navigation assessment will be considered in the ES:

- **General (applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to made to MD-LOT):**
  - MGN 654 Offshore Renewable Energy Installations (OREI): Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021a).
  - MGN 661 Navigation: Safe and Responsible Anchoring and Fishing Practices (MCA, 2021b).
  - Revised Guidelines for Formal Safety Assessment (FSA) for Use in the IMO Rule-Making Process (IMO, 2018).
  - The Royal Yachting Association's (RYA) Position on Offshore Renewable Energy Developments: Paper 1 (of 4) – Wind Energy (RYA, 2019a).

Assessment of Effects

6.8.8.4 As required under the MCA methodology (Annex 1 to MGN 654) (MCA, 2021), and in line with international marine risk assessment standards, the IMO Formal Safety Assessment (FSA) (IMO, 2018) approach will be applied for impact assessment within the NRA and shipping and navigation chapter of the ES. This methodology differs from the overarching methodology applied for other topics within the ES (see **part 1, section 5.5**), however is a requirement of the MCA under MGN 654 for assessment of shipping and navigation risk.

6.8.8.5 The FSA methodology is centred on risk control and assesses each impact in terms of its frequency of occurrence and severity of consequence, in order that its significance be determined as either 'broadly acceptable', 'tolerable', or 'unacceptable', via a risk matrix as shown in **Table 6.8.3**. Any impact assessed as 'unacceptable' will require additional mitigation measures implemented beyond those considered embedded to reduce the impact to within 'tolerable' or 'broadly acceptable' parameters and As Low As Reasonably Practicable (ALARP). Any impacts found to be 'unacceptable' or 'tolerable' but not ALARP under the FSA are considered 'significant' in EIA terms.

Table 6.8.3: IMO FSA Risk Matrix

Frequency of Consequence	Severity of Consequence: Negligible	Minor	Moderate	Serious	Major
Negligible	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable
Extremely Unlikely	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable	Tolerable
Remote	Broadly Acceptable	Broadly Acceptable	Tolerable	Tolerable	Unacceptable
Reasonably Probable	Broadly Acceptable	Tolerable	Tolerable	Unacceptable	Unacceptable
Frequent	Tolerable	Tolerable	Unacceptable	Unacceptable	Unacceptable

6.8.8.6 Severity and consequence will be determined by the NRA findings which will be based on various factors, including:

- output of the baseline assessment;
- consideration of embedded environmental measures in place;
- lessons learnt from other offshore wind farms;
- levels of stakeholder concern; and
- output of consultation.

Cumulative Effects and Inter-related Effects

6.8.8.7 All impacts identified on an in-isolation basis will be considered within the NRA for the potential for cumulative effects. Cumulative developments will be assessed based on the most recent publicly available information at the time with a screening exercise undertaken to determine which cumulative developments should be considered and to what degree (through use of a tiering system). Factors which will be considered in the screening exercise include:

- distance from the Offshore Transmission Infrastructure;
- development status;
- level of interaction with main commercial routes passing in proximity to the Offshore Transmission Infrastructure;
- consultation feedback; and
- data confidence level.

6.8.8.8 This method will take international vessel operators and ports into consideration. To sufficiently capture effects, both base-case and future-case scenarios will be applied in terms of deviations for main commercial routes on a cumulative level.

6.8.8.9 The shipping and navigation chapter of the ES will also consider inter-related effects arising from the Offshore Transmission Infrastructure, including potential project lifetime and receptor-led effects. This assessment will be undertaken in accordance with the standard industry guidance and approach, as outlined in **part 1, section 5** of this EIA Scoping Report.

Transboundary Impacts

6.8.8.10 The approach to transboundary impacts is set out in **part 1, section 5.10** of this EIA Scoping Report. **Part 5,** a**ppendix 5.1** of this EIA Scoping Report presents the transboundary impacts screening which has been carried out for the Offshore Transmission Infrastructure. This screening exercise identified that there is potential for significant transboundary impacts upon shipping and navigation from construction, operation and maintenance, and decommissioning phases of the Offshore Transmission Infrastructure. These will be considered within the in-isolation assessment, and cumulative assessment as part of the NRA process.

Relevant Consultations

6.8.8.11 The Applicant has undertaken early consultation with selected shipping and navigation stakeholders, including the MCA, NLB and UK Chamber of Shipping. Consultation with these stakeholders will continue throughout the PEIR and ES phases via ad-hoc meetings to inform the shipping and navigation chapter in the ES as relevant. The following stakeholders relevant to shipping and navigation will be consulted via these meetings:

- **General (applicable to the application for a DCO to be made to the Planning Inspectorate in English waters, and a Marine Licence to be made to MD-LOT in Scottish waters):**
  - UK Chamber of Shipping;
  - MCA;
  - NLB;
  - Trinity House; and
  - Relevant port authorities.

6.8.8.12 The NRA process will include consultation as required under MGN 654. As a minimum this is anticipated to include the consultees detailed in **paragraph 6.8.8.11** and in the list below, however additional parties may be consulted as directed by the NRA process:

- RYA Scotland;
- RYA;
- regular users of the area; and
- relevant fishing users/organisations (via the FLO).

6.8.9 Next Steps

6.8.9.1 As required under MGN 654, an NRA will be developed for the Offshore Transmission Infrastructure which will be submitted in support of the Offshore Transmission Infrastructure Development Consent Order (DCO) application. This will include a completed MGN 654 checklist to demonstrate that all requirements under MGN 654 have been met.

6.8.9.2 The requirement for any mitigation measures in addition to those adopted as part of the project will be dependent on the significance of risk associated with assessed impacts. The requirement for, and feasibility of, any mitigation measures will be consulted upon with statutory consultees throughout the EIA process.

6.9. Marine Archaeology

6.9.1 Introduction

6.9.1.1 This section of the EIA Scoping Report identifies the proposed scope of the assessment for marine archaeology from construction, operation and maintenance and decommissioning of the proposed Offshore Transmission Infrastructure. This includes the key data sources used to characterise the baseline environment in the vicinity of the Offshore Transmission Infrastructure within Scottish and English waters, and the impacts proposed to be scoped in and out of the assessment for marine archaeology in the ES.

6.9.2 Proposed Study Area for the Assessment

6.9.2.1 The study area used for the assessment of marine archaeology encompasses the Offshore Scoping Boundary, plus a 2 km buffer to provide a wider context with regard to marine archaeology and to identify marine archaeology receptors which could be subject to indirect effects (**Figure 6.9.1**). This study area is referred to as the marine archaeology study area. The intertidal area, between Mean High Water Springs and Mean Low Water Springs, is covered in the onshore Historic Environment section of the EIA Scoping Report (**part 3, section 7.6**).

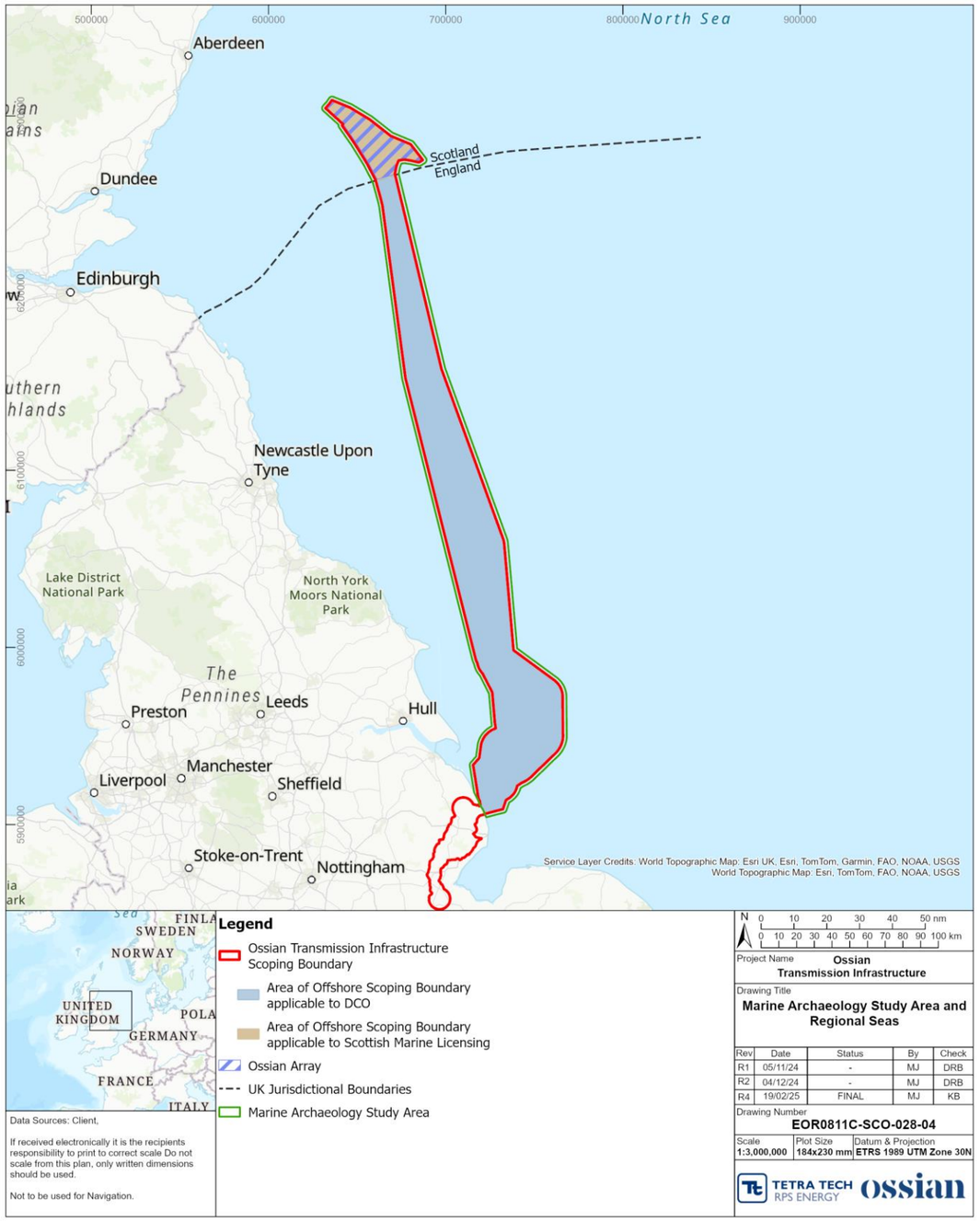

Figure 6.9.1: Marine Archaeology Study Area

6.9.3 Baseline Environment

6.9.3.1 An outline of the baseline environment for marine archaeology based upon an initial review of key data sources is provided below. The following key data sources have been used primarily to inform this preliminary baseline characterisation:

- United Kingdom Hydrographic Office (UKHO) database of wrecks and obstructions;
- Canmore, National Record of the Historic Environment (NRHE) maintained by Historic Environment Scotland; and
- Ossian Array EIA Report: Marine Archaeology Technical Report (Ossian OWFL, 2024).

6.9.3.2 It is recognised that these sources do not provide a definitive list of the marine archaeology receptors present. The baseline characterisation will be further refined based on the results of site-specific geophysical and geotechnical survey, as well as more complete desk-based assessment in the Preliminary Environmental Information Report (PEIR) and ES. The data sources for the EIA desk-based assessment are listed in **Table 6.9.1**.

6.9.3.3 Gazetteers of the marine archaeological receptors in the marine archaeology study area for the EIA Scoping Report is included in **annex 0**

6.9.3.4 Marine archaeological receptors located within the marine archaeology study area will be considered against the following categories:

- Seabed prehistory: for example, palaeochannels and other features that contain prehistoric sediment, and derived Palaeolithic artefacts, e.g. handaxes.
- Maritime archaeology: maritime archaeological sites consist broadly of vessel remains, wreckage and submerged vessel/cargo debris.
- Aviation archaeology: this comprises all military and civilian aircraft crash sites and related wreckage.

6.9.3.5 Heritage sites in the marine environment may be designated under a number of pieces of legislation, either due to their heritage value or for other reasons. The relevant designations include:

- scheduled monuments under the Ancient Monuments and Archaeological Areas Act 1979;
- protected places and controlled sites under the Protection of Military Remains Act 1986;
- protected wrecks under the Protection of Wrecks Act 1973; and
- historic marine protected areas (HMPA) under the Marine (Scotland) Act 2010.

6.9.3.6 This baseline environment section is split into the following subsections to allow the reader to distinguish between information relevant to specific jurisdictions:

- **General** – this subsection summarises baseline environment information across the entire marine archaeology study area (i.e. both English and Scottish waters) and is therefore applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to be made to MD-LOT.
- **English Waters** – this subsection summarises baseline environment information which is specific to the portion of the marine archaeology study area located within English waters and is therefore applicable to the application for a DCO to be made to the Planning Inspectorate.
- **Scottish Waters** – this subsection summarises baseline environment information which specific to the portion of the marine archaeology study area located within Scottish waters and is therefore applicable to the application for a Marine Licence to be made to MD-LOT.

General

Maritime Archaeology

6.9.3.7 The UK has a long maritime history since at least the Mesolithic period. Wreck sites are a common feature around the entirety of the UK coast. Maritime archaeological sites can be considered to comprise two broad categories; the remains of vessels that have been lost and those sites that consist of vessel-related material including equipment lost overboard or deliberately jettisoned such as fishing gear, ammunition and anchors or the only surviving remains of a vessel such as its cargo or a ballast mound.

6.9.3.8 There is the potential for unknown maritime archaeological sites and material from all periods to exist in the marine archaeology study area.

Aviation Archaeology

6.9.3.9 There are no designated sites in the marine archaeology study area.Marine aviation archaeology receptors comprise the remains or associated remains of military and civilian aircraft that have been lost at sea. Evidence can be divided into three primary time periods based on major technological advances in aircraft design: pre-1939; 1939 to 1945; and post-1945.

6.9.3.10 There are no known aircraft crash sites located within the marine archaeology study areas (**Figure 6.9.2**):

6.9.3.11 There is the potential for the discovery of previously unknown aircraft-related debris to exist on the seafloor within the marine archaeology study area, with a higher potential for material dating to the Second World War.

6.9.3.12 Remains of aircraft that crashed whilst on military service are automatically protected by the Protection of Military Remains Act 1986.

English waters

Submerged Prehistory

6.9.3.13 No known prehistoric archaeological material has been recorded in the analysed datasets within the marine archaeology study area.

6.9.3.14 The prehistoric record for England spans from the earliest hominin occupation of what is now UK, at least as far back as 970,000 Before Present (BP) (based on evidence from Happisburgh, Norfolk and Pakefield, Suffolk) (Historic England, 2023). The North Sea contains prehistoric archaeological remains which date back to around 100,000 years ago, as clearly attested by the emergent landscape popularly known as 'Doggerland', although evidence for Palaeolithic activity in the north of the North Sea area is sparse. Mesolithic activity is well attested from the coasts and marine areas of the British Isles (Bicket and Tizzard, 2015).

6.9.3.15 Palaeocoastline modelling undertaken by Brooks *et al*. (2011) suggests that the majority of the marine archaeology study area in English waters may have been fully submerged since the Last Glacial Maximum (LGM). It is therefore unlikely that there is any potential for evidence of submerged prehistoric archaeology in these areas of the marine archaeology study area in English waters. However, there were potentially stable subaerial landforms within the marine archaeology study area in English waters, primarily in the nearshore area, along the east coast of England, and so there is potential for submerged prehistoric archaeological material in association with these palaeolandscapes.

Maritime Archaeology

6.9.3.16 There are 403 UKHO records of known wrecks in the marine archaeology study area in English waters (**Figure 6.9.2**). There are 110 UKHO records of obstructions and foul ground which may also represent maritime archaeological material (**annex 0**). The initial desk-based assessment shows a significantly larger concentration of records in the southern two thirds of the marine archaeology study area in English waters (**Figure 6.9.2**). This is primarily due to the northern third overlying deeper water and being further offshore. The consequence of this is that the northern third of the marine archaeology study area in English waters is likely to have been less surveyed and less regularly used historically for navigation.

Aviation Archaeology

6.9.3.17 There are three aviation recorded losses located in the marine archaeology study area, all of which are located in English waters. These aviation recorded losses date to post-1945, highlighting the potential for unknown aircraft material to be located in the whole of the marine archaeology study area:

- UKHO 6718, RAF Tornado, crashed 1998;
- UKHO 9088, United States Air Force (USAF) F15, crashed 1990; and
- UKHO 9178, Aircraft, possible F3 Tornado, ditched 1995 (**annex 0; Figure 6.9.2**).

Scottish waters

Submerged Prehistory

6.9.3.18 No known prehistoric archaeological material has been recorded in the analysed datasets within the marine archaeology study area.

6.9.3.19 In the marine archaeology study area in Scottish waters, there is little to no potential for the survival of archaeological material before the advent of the Holocene period (12,000 BP to Present Day) (Ossian OWFL, 2024). The marine archaeology study area in Scottish waters may have quickly been submerged following the LGM, circa 18,000 BP. Raised marine deposits have been found within the inner estuaries of Scottish rivers, suggesting that even nearshore areas were submerged by the Windermere Interstadial (circa 15,000 BP to 13,000 BP). This in turn suggests that offshore areas were submerged by this period at least, or perhaps even earlier (Brooks *et al.*, 2011; Holloway *et al.*, 2002; Peacock, 1999; Stoker *et al.*, 2008). Thus, it can be inferred that most of the marine archaeology study area in Scottish waters may have been submerged relatively quickly following the LGM. There is, therefore, low potential for submerged prehistoric archaeology within the marine archaeology study area in Scottish waters.

Maritime Archaeology

6.9.3.20 As noted in **paragraph 6.9.3.9**, there are no designated sites in the marine archaeology study area.

6.9.3.21 There are two Canmore records of known wrecks in the marine archaeology study area in Scottish waters (**Figure 6.9.3**), and one UKHO record of an obstruction which may also represent maritime archaeological material (**Figure 6.9.2**).

6.9.3.22 Within the Ossian Array EIA Report, a marine archaeology study area consisting of the Array Site Boundary plus an additional 2 km buffer was assessed (referred to here as the 'Array marine archaeology study area'), and included archaeological assessment of geophysical survey data (Ossian OWFL, 2024). The Array Site Boundary is contained entirely within the marine archaeology study area in Scottish waters, so the results of that assessment can give an indication of the archaeological receptors likely to be present in the marine archaeology study area in Scottish waters. The Ossian Array EIA Report identified 324 geophysical anomalies of archaeological interest within the Array marine archaeology study area (**annex 0; Figure 6.9.3**) (Ossian OWFL, 2024). Of these, following the classification system in **Table 6.9.4,**:

- three were classified as high potential;
- 14 were classified as medium potential; and
- 307 were classified as low potential.

6.9.3.23 Of the three high potential anomalies, two were classified as wrecks and one was classified as a potential wreck (Ossian OWFL, 2024). Archaeological Exclusion Zones (AEZs) were recommended for two of the high potential anomalies within the Ossian Array EIA Report, along with AEZs for the 14 medium potential anomalies.

6.9.3.24 Recorded losses are maritime losses that are known to have occurred in an area but to which no specific location can be attributed as positional data of these records is unreliable. However, they do provide information on the archaeological potential of the area. There are four recorded losses in the marine archaeology study area in Scottish waters, all of which were lost in the 20th century (**annex 0**). Further recorded losses will be identified in the PEIR and ES.

Future Baseline Conditions

6.9.3.25 The EIA process will consider the existing baseline conditions within the marine archaeology study area, however, it will also evaluate the future baseline conditions as far as reasonably practicable. The baseline environment is not static, therefore, even if the Ossian Transmission Infrastructure does not come forward, the baseline environment will still exhibit some degree of natural change. These changes may occur due to naturally occurring cycles and processes and any potential changes resulting from climate change.

6.9.3.26 Variability and changes in naturally occurring processes may bring direct and indirect changes to marine archaeology receptors. For marine archaeology the processes causing this change can be physical, chemical and/or biological. For example, metal wrecks exposed on the seabed will corrode and collapse over time due to chemical processes. The baseline described in **part 2, section 6.9.3** be considered as a snapshot of the present marine archaeology environment within a gradually changing environment.

6.9.3.27 The marine archaeology chapter of the ES will ensure to place any potential impacts on receptors into the context of the envelope of change that may occur over the timescale of the Ossian Transmission Infrastructure.

6.9.4 Proposed Data Sources

6.9.4.1 **Table 6.9.1** presents the data sources proposed for the marine archaeology assessment.

6.9.4.2 Additional data sources (e.g. emerging research and offshore wind EIAs) will also be used to inform the assessment in the marine archaeology chapter of the ES. Note that, in addition to these data sources, relevant output of the consultation process will also be considered.

6.9.4.3 Information on unexploded ordnance (UXO) presence within the marine archaeology study area will be collected during a UXO Desktop Assessment and will be used to inform the marine archaeology chapter of the ES.

Table 6.9.1: Summary of Key Data Sources for Marine Archaeology

Title	Year	Author	Citation
General (applicable to both English and Scottish waters)			
UKHO Records of wrecks and obstructions	2024	UKHO	UKHO (2024)
EMODnet palaeolandscapes	2019	EMODnet	EMODnet (2019)
British Geological Survey (BGS) GeoIndex Offshore	2021	BGS	BGS (2021)
English waters			
National Record of the Historic Environment (NRHE) maintained by Historic England	2024	Historic England	Historic England (2024)
Humber Historic Environment Record (HER)	2024	Hull City Council	Hull City Council (2024)
Lincolnshire HER	2024	Lincolnshire County Council	Lincolnshire County Council (2024)
North Yorkshire HER	2024	North Yorkshire Council	North Yorkshire Council (2024)
Scottish waters			
Ossian Array EIA Report: Marine Archaeology Technical Report	2024	Ossian OWFL	Ossian OWFL (2022)
Canmore, NRHE maintained by Historic Environment Scotland	2024	Historic Environment Scotland	Historic Environment Scotland (2024)

Site-Specific Data

6.9.4.4 The Applicant undertook a geophysical survey across the Array Site Boundary (which is encompassed within the Offshore Scoping Boundary in Scottish waters) in April to July 2022. An archaeological assessment of the collected geophysical data was undertaken and reported in the Ossian Array EIA Report (Ossian OWFL, 2024). The results of this assessment have informed the baseline characterisation for the Offshore Scoping Boundary in Scottish waters within this EIA Scoping Report section, where applicable. The corridor to the west of the marine archaeology study area in Scottish waters, within which the Offshore Export Cables may be located, was not surveyed as part of the Array geophysical survey (see **Figure 6.9.3**) but the Applicant proposes to undertake geophysical survey works of this area to inform mitigation in the form of an Offshore Written Statement of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) (see **part 2, section 6.9.5**).

6.9.4.5 A geophysical survey of the Offshore Scoping Boundary (in English waters) has been undertaken (February to November 2024, with the results of the archaeological assessment to be presented within the marine archaeology technical report and chapter of the ES. A geotechnical survey will also be undertaken across the Array and Offshore Export Cable Corridor to inform final layout/design.

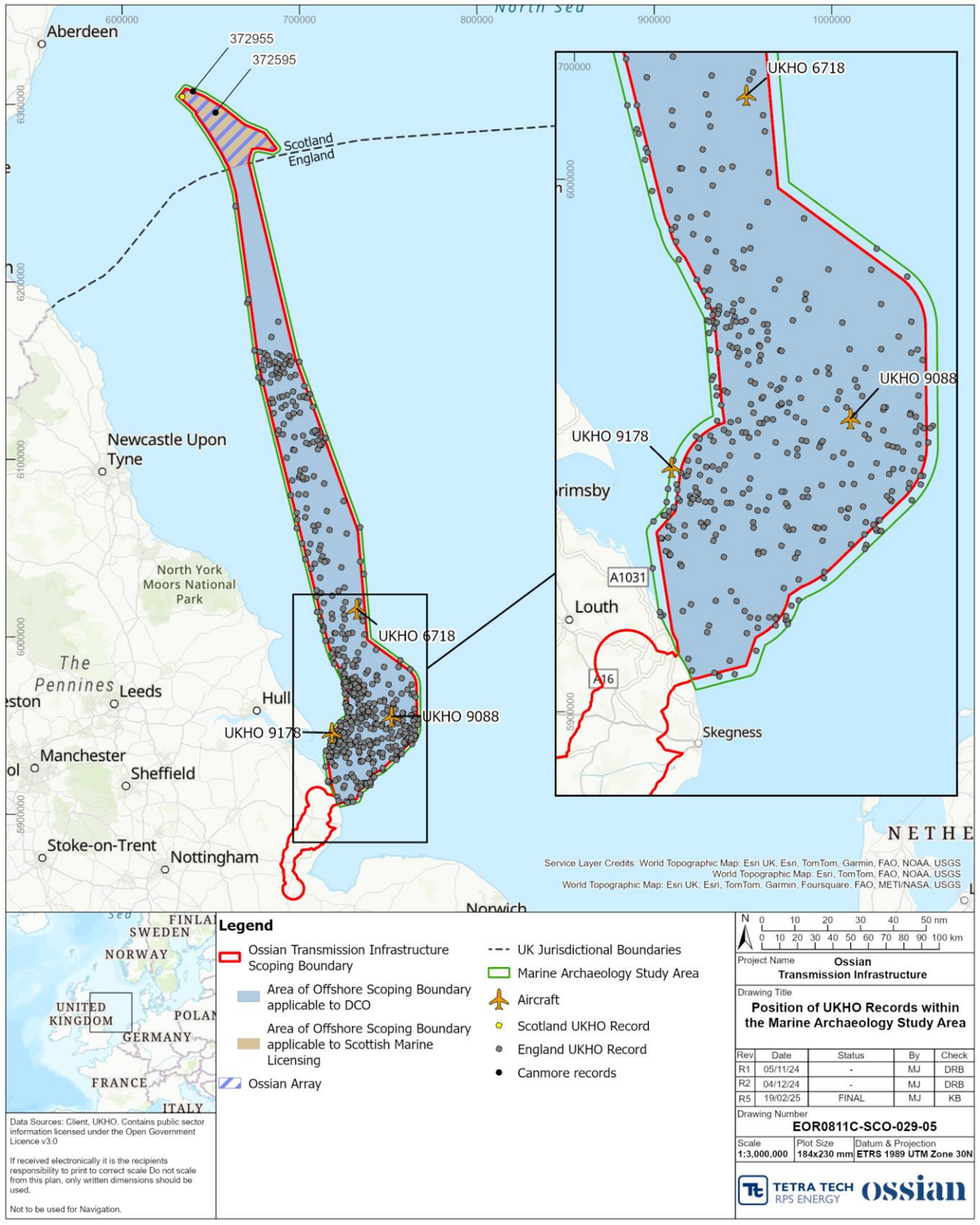

Figure 6.9.2: Maritime Archaeology Records Within the Marine Archaeology Study Area

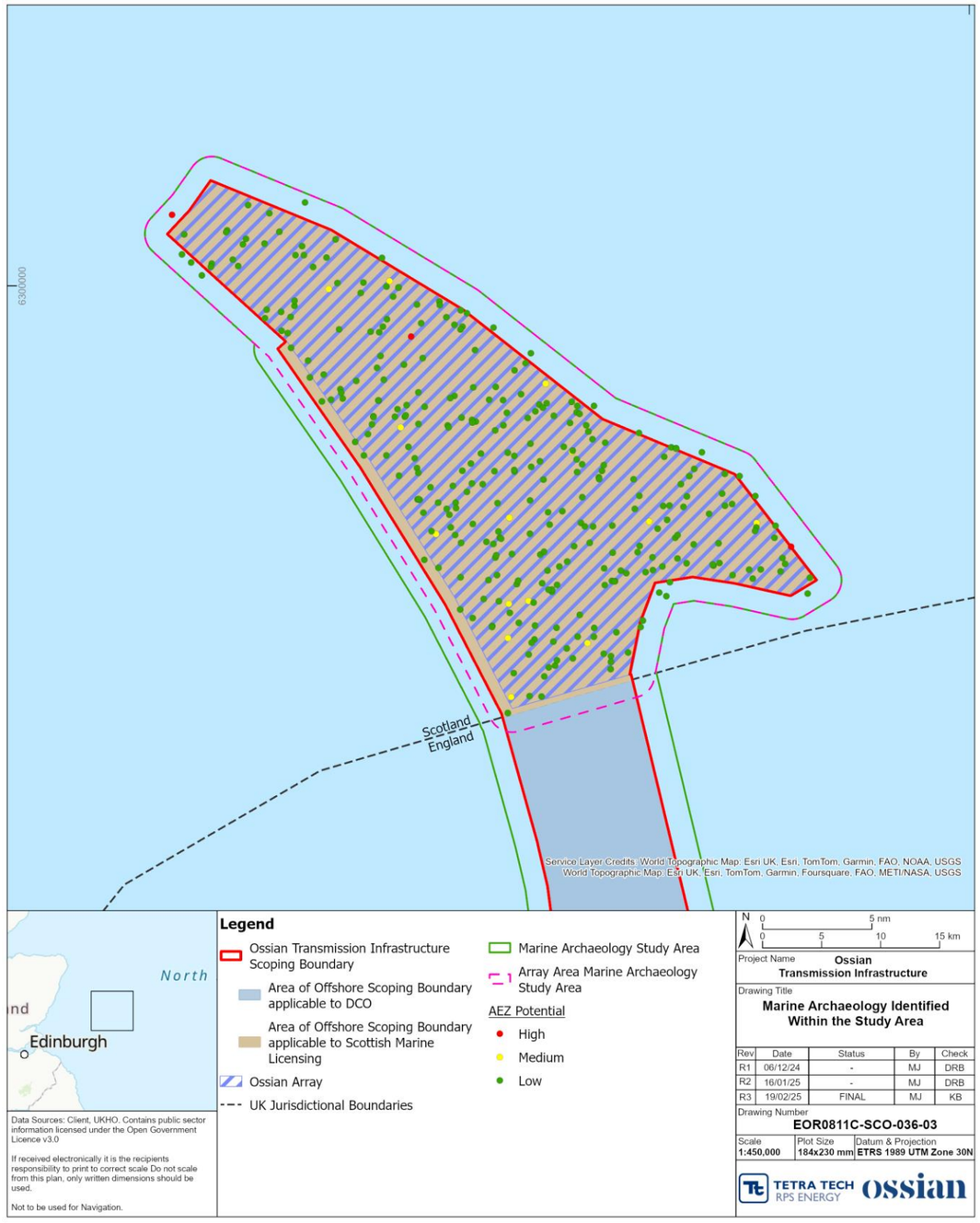

Figure 6.9.3: Geophysical Anomalies Within the Array Area Marine Archaeology Study Area

6.9.5 Mitigation Measures

6.9.5.1 The following mitigation measures adopted as part of the Offshore Transmission Infrastructure are relevant to the assessment for marine archaeology. These measures may evolve (and be further clarified) as the design and EIA process progresses.

- Micro-siting of the Offshore Export Cables to avoid known marine archaeological receptors.
- The implementation of AEZs around anomalies and records identified as having high or medium archaeological potential, to mitigate the potential impacts from offshore infrastructure. The size of the AEZ will be evidence-based and established using the precautionary principle to ensure that it is of sufficient size (likely to be 50 m to 100 m buffer) to protect the site from the nature of impact (Wessex Archaeology, 2007; Wessex Archaeology for TCE, 2021).
- All anomalies of possible archaeological potential will be reviewed against the final layout and design. If they are likely to be impacted, these anomalies would undergo further archaeological investigation. Should these anomalies prove to be of archaeological importance then future AEZs may be implemented following consultation with Historic England (HE) or Historic Environment Scotland (HES).
- Archaeological input into specifications for and analysis of future preconstruction geophysical and geotechnical surveys.
- Commitment to preparation and agreement on an Offshore WSI and PAD, similar to that set out by The Crown Estate (TCE) (2014), prior to any post-consent works within the Offshore Export Cable Corridor.
- Archaeologists to be consulted in the preparation of any preconstruction Remotely Operated Vehicle (ROV) surveys and in monitoring/checking of data, if appropriate, based upon the findings of the archaeological assessment of geophysical survey data.
- Archaeological input into specifications for and analysis of future pre-construction geotechnical surveys, and a provision for sampling, analysis and reporting of recovered cores, if required.
- Archaeologists to be consulted in advance of pre-construction site preparation activities and, if appropriate, to carry out watching briefs of such work. The requirement for watching briefs is determined during the lifecycle of the project. If previously unknown discoveries of archaeological significance are made, an archaeologist may be required on-board to monitor and provide on-site advice of how best to avoid/record/preserve discoveries of archaeological significance.
- Mitigation of unavoidable direct impacts on known sites of archaeological importance through a series of agreed measures to be set out in a WSI.

6.9.6 Proposed Scope of the Assessment

6.9.6.1 Potential impacts that are proposed to be scoped into the assessment for marine archaeology are set out in **Table 6.9.2**. All impacts scoped into the assessment are within the marine archaeology study area in English waters as equivalent impacts in the marine archaeology study area in Scottish waters have previously been assessed as part of the Array Application[13] (Ossian OWFL, 2024).

[13] It should be noted that the EIA undertaken for the Array Application concluded no significant effects on marine archaeology receptors as a result of the Array (Ossian OWFL, 2024).

Table 6.9.2: Potential Impacts Proposed to be Scoped in for Marine Archaeology

Impact	Project Phase[14]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Increased SSCs and deposition leading to indirect impacts on marine archaeology receptors in the marine archaeology study area (in English waters)	✓	×	✓	✓	×	Seabed disturbance and associated deposition could arise during the construction phase from seabed preparation, and cable installation activities. This could lead to effects on known archaeological receptors. Effects from decommissioning are expected to be similar to, or less than, effects from construction.	The marine archaeology baseline developed from the review of desktop data and archaeological assessment of geophysical survey data, with reference to the physical processes chapter, will consider the extent of sediment disturbance and associated deposition. The sensitivity of receptors will be assessed against the magnitude of each impact as defined through the Maximum Design Scenario (MDS) to determine the significance of effect.
Direct damage to marine archaeology receptors in the marine archaeology study area (in English waters)	✓	×	×	✓	×	Activities during the construction phase could directly damage any archaeological receptors present, primarily during seabed preparation and cable installation. These effects will likely be localised but would lead to adverse and irreversible damage to archaeological receptors, should they occur.	Where possible, the magnitude of the impact will be derived from the MDS. For direct damage, the MDS will present the largest areas of seabed impacted. The cable route will seek to avoid all known marine archaeological receptors and therefore any risk of direct damage, primarily through the implementation and use of suitable buffers. Where direct damage is unavoidable, the magnitude of the impact will be based on the MDS.
Alteration of sediment transport regimes leading to indirect impacts on marine archaeology receptors in the marine archaeology study area (in English waters)	×	✓	×	✓	×	The physical presence of infrastructure (e.g. external cable protection) may lead to localised changes in tide and wave climate. These changes could affect the distribution of sediment, which could then be directed towards or away from known archaeological receptors causing damage.	The marine archaeology baseline developed from the review of desktop data and archaeological assessment of geophysical survey data, with reference to the physical processes chapter, will consider the extent of the alteration of sediment transport regimes. The sensitivity of receptors will be assessed against the magnitude of each impact as defined through the MDS to determine the significance of effect. Cable burial is the primary mitigation strategy, this will limit the need for cable protection. The magnitude of the impact will be based on the volume of cable that can be buried.

[14] Construction (C), Operation and Maintenance (O), Decommissioning (D)

6.9.7 Impacts Proposed to be Scoped Out

6.9.7.1 Impacts that are proposed to be scoped out of the assessment for marine archaeology and the justification are set out in **Table 6.9.3**. All impacts in the marine archaeology study area (in Scottish waters) is proposed to be scoped out of the assessment.

Table 6.9.3: Impacts Proposed to be Scoped Out of the Assessment for Marine Archaeology

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
All Phases			
All impacts within the marine archaeology study area in Scottish waters	×	✓	Impacts broadly similar to those predicted for the installation of the Offshore Export Cables have previously been assessed for most of the marine archaeology study area in Scottish waters as part of the Array Application (Ossian OWFL, 2024). This included assessment of the installation of inter-array and interconnector cables via trenching with a trench width of up to 2 m and a maximum trench depth of 3 m (Ossian OWFL, 2024). As described in **paragraphs 6.9.3.18 to 6.9.3.24** there are very few known marine archaeology receptors and therefore the potential for a significant effect is likely to be low. The Array Application determined that there were no significant effects on marine archaeology receptors resulting from the construction, operation and maintenance and decommissioning of the Ossian Array (Ossian OWFL, 2024). A detailed baseline of the environment present in most of the marine archaeology study area in Scottish waters was provided in the Array Application. The corridor to the west of the marine archaeology study area in Scottish waters, within which the Offshore Export Cables may be located, was not surveyed as part of the Array geophysical survey (see **Figure 6.9.3**) but the Applicant proposes to undertake geophysical survey works of this area and geotechnical survey across the Array and Offshore Export Cable Corridor to inform final layout/design and the Offshore WSI and PAD. The Array Application assessment was considered sufficient to characterise the baseline of the marine archaeology study area in Scottish waters and impacts can be mitigated via a WSI. It is considered that impacts to marine archaeology receptors within the corridor to the west of the marine archaeology study area in Scottish waters will be similar to those already assessed as part of the Array Application and the potential for a significant effect is likely to be low. With application of the Offshore WSI and PAD as mitigation, it is proposed that all impacts in Scottish waters can be scoped out of the PEIR and ES.
Operation and Maintenance			
Increased SSCs and associated sediment deposition leading to indirect impacts on marine archaeology receptors in the marine archaeology study area (in English waters)	✓	×	During the operation and maintenance phase, minimal effects associated with increased SSCs and associated sediment deposition are expected. Any increase in SSC is expected to be much smaller and is therefore not expected to cause any significant impacts on marine archaeology receptors. Effects may arise from minor repairs or cable reburial events only; therefore, any increases in SSCs are expected to be much smaller in scale than for the construction and decommissioning phases.
Construction and Decommissioning			
Alteration of sediment transport regimes leading to indirect	✓	×	During the construction and decommissioning phases there will be no physical presence of infrastructure (e.g. external cable protection) so the effects are expected to be much smaller than for the operation and maintenance phase. There will be no physical infrastructure in the marine archaeology study area (in

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
impacts on marine archaeology receptors in the marine archaeology study area (in English waters)			English waters) during these phases and so there will be no change to the baseline tide and wave climate, as a result no significant impacts are anticipated.
Operation and Maintenance and Decommissioning			
Direct damage to maritime archaeology receptors in the marine archaeology study area (in English waters)	✓	×	During the operation and maintenance phase, and the decommissioning phase, all activities such as cable repair or replacement of cable protection are likely to take place within the footprint of the impacts from the construction phase and are therefore not expected to cause any additional impacts on marine archaeology receptors.

6.9.8 Proposed Assessment Methodology

6.9.8.1 The assessment methodology proposed to be used for the impacts proposed to be scoped in for marine archaeology as set out in **Table 6.9.2** is described below.

Legislation and Policy

6.9.8.2 An overview of relevant legislation and policy is provided in **part 1, section 2** of this EIA Scoping Report. Further details of topic specific legislation and policy will be provided within the marine archaeology ES chapter.

Relevant Guidance

6.9.8.3 The following guidance documents relevant to the marine archaeology assessment will be considered in the ES:

- **General (applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to made to MD-LOT):**
  - Standard and guidance for historic environment desk-based assessment (Chartered Institute for Archaeologists, 2020);
  - Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (Historic England, 2008);
  - Marine Geophysics Data Acquisition, Processing and Interpretation Guidance Notes (English Heritage (now Historic England) and Bates *et al.,* 2013);
  - Designation Policy and Selection Guidance (HES, 2020);
  - Code of Conduct (Chartered Institute for Archaeologists, 2014);
  - COWRIE Historic Environment Guidance for the Offshore Renewable Energy Sector (Wessex Archaeology, 2007);
  - Offshore Renewables protocol for Archaeological Discoveries (TCE, 2014).
  - Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (Gribble and Leather, 2010);
  - Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects (Wessex Archaeology for TCE, 2021);
  - Code of Practice for Seabed Development (Joint Nautical Archaeology Policy Committee (JNAPC), 2006);
  - Military Aircraft Crash Sites: Guidance on their significance and future management (Historic England, 2002);
  - Ships and Boats: Prehistory to Present: Designation Selection Guide (Historic England, 2012);
  - Commercial renewable energy development and the historic environment: Historic England Advice Note 15. Swindon. (Historic England 2021);
  - Environmental Impact Assessment Handbook (NatureScot (previously Scottish Natural Heritage) and HES, 2018).

Assessment of Effects

6.9.8.4 The marine archaeology assessment will follow the methodology set out in **part 1, section 5** of this EIA Scoping Report. Consultation with stakeholders throughout the EIA process will be used to inform the approach and focus of these impact assessments.

6.9.8.5 Specific to marine archaeology, a marine archaeology technical report will be prepared to characterise the baseline conditions for the marine archaeology study areas. This will include a full desk-based assessment using the data sources listed in **Table 6.9.1**. This will be combined with an archaeological assessment of geophysical data, to give a comprehensive baseline that can be used to underpin the EIA.

Cumulative Effects and Inter-related Effects

6.9.8.6 The Cumulative Effects Assessment (CEA) for marine archaeology will follow the general methodology set out in **part 1, section 5**. The marine archaeology chapter of the ES will also consider inter-related effects arising from the Offshore Transmission Infrastructure, including potential project lifetime and receptor-led effects. This assessment will be undertaken in accordance with the standard industry guidance and approach, as outlined in **part 1, section 5** in the EIA Scoping Report.

Geophysical Data Assessment

6.9.8.7 A qualified and experienced maritime archaeologist with a background in geophysical and hydrographic data acquisition, processing and interpretation will undertake the archaeological review of geophysical data collected within the marine archaeology study area (in English waters), typically including analysis of magnetometer, Side Scan Sonar (SSS), Sub-Bottom Profiler (SBP) and Multi Beam EchoSounder (MBES) data, to gain an understanding of the geological and topographic make-up of the area and to identify any geophysical anomalies that are visible on the seabed.

6.9.8.8 The criteria outlined in **Table 6.9.4** will be used to assign the archaeological potential to each identified anomaly

Table 6.9.4: Criteria for Assigning Archaeological Potential to Geophysical Anomalies

Potential	Criteria
Low	An anomaly potentially of anthropogenic origin but that is unlikely to be of archaeological significance – Examples may include discarded modern debris such as rope, cable, chain or fishing gear; small, isolated anomalies with no wider context; or small boulder-like features with associated magnetometer readings.
Medium	An anomaly believed to be of anthropogenic origin but that would require further investigation to establish its archaeological significance – Examples may include larger unidentifiable debris or clusters of debris, unidentifiable structures, or significant magnetic anomalies.
High	An anomaly almost certainly of anthropogenic origin and with a high potential of being of archaeological significance – high potential anomalies tend to be the remains of wrecks, the suspected remains of wrecks, or known structures of archaeological significance.

Transboundary Impacts

6.9.8.9 The approach to transboundary impacts is set out in **part 1, section 5.10** of this EIA Scoping Report. **Part 5,** a**ppendix 5.1** of this EIA Scoping Report presents the transboundary impacts screening which has been carried out for the Offshore Transmission Infrastructure. All predicted impacts on marine archaeology are likely to be limited in extent to the marine archaeology study area. Therefore, it is considered that any potential impacts associated with the Offshore Transmission Infrastructure will not affect marine archaeology receptors in any European Economic Area (EEA) state. As such, no significant transboundary effects are anticipated, and transboundary impacts on marine archaeology are proposed to be scoped out of the ES.

Relevant Consultations

6.9.8.10 The Applicant has undertaken early consultation with selected stakeholders including HE and MMO. Consultation with these stakeholders will continue throughout the PEIR and ES phases and will inform the marine archaeology chapter in the ES as relevant.

6.9.9 Next Steps

6.9.9.1 The next steps for the marine archaeology topic are:

- to agree with stakeholders upon the approach for the assessment of marine archaeology (including presenting sensitivities of receptors, mitigation measures); and
- to seek agreement on the impacts proposed to be scoped in and out of further assessment within the marine archaeology chapter of the ES.

6.10. Infrastructure and Other Sea Users

6.10.1 Introduction

6.10.1.1 This section of the EIA Scoping Report identifies the proposed scope of the assessment for relevant infrastructure and other sea user receptors from construction, operation and maintenance and decommissioning of the proposed Offshore Transmission Infrastructure. This includes the key data sources used to characterise the baseline environment in the vicinity of the Offshore Transmission Infrastructure within Scottish and English waters, and the impacts proposed to be scoped in and out of the assessment for infrastructure and other sea user receptors in the ES.

6.10.2 Proposed Study Area for the Assessment

6.10.2.1 As the infrastructure and other sea users study area (**Figure 6.10.1**) varies in scale depending on the receptor, this has been divided into two study areas, according to each receptor, as follows:

- The local infrastructure and other sea users study area encompasses the Offshore Scoping Boundary and Intertidal Scoping Boundary, plus an additional 1 km buffer. This is to account for 500 m safety zones, or advisory clearance areas, present at oil and gas infrastructure, cables and pipelines, and other offshore wind farms. This local infrastructure and other sea users study area includes the extent of potential direct physical overlap between the Offshore Transmission Infrastructure and the following receptors:
  - recreational receptors (including sailing and motor cruising, kite surfing, surfing, windsurfing, wing foiling, sea/surf kayaking and canoeing, recreational fishing and beach users);
  - offshore renewable energy projects (e.g. offshore wind farms, tide and wave projects);
  - cables and pipelines;
  - carbon capture and storage (CCS), natural gas storage and underground coal gasification installations;
  - offshore microwave fixed communication links;
  - oil and gas operations; and
  - military activity.
- The regional infrastructure and other sea users study area refers to the Offshore Scoping Boundary plus an additional buffer measuring 15 km in a north-south orientation and 5 km in an east-west orientation, which is representative of the one spring tidal excursion as determined by the physical processes study area (see **part 2, section 6.2**). This will account for any potential effects of increases in SSCs. The receptors which are susceptible to these increases are as follows:
  - aggregate extraction and disposal sites; and
  - recreational receptors (diving sites and bathing waters).

6.10.2.2 Further details of the location and extent of the Intertidal Scoping Boundary can be found in **Figure 3.5.1** of **part 1, section 3**.

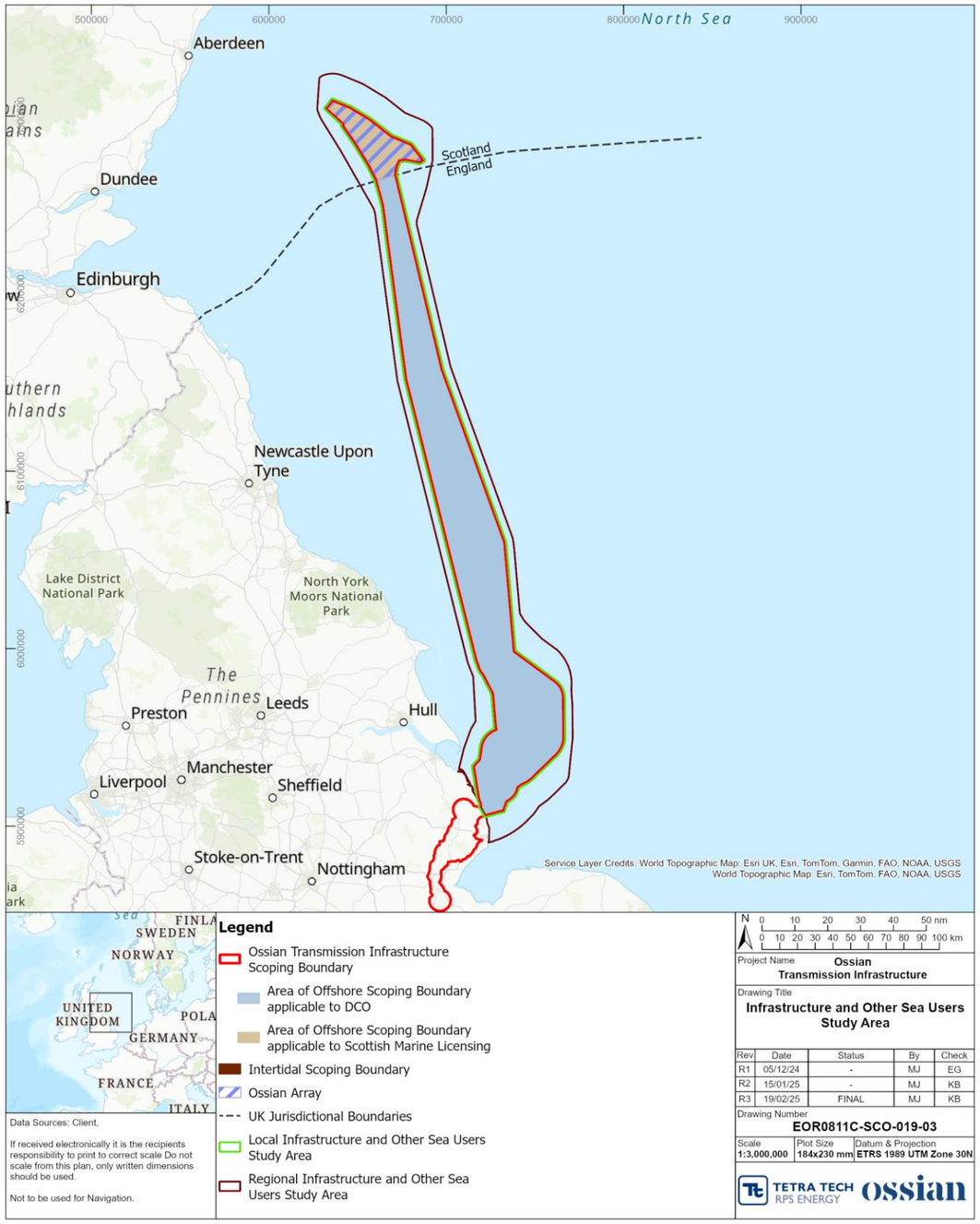

Figure 6.10.1: Infrastructure and Other Sea Users Study Area

6.10.3 Baseline Environment

6.10.3.1 An outline of the baseline environment for infrastructure and other sea users, based upon an initial review of key data sources is provided below.

6.10.3.2 This baseline environment section is split into the following subsections to allow the reader to distinguish between information relevant to specific jurisdictions:

- **General** – this subsection summarises baseline environment information across the entire infrastructure and other sea users study area (i.e. both English and Scottish waters) and is therefore applicable to both the application for a DCO to be made to the Planning Inspectorate and the application for a Marine Licence to be made to MD-LOT.
- **English Waters** – this subsection summarises baseline environment information which is specific to the portion of the infrastructure and other sea users study area located within English waters and is therefore applicable to the application for a DCO to be made to the Planning Inspectorate.
- **Scottish Waters** – this subsection summarises baseline environment information which specific to the portion of the infrastructure and other sea users study area located within Scottish waters and is therefore applicable to the application for a Marine Licence to be made to MD-LOT.

General

Local Infrastructure and Other Sea Users Study Area

Recreational Boating

6.10.3.3 Recreational boating entails inshore and offshore sailing and racing, cruising and motor cruising as well as powerboat activities for personal or leisure use. Offshore sailing primarily involves organised racing undertaken by yachts, whereas inshore sailing and racing will involve smaller craft such as dinghies, and yachts cruising for leisure.

6.10.3.4 The navigational safety of, and risks to, recreational vessels is considered in **part 2, section 6.8** of this EIA Scoping Report. This section of the EIA Scoping Report (and the subsequent infrastructure and other sea users chapter of the ES) considers recreational vessels undertaking sailing, motor cruising and sea fishing as an activity.

6.10.3.5 As illustrated in **Figure 6.10.2**, there is a high intensity and volume of inshore recreational sailing and motor cruising along the coastline. The Automatic Identification System (AIS) track data highlights extensive inshore movements of recreational vessels as well as an increasing number of offshore movements in the southern half of the local infrastructure and other sea users study area.

6.10.3.6 The southern portion of the Offshore Scoping Boundary, close to the Landfall, is located within an extensive inshore General Boating Area, and several designated bathing water areas are also found within this area (**Figure 6.10.2**). General Boating Areas reflect use by recreational craft which do not carry AIS transponders.

6.10.3.7 Saltfleet Haven Boat Club, the Humber Cruising Association, Grimsby & Cleethorpes Yacht Club, Humber Mouth Yacht Club and Gibraltar Point Sailing Club are five RYA affiliated clubs located either within the local infrastructure and other sea users study area, or within the General Boating Area which overlaps with the local infrastructure and other sea users study area. These clubs will avail of the General Boating Area highlighted in **Figure 6.10.2**, and thus activities will overlap with the local infrastructure and other sea users study area.

Cables and Pipelines

6.10.3.8 There are numerous cables and pipelines which pass through the local infrastructure and other sea users study area (see **Figure 6.10.3** and **Figure 6.10.4**), and these are listed below with additional information where relevant:

- EGL 2, EGL3, and EGL4 direct current power cables overlap with a significant proportion of the local infrastructure and other sea users study area. Construction has begun on EGL2, while EGL3 and EGL4 are in the pre-application stage.
- North Sea Link direct current power cable between the UK and Norway.
- Viking Link power cable between the UK and Denmark.
- Three active telecommunications cables, and four decommissioned.
- One active oil pipeline (Norpipe).
- One active power cable (oil and gas related activity) between Ravenspurn South C and Cleeton Platforms, and two not in use.
- Eleven active gas pipelines servicing platforms located both within and outside the local infrastructure and other sea users study area.
- Nine gas pipelines not in use (four of which associated with the now decommissioned Theddlethorpe Gas Terminal), and one abandoned.
- One condensate; mixed hydrocarbon pipeline.
- A number of methanol, chemical and hydraulic pipelines.

6.10.3.9 Where the Offshore Transmission Infrastructure will be required to cross an active cable or pipeline, it is proposed that a commercial crossing agreement will be entered into with the Operator. This will be a formal agreement between parties to ensure operational safety. Crossing agreements will use the following templates and guidance:

- International Cable Protection Committee (ICPC) Recommendation 3-10 ‘Telecommunications Cable and Oil Pipeline/Power Cables Crossing Criteria’.
- Oil and Gas UK Crossing agreement template.

6.10.3.10 Where a cable or pipeline is inactive or abandoned, consultation with the Owner and/or Operator will be conducted to ascertain the necessity for a crossing agreement.

Offshore Microwave Fixed Communication Links

6.10.3.11 Offshore microwave fixed communication links are specialized systems used to provide reliable, high-capacity communication between offshore facilities, such as oil rigs or wind farms, and onshore locations. These links use microwave radio waves to transmit data over long distances across water.

6.10.3.12 Offshore microwave fixed links may be used to communicate between oil and gas platforms which are located within the local infrastructure and other sea users study area. As there will be no surface infrastructure associated with the Offshore Transmission Infrastructure, this receptor will not be considered further within this section.

English Waters

Local Infrastructure and Other Sea Users Study Area

Recreational Fishing

6.10.3.13 Recreational fishing or sport fishing describes fishing for leisure or competition rather than for profit. The Skegness Pier Angling Club and Burgh Angling Society (located in Mablethorpe) are located within the local infrastructure and other sea users study area. Both are local angling clubs which operate at short range, using standard beach gear, or from the pier (Angling Trust, 2024).

6.10.3.14 There are a number of sea fishing charters available along the coastline adjacent to the Offshore Transmission Infrastructure whose activities may overlap with the local infrastructure and other sea users study area. For example, Norfolk Sea Fishing Trips (BJR Marine) runs three to ten-hour trips including for wreck fishing.

Inshore Water Sports

6.10.3.15 Sports such as kite surfing, windsurfing, surfing, and kayaking usually occur within approximately 1 nm of the shore.

6.10.3.16 The stretch of coastline from Sutton on Sea to Mablethorpe and the beach at Skegness are used by kayakers and paddleboarders and advertised on the Go Paddling Portal as safe paddling locations. Therefore, it is likely that there is overlap between these activities and the local infrastructure and other sea users study area. Additionally, Skegness and Sutton on Sea are among the top surf locations on the east coast of England according to Surfline (Surfline, 2024).

Offshore Wind Farms

6.10.3.17 Offshore wind farm developments located in the vicinity of the Offshore Transmission Infrastructure are illustrated in **Figure 6.10.3**. There are four which overlap with the local infrastructure and other sea users study area: Humber Gateway, Inner Dowsing, Lincs and Triton Knoll Offshore Wind Farms, all of which are fully commissioned and operational.

6.10.3.18 Additionally, the offshore export cables of Dogger Bank A and B and D, Hornsea 1, 2 and 4, Sofia (associated with Dogger Bank C Offshore Wind Farm through parallel offshore cable routing and joint onshore application), and Outer Dowsing Offshore Wind Farms all overlap with the local infrastructure and other sea users as shown in **Figure 6.10.3**.

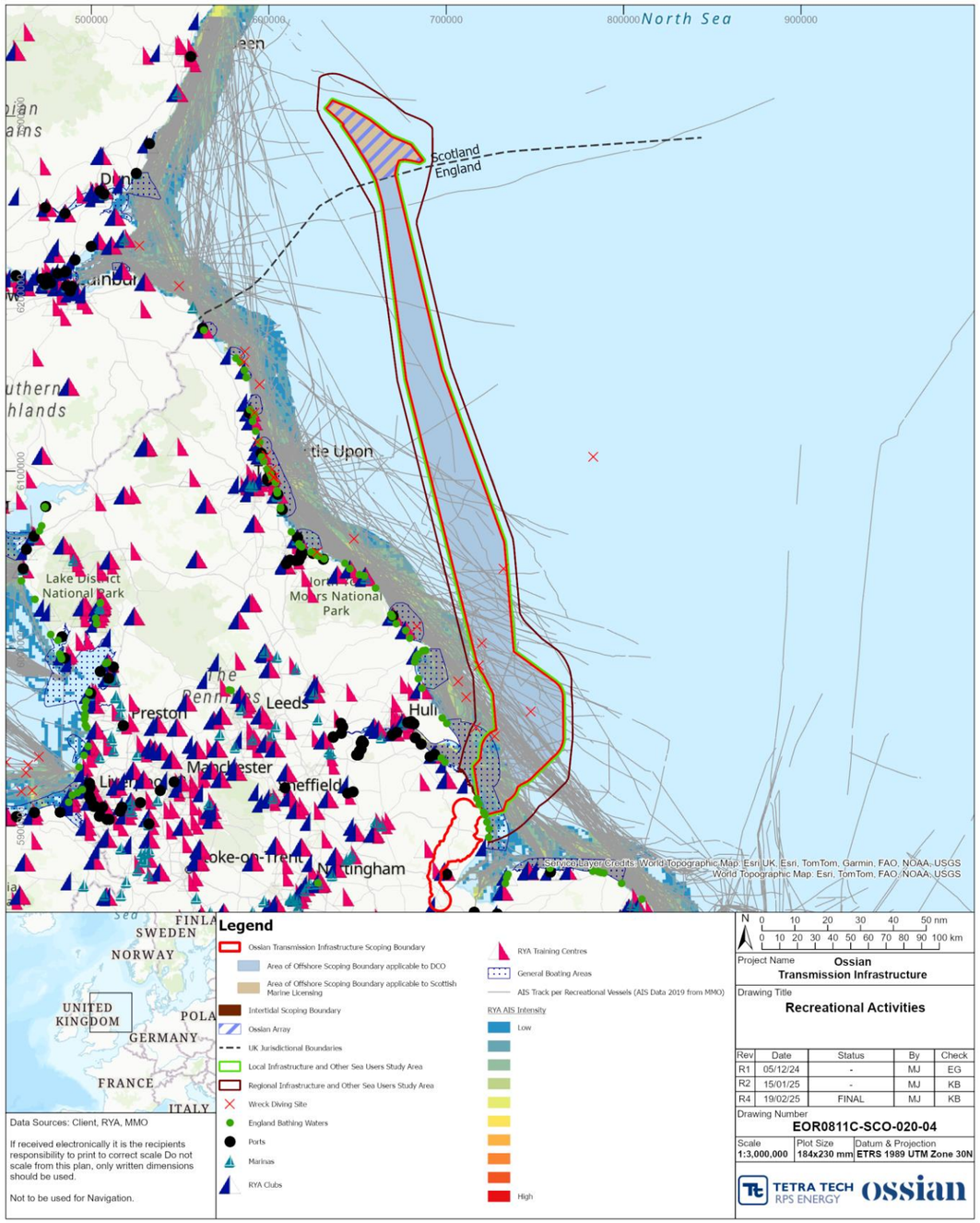

Figure 6.10.2: Recreational Activities in the Regional and Local Infrastructure and Other Sea Users Study Area

Oil and Gas Operations

6.10.3.19 The local infrastructure and other sea users study area overlaps with 42 UK Continental Shelf (UKCS) licence blocks in English waters currently licenced for the exploration and extraction of petroleum, as shown in **Figure 6.10.4**. There are 20 hydrocarbon fields also located within the local infrastructure and other sea users study area in English waters, alongside 19 platforms, which are summarised in **Table 6.10.1**.

6.10.3.20 There are a large number of subsea structures highlighted in **Figure 6.10.4** which overlap with the local infrastructure and other sea users study area in English waters including over ten wellheads, protective structures and rock dumps.

6.10.3.21 According to the NSTA, there are in excess of 50 offshore wells which lie inside the local infrastructure and other sea users study area in English waters. These include all categories of offshore wells, including, gas, oil, water injection, gas and oil condensate and dry holes, as well as a combination of active, abandoned and plugged wells (**Figure 6.10.4**).

Table 6.10.1: Hydrocarbon Platforms Within the Local Infrastructure and Other Sea Users Study Area in English Waters

Platform Name	Operator	Status
Breagh Alpha	INEOS Industries	Active
Tolmount	Harbour Energy PLC	Active
Cleeton WLTR	Perenco Oil and Gas	Active
Cleeton Riser Tower	Perenco Oil and Gas	Active
Cleeton CC	Perenco Oil and Gas	Active
Cleeton PQ	Perenco Oil and Gas	Active
York Platform	Spirit Energy	Active
Minerva	Perenco Oil and Gas	Active
Neptune	Perenco Oil and Gas	Active
Rough BD	Centrica Storage Holdings	Active
Rough BP	Centrica Storage Holdings	Active
Rough CD	Centrica Storage Holdings	Active
Rough AD	Centrica Storage Holdings	Not In Use
Rough AP	Centrica Storage Holdings	Not In Use
Hyde	Perenco Oil and Gas	Active
Amethyst C1D	Perenco Oil and Gas	Not in Use

Platform Name	Operator	Status
Amethyst A1D	Perenco Oil and Gas	Active
Amethyst A2D	Perenco Oil and Gas	Not in Use
Amethyst B1D	Perenco Oil and Gas	Not in Use

Carbon Capture and Storage

6.10.3.22 CCS is a method of preventing the release of industrial scale sources of carbon dioxide from being released into the atmosphere through capture and storage underground. There are four gas storage and carbon storage licence areas which overlap with the local infrastructure and other sea users study area in English waters, as highlighted in **Figure 6.10.3**.

6.10.3.23 Centrica Offshore UK Limited hold a gas storage licence which overlaps with the local infrastructure and other sea users study area. Additionally, the local infrastructure and other sea users study area overlaps with three other carbon dioxide appraisal and storage license areas held by Shell UK Limited and Perenco UK Limited (partnered with Carbon Catalyst Limited). These are all located within English waters.

6.10.3.24 In addition, the Viking CCS Project led by Harbour Energy (formerly Chrysaor Production) and BP, is currently awaiting approval from the Secretary of State and is due to begin construction in 2025. The license area for this project lies outside of the local infrastructure and other sea users study area, however, the offshore pipeline proposed to be utilised for transporting captured carbon dioxide is the pre-existing (but decommissioned) gas pipeline that serviced the former Theddlethorpe Gas Terminal, which can be seen in **Figure 6.10.5**.

Military Activity

6.10.3.25 Military Practice and Exercise Areas (PEXAs) are designated areas of sea where military activity can be undertaken. Coastal areas are often used for training related activities, while areas further out to sea may be used for test activities and surveillance.

6.10.3.26 There are eight PEXAs which overlap with the portion of the local infrastructure and other sea users study area located in English waters, and these are displayed in **Figure 6.10.6** below. Four areas are categorised as firing danger areas, while the remaining four are listed as Areas of Intense Aerial Activity (AIAA), as listed in **Table 6.10.2** below. The Holbeach Air Weapons Range is located over 30 km south of the local infrastructure and other sea users study area.

Table 6.10.2: Ministry of Defence Practice and Exercise Areas within the Local Infrastructure and Other Sea Users Study Area in English Waters

Area	Details	Status
D307: DONNA NOOK	surface danger area, firing danger area	Authority: DIO SD TRG; Maximum Altitude: 20000 0; Activity: F,B
D323A	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 5000 feet; Maximum Flight Level: 66000 feet
D323B	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 5000 feet; Maximum Flight Level: 66000 feet
D323C	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 5000 feet; Maximum Flight Level: 66000 feet
D323D	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 5000 feet; Maximum Flight Level: 66000 feet
D412: STAXTON	surface danger area, firing danger area	Authority: HQ Air; Maximum Altitude: 10000 0; Activity: AAF
D513: DRURIDGE BAY	surface danger area, firing danger area	Authority: HQ Air; Maximum Altitude: 10000 0; Activity: F
D513B: DRURIDGE BAY	surface danger area, firing danger area	Authority: HQ Air; Maximum Altitude: 23000 0; Activity: F

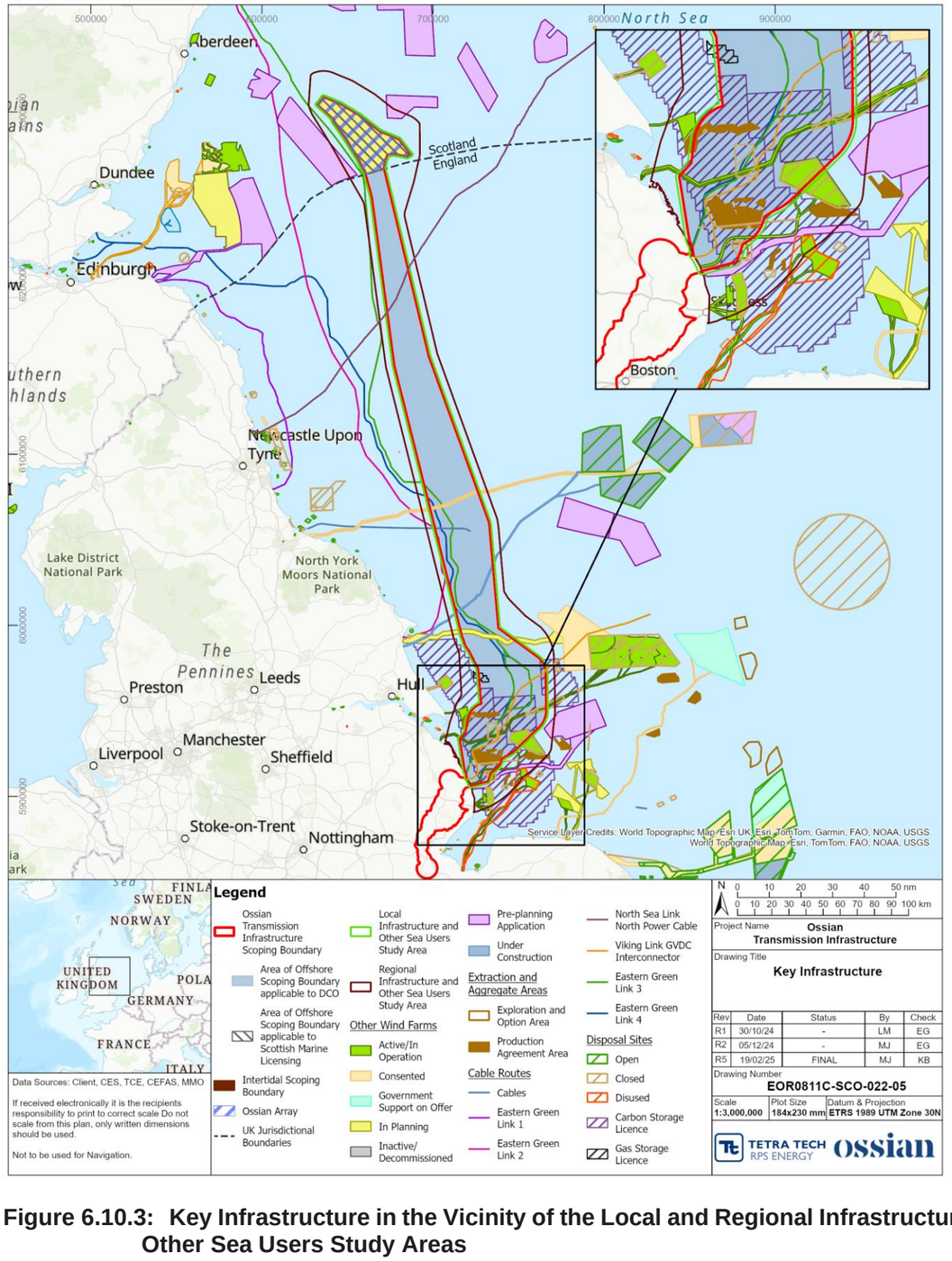

Figure 6.10.3: Key Infrastructure in the Vicinity of the Local and Regional Infrastructure and Other Sea Users Study Areas

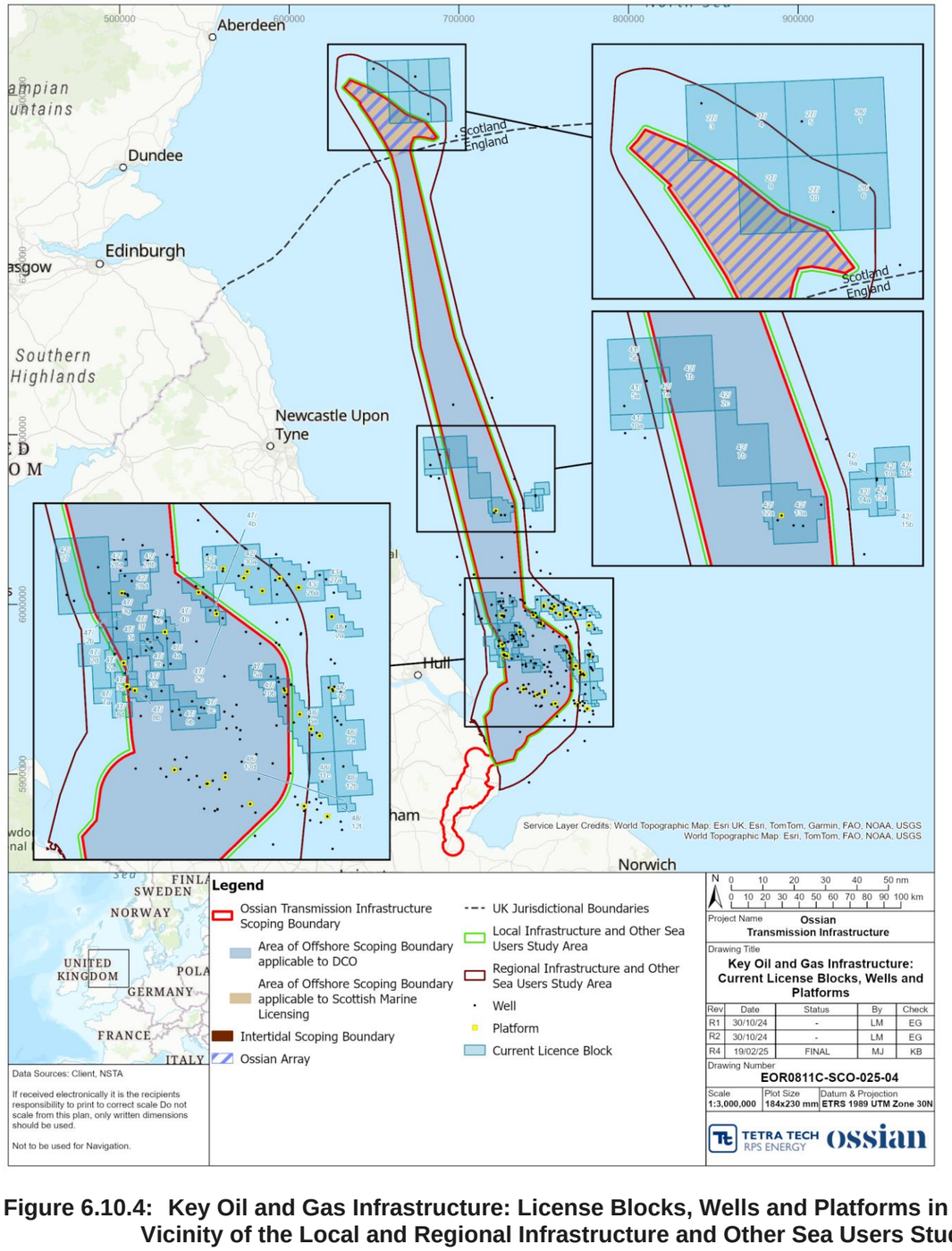

Figure 6.10.4: Key Oil and Gas Infrastructure: License Blocks, Wells and Platforms in the Vicinity of the Local and Regional Infrastructure and Other Sea Users Study Areas

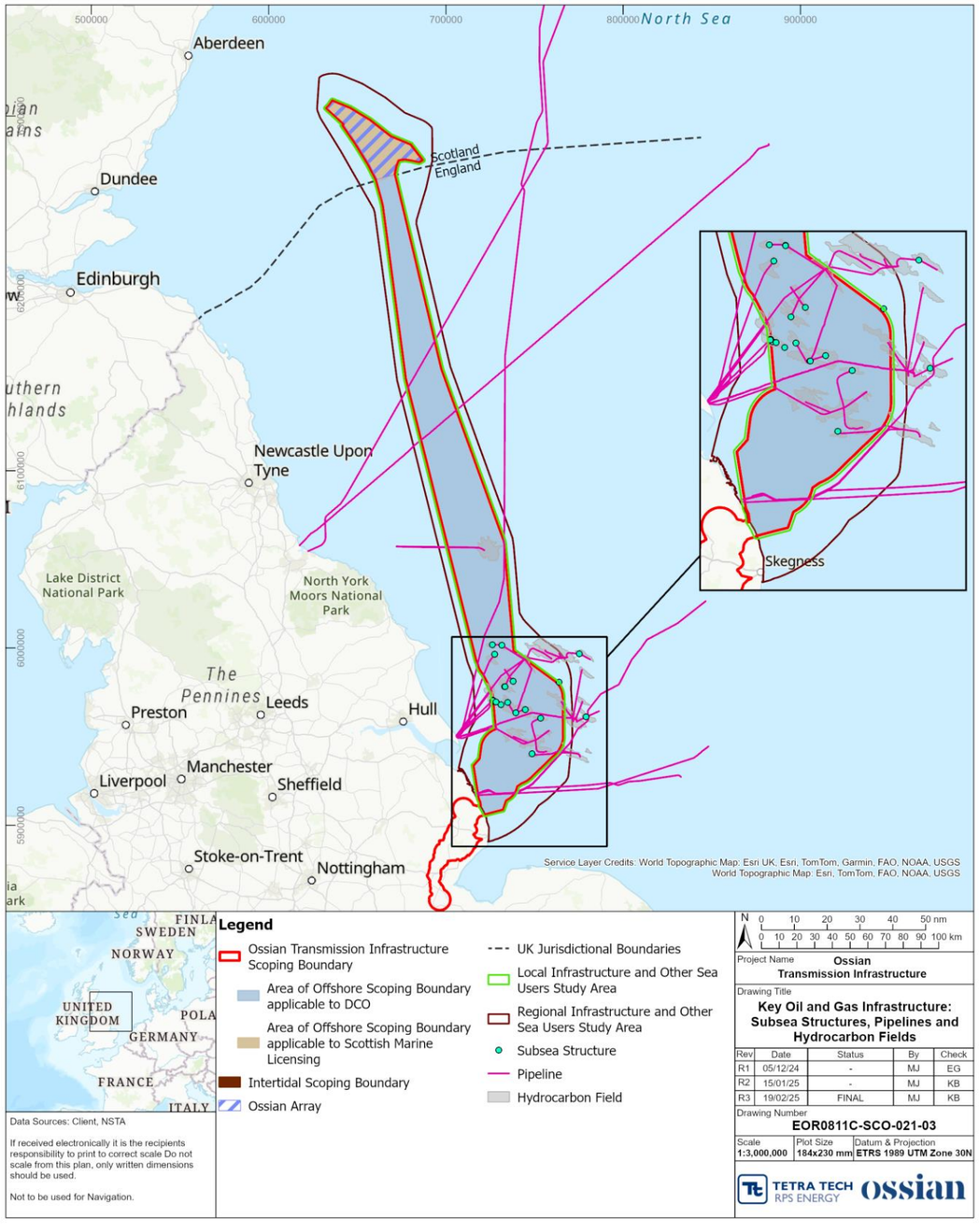

Figure 6.10.5: Key Oil and Gas Infrastructure: Subsea Structures, Hydrocarbon Fields and Pipelines in the Vicinity of the Local and Regional Infrastructure and Other Sea Users Study Areas

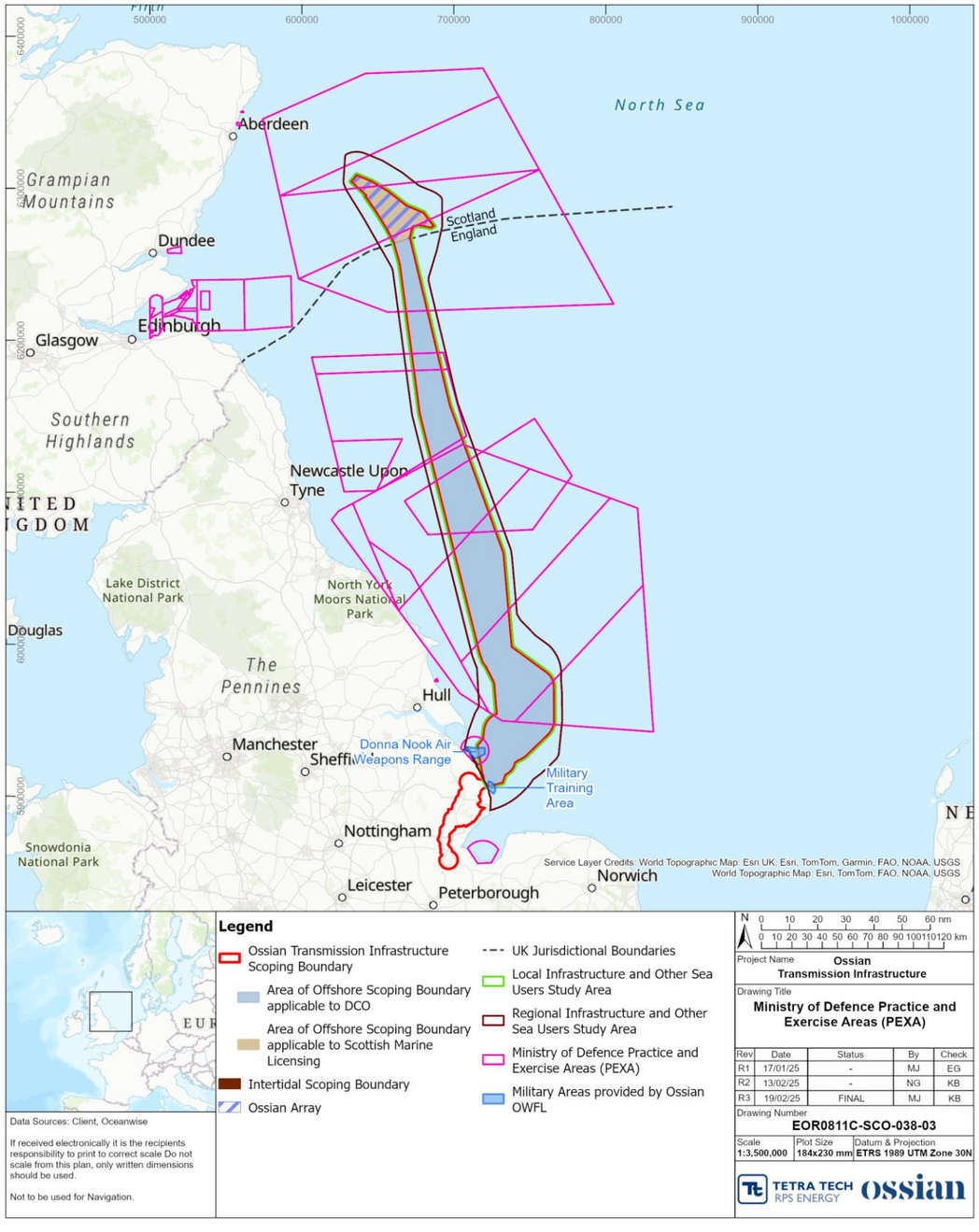

Figure 6.10.6: Ministry of Defence Practice and Exercise Areas (PEXA) in the vicinity of the Local and Regional Infrastructure and Other Sea Users Study Areas

Regional Infrastructure and Other Sea Users Study Area

6.10.3.27 Receptors within the regional infrastructure other sea users study area include offshore wind farms, aggregate extraction and disposal sites and recreational receptors (dive sites). The baseline environment for these receptors is described below.

Marine Aggregate Extraction

6.10.3.28 Marine aggregate extraction involves the removal of sand, gravel, and other materials from the seabed. These materials are primarily used in construction, such as in concrete production, land reclamation, and beach replenishment.

6.10.3.29 There are six marine aggregate production agreement areas located within or overlapping with the regional infrastructure and other sea users study area, as seen in **Figure 6.10.3**.

Disposal Sites

6.10.3.30 Disposal sites are specific locations where material such as dredged waste or fish processing waste may be disposed of under regulated conditions.

6.10.3.31 There are a number of disposal sites overlapping with the regional infrastructure and other sea users study area within English waters, as illustrated in **Figure 6.10.3**. There is one large disused disposal site crossing the southern boundary of the regional infrastructure and other sea users study area (ID: HU126). There is also one open disposal site, Hornsea Disposal Area 1, located within the Offshore Scoping Boundary. In addition, there are 13 closed disposal sites.

Diving Sites

6.10.3.32 There are six recreational dive sites located within the regional infrastructure and other sea users study area as illustrated in **Figure 6.10.2**, all of these are situated in the Offshore Scoping Boundary in English waters.

Bathing Waters

6.10.3.33 UK bathing waters are officially designated outdoor swimming sites, including beaches, lakes, and rivers, that are monitored for water quality to ensure they are safe for public use. There are seven designated bathing water sites within the regional infrastructure and other sea users study area: Mablethorpe Town, Sutton-on-Sea, Huttoft and Marsh Yard, Anderby, Chapel St Leonards, Ingoldmells South, and Skegness (**Figure 6.10.2**).

Scottish Waters

Local Infrastructure and Other Sea Users Study Area

Recreational Fishing

6.10.3.34 The east coast of Scotland is a popular coastline for recreational sea anglers fishing from the shore and by boat with popular locations situated approximately 90 km north-west of the Offshore Scoping Boundary in Scottish waters. There are multiple opportunities for offshore recreational charter fishing with trips leaving from Edinburgh, Dundee, Aberdeen and Peterhead, located to the west of the Array (Charter Boats UK (CBUK), 2024).

6.10.3.35 Recreational fishing occurring within the regional infrastructure and other users study area in Scottish waters is considered minimal or unlikely as the Offshore Scoping Boundary is approximately 80 km from the nearest point on the Scottish coastline.

Inshore Water Sports

6.10.3.36 As the Offshore Scoping Boundary is approximately 80 km from the nearest point on the Scottish coastline, inshore water sports will not occur within the local infrastructure and other users study area within Scottish waters.

Offshore Wind Farms

6.10.3.37 Offshore wind farm developments located in the vicinity of the Offshore Transmission Infrastructure are illustrated in **Figure 6.10.3**. No offshore wind farms overlap with the local infrastructure and other sea users study area in Scottish waters.

Oil and Gas Operations

6.10.3.38 The local infrastructure and other sea users study area overlaps with three UKCS licence blocks in Scottish waters currently licenced for the exploration and extraction of petroleum, as shown in **Figure 6.10.4**.

6.10.3.39 The portion of the local infrastructure and other sea users study area located in Scottish waters does not overlap with any subsea structures or offshore wells (**Figure 6.10.4**).

Carbon Capture and Storage

6.10.3.40 There are no CCS sites within the local infrastructure and other users study area within Scottish waters (**Figure 6.10.3**).

Military Activity

6.10.3.41 There are three PEXA's which overlap with the portion of the infrastructure and other sea users study area located in Scottish waters, as illustrated in **Figure 6.10.6**. These are listed as Areas of Intense Aerial Activity (AIAA) in **Table 6.10.3**.

Table 6.10.3: Ministry of Defence Practice and Exercise Areas within the Local Infrastructure and Other Sea Users Study Area in Scottish Waters

Area	Details	Status
D613B	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 10000 feet; Maximum Flight Level: 66000 feet

Area	Details	Status
D613C	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 10000 feet; Maximum Flight Level: 66000 feet
D613D	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 10000 feet; Maximum Flight Level: 66000 feet

Regional Infrastructure and Other Sea Users Study Area

Marine Aggregate Extraction

6.10.3.42 There are no marine aggregate extraction sites within the regional infrastructure and other users study area within Scottish waters (**Figure 6.10.3**).

Disposal Sites

6.10.3.43 There are no active, closed or disused disposal sites within the regional infrastructure and other users study area within Scottish waters (**Figure 6.10.3**).

Diving Sites

6.10.3.44 There are no recreational dive sites located within the regional infrastructure and other sea users study area in Scottish waters (**Figure 6.10.2**).

Bathing Waters

6.10.3.45 As the Offshore Scoping Boundary is approximately 80 km from the nearest point on the Scottish coastline, there are no designated bathing water sites within the vicinity of the regional infrastructure and other sea users study area in Scottish waters.

Future Baseline Conditions

6.10.3.46 The EIA process will consider the existing baseline conditions within the local infrastructure and other sea users study area and regional infrastructure and other sea users study area, however, it will also evaluate the future baseline conditions as far as reasonably practicable. The baseline environment is not static, therefore, even if the Ossian Transmission Infrastructure does not come forward, the environment will exhibit some degree of natural change. These changes may occur due to naturally occurring cycles and processes and any potential changes resulting from climate change.

6.10.3.47 For example, there is the potential for substantial growth in the offshore wind energy sector with new offshore wind farms being developed. Vessels associated with these developments may increase in order to support construction, and operation and maintenance activities, subsequently impacting the infrastructure and other sea users receptors described in this section through further restriction of access and displacement of recreational activity.

6.10.3.48 The infrastructure and other sea users chapter of the ES will ensure to place any potential impacts on receptors into the context of the envelope of change that may occur over the timescale of the Offshore Transmission Infrastructure.

6.10.4 Proposed Data Sources

6.10.4.1 **Table 6.10.4** presents the data sources proposed for the infrastructure and other sea users assessment.

6.10.4.2 Additional data sources (e.g. emerging research and offshore wind EIAs) will also be used to inform the assessment in the infrastructure and other sea users chapter of the ES. Note that, in addition to these data sources, relevant output of the consultation process will also be considered.

6.10.4.3 Relevant EIA Scoping Report studies and ESs for nearby developments that have been used to inform the assessment are listed below:

- EGL 3 and EGL 4 Environmental Impact Assessment Scoping Report (National Grid, 2024)
- Humber Gateway, Environmental Statement (E.ON, 2008).
- Outer Dowsing Offshore Wind Farm Environmental Statement Chapter 18 Marine Infrastructure and Other Users Volume 1 (GoBe, 2024).
- Dogger Bank Teesside A&B Environmental Statement Chapter 17 Other Marine Users (Forewind, 2014).
- Hornsea Project 2 Environmental Impact Assessment.
- Hornsea Project Four: Environmental Statement (ES), Volume A2, Chapter 11: Infrastructure and Other Users (GoBe, 2021).

Table 6.10.4: Data Sources Infrastructure and Other Sea Users

Title/Data	Source	Year	Author
General (applicable to both English and Scottish waters)			
Aggregate Extraction Areas and Disposal Sites	The Crown Estate (TCE)	2021	TCE
Angling Trust Interactive Map	Angling Trust	2024	Angling Trust Limited
Global Offshore Map	TGS, 4C Offshore	2024	TGS
Offshore Wind Farms	TCE	2023	TCE
Oil and Gas Infrastructure, license blocks, cables and pipelines	North Sea Transition Authority (NSTA) Open Data	2024	NSTA

Title/Data	Source	Year	Author
Kingfisher Information Service – Offshore Renewable and Cable Awareness (KIS-ORCA) Webmap Service	KIS-ORCA	2019	KIS-ORCA
Marinas, Recreational Activities, Royal Yachting Association (RYA) Clubs and Training Centres, General Boating Areas	United Kingdom (UK) Coastal Atlas of Recreational Boating	2018	RYA
Webmap Service – Human Activities	European Marine Observation and Data Network (EMODnet) Interactive Mapper	2024	EMODnet
Wreck Diving Sites	UK Diving	2010	UK Diving
English waters			
Visit England – Northeast England	Visit England	2024	Visit England
Scottish waters			
National Marine Plan Interactive (NMPi)	Marine Scotland	2024	Marine Scotland
VisitScotland	Scottish Tourism Board	N/A	N/A

6.10.5 Mitigation Measures

6.10.5.1 The following measures adopted as part of the Offshore Transmission Infrastructure are relevant to the assessment for infrastructure and other sea users. These measures may evolve (and be further clarified) as the design and EIA process progresses:

- Promulgation of information advising on the nature, timing and location of activities, including through Notices to Mariners (NtMs) and publication of information in local and regional yacht clubs and angling clubs.
- The development of, and adherence to, a Navigational Safety Plan (NSP) to describe measures relating to navigational safety, will be developed post-consent.
- The development of, and adherence to, a Vessel Management Plan (VMP), to confirm the types and numbers of project vessels and to consider vessel coordination including indicative transit route planning, will be developed post-consent.
- Consultation with oil and gas operators and other energy infrastructure operators to promote and maximise cooperation between parties and reduce both spatial and temporal interactions between conflicting activities. The type and extent of consultation will vary depending on whether the neighbouring project is in the pre-application/pre-planning phase or is a preexisting development.
- Installation of infrastructure over or adjacent to existing or future cables or pipelines will be subject to crossing or proximity agreements between the two parties, prior to the start of the construction phase.

6.10.6 Proposed Scope of the Assessment

6.10.6.1 Potential impacts that are proposed to be scoped into the assessment for infrastructure and other sea users are set out in **Table 6.10.5.**

Table 6.10.5: Potential Impacts Proposed to be Scoped in for Infrastructure and Other Sea Users

Impact	Project Phase[15]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Displacement of recreational activities	✓	✓	✓	✓	✓	Safety zones and advisory clearance distances established during construction may displace recreational activities.	Qualitative assessment informed from the results of baseline data review and consultation.
Increased SSCs and associated deposition affecting recreational diving sites and designated bathing water sites.	✓	✓	✓	✓	×	Increased SSCs and associated deposition arising from construction, activities within the Offshore Scoping Boundary may affect recreational diving sites and designated bathing water sites.	Qualitative assessment informed from the results of baseline data review, consultation, and the physical processes chapter of the ES.
Impacts to existing cables or pipelines or restrictions on access to cables or pipelines.	✓	✓	✓	✓	✓	There are numerous active cables and pipelines within the Offshore Scoping Boundary and therefore there is potential for impact to existing cables or restrictions on access to cables from installation.	Qualitative assessment informed from the results of baseline data review and consultation.
Increased SSCs and associated deposition affecting aggregate extraction areas.	✓	✓	✓	✓	✓	Installation of the Offshore Transmission Infrastructure has the potential to lead to increased SSCs and deposition, which could cause a change in aggregate resource in aggregate extraction areas.	Qualitative assessment informed from the results of baseline data review and the physical processes chapter of the ES.
Reduction or restriction of oil and gas exploration activities (including surveys, drilling and the placement of infrastructure) within the Offshore Transmission Infrastructure.	✓	✓	✓	✓	✓	The installation of the Offshore Transmission Infrastructure may reduce or restrict oil and gas exploration activities.	Qualitative assessment informed from the results of baseline data review and consultation.
Alterations to sediment transport pathways affecting aggregate extraction areas.	×	✓	×	✓	✓	The physical presence of any cable protection may interrupt sediment transport pathways which could affect aggregate resource in aggregate extraction areas. This is applicable during the operation and maintenance phase only as construction and decommissioning activities will lead to sediment disturbance and deposition, covered above. These impacts could therefore result in likely significant effects on infrastructure and other users.	Qualitative assessment informed from the results of baseline data review and the physical processes chapter of the ES.

[15] Construction (C), Operation and Maintenance (O), Decommissioning (D)

6.10.7 Impacts Proposed to be Scoped Out

6.10.7.1 Impacts that are proposed to be scoped out of the assessment for infrastructure and other sea users and the justification are set out in **Table 6.10.6**.

Table 6.10.6: Impacts Proposed to be Scoped out of the Assessment for Infrastructure and Other Sea Users

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
All Phases			
Interference with offshore microwave fixed communication links.	✓	✓	There is no proposed surface infrastructure associated with the Offshore Transmission Infrastructure, therefore there will be no interference with microwave fixed communication links between offshore oil and gas platforms.
Interference with Military PEXAs	✓	✓	There is no proposed surface infrastructure associated with the Offshore Transmission Infrastructure, therefore it is proposed that there will be no interference with Military PEXA.

6.10.8 Proposed Assessment Methodology

6.10.8.1 The assessment methodology to be used for the impacts proposed to be scoped in as set out in **Table 6.10.5** is described below.

Legislation and Policy

6.10.8.2 An overview of relevant legislation and policy is provided in **part 1, section 2** of this EIA Scoping Report. Further details of topic specific legislation and policy will be provided within the infrastructure and other sea users ES chapter.

Relevant Guidance

6.10.8.3 The following guidance documents relevant to the infrastructure and other sea users assessment will be considered in the ES:

- **General (applicable to the application for a DCO to be made to the Planning Inspectorate in English waters, and a Marine Licence to be made to MD-LOT in Scottish waters):**
  - RYA's position on offshore renewable energy developments: Paper 1 (of 4) – Wind Energy, June 2019 (RYA, 2019);
  - European Subsea Cables UK Association (ESCA) guideline no 6, the proximity of offshore renewable energy installations and submarine cable infrastructure in UK waters (ESCA) 2023);
  - ICPC recommendations:
    - Recommendation No.2-11B: Cable routing and reporting criteria (ICPC, 2015);
    - Recommendation No.3-10C: Telecommunications cable and oil pipeline/power cables crossing criteria (ICPC, 2014);
    - Recommendation No.13-2C: The proximity of offshore renewable wind energy installations and submarine cable infrastructure in national waters (ICPC, 2013);
  - Pipeline crossing agreement and proximity agreement pack (Oil and Gas UK, 2021); and
  - Submarine cables and offshore renewable energy installations proximity study (The Crown Estate (TCE), 2012).

Assessment of Effects

6.10.8.4 The infrastructure and other sea users EIA will follow the methodology set out in **part 1, section 5** of this EIA Scoping Report.

Cumulative Effects and Inter-related Effects

6.10.8.5 The Cumulative Effects Assessment (CEA) for infrastructure and other sea users will follow the general methodology set out in **part 1, section 5.8** of this EIA Scoping Report. The infrastructure and other sea users chapter of the ES will also consider inter-related effects arising from the Offshore Transmission Infrastructure, including potential project lifetime and receptor-led effects. This assessment will be undertaken in accordance with the standard industry guidance and approach, as outlined in **part 1, section 5.9** of this EIA Scoping Report.

Transboundary Impacts

6.10.8.6 The approach to transboundary impacts is set out in **part 1, section 5.10** of this EIA Scoping Report. **Part 5, appendix 5.1** of this EIA Scoping Report presents the transboundary impacts screening which has been carried out for the Ossian Transmission Infrastructure. As a result of this screening exercise, it is proposed that transboundary impacts and effects on infrastructure and other sea users are screened out from the EIA process.

Relevant Consultations

6.10.8.7 The Applicant has undertaken early consultation with selected offshore energy project developers in the vicinity of the Offshore Scoping Boundary. Consultation with these developers will continue throughout the PEIR and ES phases and will inform the infrastructure and other sea users chapter in the ES as relevant.

6.10.9 Next Steps

6.10.9.1 The next steps for infrastructure and other sea users are:

- to acquire and agree any additional data sources relevant to the infrastructure and other sea users receptors via consultation;
- to agree with stakeholders upon the approach for the assessment of infrastructure and other sea users (including presenting sensitivities of receptors, appropriate mitigation);
- to agree that all receptors relevant to infrastructure and other sea users have been identified and scoped in or out accurately; and
- to agree with stakeholders upon the potential impacts for assessment in the infrastructure and other sea users chapter of the ES.

6.11. Water Quality

6.11.1 Introduction

6.11.1.1 This section of the EIA Scoping Report identifies the proposed scope of the assessment for offshore water quality receptors from construction, operation and maintenance and decommissioning of the proposed Offshore Transmission Infrastructure. This includes the key data sources used to characterise the baseline environment in the vicinity of the Offshore Transmission Infrastructure, and the impacts proposed to be scoped in and out of the assessment for offshore water quality receptors in the ES.

6.11.1.2 A Water Framework Directive (WFD) Screening annex detailing the potential for impacts on the environmental objectives of the coastal English water bodies (i.e. within 1 nm for ecological status and 12 nm for chemical status) that could be affected by the Offshore Transmission Infrastructure is provided in **part 5, appendix 9.2** of this EIA Scoping Report.

6.11.2 Proposed Study Area for the Assessment

6.11.2.1 The water quality study area encompasses the Offshore Scoping Boundary and Intertidal Scoping Boundary, plus one spring tidal excursion (ABPmer, 2024) as determined by the physical processes study area (see **part 2, section 6.2**). Further details of the location and extent of the Intertidal Scoping Boundary can be found in **Figure 3.5.1** of **part 1, section 3**.

6.11.2.2 The water quality study area includes the seabed and coastal areas potentially affected by the Offshore Transmission Infrastructure (**Figure 6.11.1**). The water quality study area will also guide the WFD screening appendix (see **part 5, appendix 9.2** of this EIA Scoping Report).

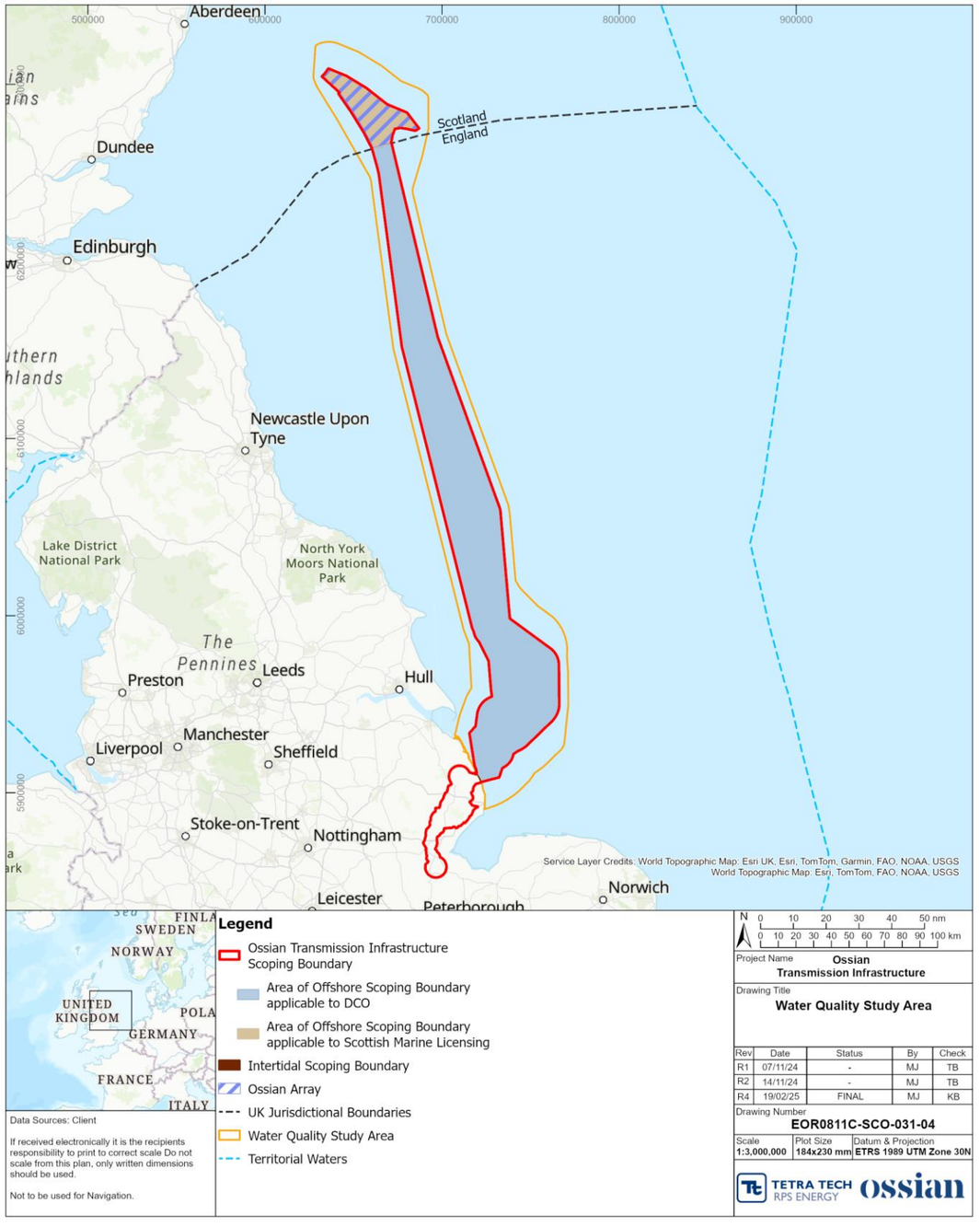

Figure 6.11.1: Water Quality Study Area

6.11.3 Baseline Environment

6.11.3.1 An outline of the baseline environment for offshore water quality based upon an initial review of data sources is provided below. This baseline environment section is split into the following subsections to allow the reader to distinguish between information relevant to specific jurisdictions:

- **English Waters** – this subsection summarises baseline environment information which is specific to the portion of the water quality study area located within English waters and is therefore applicable to the application for a DCO to be made to the Planning Inspectorate.
- **Scottish Waters** – this subsection summarises baseline environment information which specific to the portion of the water quality study area located within Scottish waters and is therefore applicable to the application for a Marine Licence to be made to MD-LOT.

6.11.3.2 The baseline characterisation of the ES will be refined with data from site-specific benthic ecology surveys, which will include contaminant analysis of water and sediment samples. The key desktop data sources used to inform this section of the EIA Scoping Report are shown in **Table 6.11.1**.

English Waters

6.11.3.3 The water quality study area is within the geographic scope for Marine Strategy Framework Directive (MSFD) monitoring, with compliance measured through Good Environmental Status (GES). This monitoring aims to assess how well marine waters score across a number of descriptors such as biological/ecological diversity, hydrographical conditions or contaminant concentrations.

6.11.3.4 The water quality study area includes seven bathing beaches: Mablethorpe Town, Sutton-on-Sea, Huttoft and Marsh Yard, Anderby, Chapel St. Leonard's, Ingoldmells South, and Skegness. All but Sutton-on-Sea were classified as having excellent bathing water status in 2024; Sutton-on-Sea has an advisory against swimming due to harmful algal blooms (Environment Agency, 2024). While there is no statutory requirement to maintain a specific status, water quality information must be available to the public at bathing locations.

6.11.3.5 There are a number of water quality sampling locations as informed by the Environment Agency Water Quality Data Archive located along the Lincolnshire coastline. All determinants from relevant sampling locations were within WFD Environmental Quality Standards (EQS) and Annual Averages (AA) within the past year (DEFRA, 2021a).

6.11.3.6 As described in **part 2, section 6.3**, data from the Eastern Green Link 3 and 4 Scoping Report suggested that despite potential sources of contamination within the project area, including gas fields and disposal sites, sediment contaminant levels within and adjacent to the Offshore Scoping Boundary (in English waters) were below Cefas Action Level 1 (Database on the Marine Environment, 2023; National Grid, 2024). Additionally, within the benthic subtidal and intertidal ecology study area close to Landfall there was no indication of levels above Cefas Action Level 1 of any assessed sediment contaminant (including Organotins, PAH, PCB and Total Hydrocarbons) (Cefas, 2024a). Thus, the risk of release into the water column remains low.

6.11.3.7 Sediment disturbance from activities such as cable installation during construction, maintenance activities, and removal activities during decommissioning may resuspend sediment-bound contaminants, impacting water quality. Metal concentrations within the North Sea are generally higher nearshore, reflecting river input and land runoff. Sediments within the water quality study area are predominantly coarse (sands and gravels with only low mud content), posing a low risk for anthropogenic contamination (see **part 2, section 6.2** and **part 2, section 6.3** of this EIA Scoping Report for further information).

Shellfish Water Protected Areas

6.11.3.8 Shellfish is a collective term for crustaceans (e.g. shrimp, lobster, crab) and molluscs (e.g. cockles, whelk, mussels, oysters), which filter large volumes of water to obtain food. During this process they can concentrate organisms such as bacteria and viruses in their bodies, some of which are harmful to humans (pathogens). Such organisms can be present due to contamination of water with sewage or animal faeces (faecal contamination).

6.11.3.9 Regulation 9 of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 provides for the designation of Shellfish Waters in England. The water quality study area does not overlap with any Shellfish Protected Areas (see **part 5, appendix 9.2, Figure 1.3**).

Scottish Waters

6.11.3.10 As described in **part 2, section 6.3,** site-specific surveys of the Array Site Boundary (which partly overlaps with the Offshore Scoping Boundary in Scottish waters) found that concentrations of Total Organic Matter (TOM), Total Organic Carbon (TOC), Total Hydrocarbon Content (THC), and Polycyclic Aromatic Hydrocarbons (PAH) were low across the Array Site Boundary. All levels of metals and PAH in the grab samples were below Cefas Action Level 1, and all but one sample in this area were also below the National Environment Agency (NEA) 2 Good threshold and the Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines threshold (CCME, 1995; 2001; NEA, 2016 (Revised 2020)). Levels of organotin and Polychlorinated biphenyls (PCBs) were below the limit of detection in most samples (Ossian OWFL, 2024). Sediment contamination levels are expected to be very low overall within the Offshore Scoping Boundary in Scottish waters, in line with the findings of these site-specific surveys.

Future Baseline Conditions

6.11.3.11 The EIA process will consider the existing baseline conditions within the water quality study area; however, it will also evaluate the future baseline conditions as far as reasonably practicable. The baseline environment is not static, therefore, even if the Ossian Transmission Infrastructure does not come forward, the environment will exhibit some degree of natural change. These changes may occur

due to naturally occurring cycles and processes and any potential changes resulting from climate change.

6.11.3.12 Variability and changes in naturally occurring processes may bring direct and indirect changes to offshore water quality. For example, movement of sediments as a result of changes to ocean currents may lead to higher sediment concentrations or release of contaminants.

6.11.3.13 The offshore water quality chapter of the ES will ensure to place any potential impacts on receptors into the context of the envelope of change that may occur over the timescale of the Offshore Transmission Infrastructure.

6.11.4 Proposed Data Sources

6.11.4.1 **Table 6.11.1** presents the data sources proposed for the offshore water quality assessment.

6.11.4.2 Additional data sources (e.g. emerging research, offshore wind EIAs) may be used to characterise the baseline environment for offshore water quality receptors in the ES, to ensure a robust characterisation is provided. Note that, in addition to these data sources, relevant output of the consultation process will also be considered.

Table 6.11.1: Summary of Key Data Sources for Offshore Water Quality

Title	Source	Year	Author
General (applicable to both English and Scottish waters)			
Environment Agency Water Quality Archive	Department for Environment Food and Rural Affairs (DEFRA)	2021	DEFRA
Bathing Waters Monitoring Locations	Environment Agency	2024	Environment Agency
Action level tool for sediment contaminants	Centre for Environment Fisheries and Aquaculture Science (Cefas)	2024	Cefas
Water Framework Directive: shellfish protected areas	DEFRA	2024	DEFRA
Eastern Green Link (EGL) 3 and EGL4 Scoping Report	The Planning Inspectorate (PINS)	2024	National Grid
Scottish waters			
Morven Offshore Wind Farm Scoping Report	Scottish Government - Marine Directorate	2023	EnBW bp
Ossian Array: EIA Report	Ossian OWFL	2024	Ossian OWFL
English waters			
None			

Site Specific Data

6.11.4.3 No site-specific surveys have been undertaken to date within the Offshore and Intertidal Scoping Boundaries to provide characterisation of the water quality study area.

6.11.4.4 Site-specific surveys for benthic ecology will take place across both the Offshore Scoping Boundary and the Intertidal Scoping Boundary, planned for 2025. These will be reported in full within the benthic subtidal and intertidal ecology technical report of the ES. The water quality sampling results from this survey will be used to define the baseline of the offshore water quality chapter of the ES.

6.11.5 Mitigation Measures

6.11.5.1 The following measures adopted as part of the Offshore Transmission Infrastructure are relevant to the assessment for offshore water quality. These measures may evolve (and be further clarified) as the design and EIA process progresses:

- The development of, and adherence to, an appropriate Code of Construction Practice (CoCP).
- The development of, and adherence to, an Environmental Management Plan (EMP).
- The development of, and adherence to a Marine Pollution Contingency Plan (MPCP).
- The development of, and adherence to, an Invasive Non-Native Species (INNS) Management Plan.
- The development of, and adherence to, a Decommissioning Programme.

6.11.5.2 The significance of the likely effects of the Offshore Transmission Infrastructure on offshore water quality will determine the requirement and feasibility for any further mitigation requirements to be adopted and will be consulted upon with statutory consultees throughout the EIA process.

6.11.6 Proposed Scope of the Assessment

6.11.6.1 Potential impacts that are proposed to be scoped into the assessment for offshore water quality are set out in **Table 6.11.2**.

Table 6.11.2: Potential Impacts Proposed to be Scoped In for Offshore Water Quality

Impact	Project Phase[16]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Increased SSC and associated deposition (impacts in English waters only)	✓	✓	✓	✓	×	During all phases, there is the potential for impacts arising from increased SSCs and associated sediment deposition on offshore water quality. These impacts could arise from construction activities, including seabed preparation/clearance, and cable installation, and decommissioning activities, such as the removal of the cables and cable protection. Any such impacts are expected to be highly localised to the immediate vicinity of the activities and temporary. Changes in SSCs can affect water quality. Effects associated with increased SSCs and associated deposition during the operation and maintenance phase are expected to be minimal and associated with repair and reburial events only, with SSCs and redeposition expected to be considerably lower than during the construction and decommissioning phases.	This assessment will consider the potential impacts arising due to changes in SSC and deposition on water quality and sediment transport. Elevations in SSC and subsequent deposition of disturbed sediments will also have the potential to result in adverse and indirect impacts on receptors for water quality, and the significance of the effect will be assessed in the offshore water quality chapter of the ES. During decommissioning, the impacts are expected to be less than or equal to the impacts arising during the construction phase. As such, the magnitude of impacts will be assumed to be equal to or less than those described for the construction phase, above.

[16] Construction (C), Operation and Maintenance (O), Decommissioning (D)

Impact	Project Phase[16]			Relevant to England or Scotland		Description	Proposed Approach to Assessment
	C	O	D	England	Scotland		
Release of contaminated sediments (impacts in English waters only)	✓	✓	✓	✓	×	Temporary resuspension of contaminants in sediments during construction and cable laying may adversely affect offshore water quality. Although there is a lack of evidence for contaminated sediments within the water quality study area, sediment quality has been included at this stage to address potential impacts on water quality through increased SSC. Cable installation in accordance with the CoCP and minimum burial depths reduces the likelihood of maintenance or repairs; however, localised repairs or external cable protection may be needed in some cases. Cable removal may temporarily disturb sediments and potentially release contaminants into the water column, though highly localised to the vicinity of the activities.	The physical processes assessment will be based upon a literature review of relevant offshore wind farm projects and other relevant projects in the vicinity of the Offshore Transmission Infrastructure to provide an overview of the potential impacts to physical processes (as set out in **part 2, section 6.2**) This will be used to inform the assessment of likely effects arising from increased SSCs and associated sediment deposition, which will hence inform the assessment of potential impacts from the release of sediment-bound contaminants. Desktop sources including the Cefas Action Level viewer (Cefas, 2024a) will also be used to help determine the level of sediment contamination within the impact area and within the water quality study area, if required. Data from other offshore wind farm surveys will also be used to inform this impact assessment. Targeted site-specific surveys are planned for 2025 to characterise benthic ecology, which will include the collection of water and sediment samples for contaminant analysis. The magnitude of the impact will be derived from the Maximum Design Scenario (MDS) (informed by the site-specific surveys, and other sources outlined above); this applies to all impacts listed in this table. During operation and maintenance and decommissioning, the impacts are expected to be less than or equal to the impacts arising during the construction phase. As such, the magnitude of impacts will be assumed to be less than those described for the construction phase.
Alteration of sediment transport and pathways due to infrastructure presence at the proposed Landfall (impacts in English waters only)	×	✓	×	✓	×	The Offshore Export Cables make Landfall through the intertidal zone. The presence of external cable protection in the intertidal zone during the operation and maintenance phase may disturb or disrupt the intertidal sediment transport.	The potential impact of the Offshore Transmission Infrastructure on intertidal sediment transport and sediment transport pathways will be informed by a qualitative assessment and literature review of relevant offshore wind farm projects in the vicinity of the Offshore Transmission Infrastructure. The Cable Burial Risk Assessment (CBRA) will also inform on potential impacts on sediment transport pathways and will likely identify the need for external cable protection at and near Landfall.

6.11.7 Impacts Proposed to be Scoped Out

6.11.7.1 Impacts that are proposed to be scoped out of the assessment for offshore water quality and their justifications are set out in **Table 6.11.3**.

Table 6.11.3: Impacts Proposed to be Scoped Out of the Assessment for Offshore Water Quality

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
All Phases			
Sediment transport and pathways due to infrastructure presence within the water column	✓	✓	The impact of sediment transport and pathways due to the presence of infrastructure within the water column is being scoped out because the external cable presence and other infrastructures are unlikely to significantly alter the wave or tidal regime. These hydrodynamic processes are the primary drivers of sediment transport in the marine environment. As the infrastructure is not expected to disrupt these processes, it is highly unlikely that it will influence sediment transport and water quality as a result.
Risk of introduction and spread of INNS	✓	✓	Vessel movements during all phases of the Offshore Transmission Infrastructure pose a potential risk for INNS introduction and spread, which will be addressed within the benthic subtidal and intertidal ecology chapter of the ES and managed through an INNS Management Plan. Additionally, the EMP will include measures to reduce the risk of potential introduction and spread of INNS so far as reasonably practical and vessels will be required to comply with the International Maritime Organisation (IMO) ballast water guidelines. Therefore, significant impacts on the offshore water quality because of the introduction of or spread of INNS is not predicted. This impact is proposed to be scoped out of further consideration through the EIA process with respect to offshore water quality receptors.
Accidental pollution	✓	✓	There is a risk of pollution being accidentally released during all phases of the Offshore Transmission Infrastructure from sources including vessels/vehicles, equipment/machinery and operational painting and cleaning of marine growth. However, the risk of such events is managed by the implementation of measures set out in standard post-consent management plans (e.g. an EMP, including a MPCP). These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. These will also set out industry good practice and the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention), IMO and the International Convention for the Prevention of Pollution from Ships (MARPOL) guidelines for preventing pollution at sea. Therefore, the likelihood of accidental pollution occurring is very low and in the unlikely event that such an event did occur, the magnitude of these will be reduced through measures such as a MPCP. This impact is proposed to be scoped out of further consideration through the EIA process with respect to offshore water quality receptors.
Achievement of GES	✓	✓	The Offshore Transmission Infrastructure is not expected to compromise GES indicators or United Kingdom (UK) Marine Strategy aspirations as biological/ecological diversity, hydrographical conditions or contaminant concentrations will not be affected, so this impact is proposed to be excluded from further consideration through the EIA process with respect to offshore water quality receptors.

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
All impacts within the water quality study area in Scottish waters	×	✓	Due to its location within Scottish offshore waters, and there being no pathway for likely significant effects on visibility, prey availability and low light levels, it is proposed that impacts on offshore water quality receptors within Scottish waters is scoped out of further consideration through the EIA process. Assessment of the key impact, increases in suspended sediment concentrations (SSCs), has been accounted for within the physical processes section of this EIA Scoping Report (**part 2, section 6.2**) which encompasses the entirety of the Offshore Scoping Boundary (i.e. in Scottish and English waters) and the Intertidal Scoping Boundary. In addition, for the Array Application (Ossian OWFL, 2024), which assessed the Array Site Boundary, consultees agreed to scope out a standalone offshore water quality chapter for the same reasons as outlined above via the Ossian Array Scoping Opinion (MD-LOT, 2023). As the Offshore Scoping Boundary in Scottish waters encompasses the Array Site Boundary, it is considered that a similar approach would be appropriate for the Ossian Transmission Infrastructure and therefore it is proposed that impacts on offshore water quality receptors within Scottish waters is scoped out of further consideration through the EIA process.

Impact	Relevant to England or Scotland		Justification
	England	Scotland	
Bathing water quality	✓	✓	The Offshore Transmission Infrastructure is not anticipated to impact designated bathing waters within the water quality study area. Bathing water quality is assessed through testing of *Escherichia coli* and intestinal enterococci which are not likely to be affected by the Offshore Transmission Infrastructure construction, operation and maintenance, and decommissioning. The main sources for *E. coli* and intestinal enterococci are due to terrestrial impacts such as sewage discharge and agricultural run-off. The Offshore Transmission Infrastructure should, therefore, not provide a source of contamination in this regard. Bathing water quality is proposed to be scoped out of further consideration through the EIA process with respect to offshore water quality receptors.

6.11.8 Proposed Assessment Methodology

6.11.8.1 The assessment methodology proposed to be used for the impacts proposed to be scoped in for offshore water quality as set out in **Table 6.11.2** is described below.

Legislation and Policy

6.11.8.2 An overview of relevant legislation and policy is provided in **part 1, section 2** of this EIA Scoping Report. Further details of topic specific legislation and policy will be provided within the water quality ES chapter.

Relevant Guidance

6.11.8.3 The following guidance documents relevant to the offshore water quality assessment will be considered in the ES:

- **General guidance (applicable to both English and Scottish waters):**
  - Marine Strategy Framework Directive (European Union, 2008);
  - The Marine Strategy Regulations 2010;
  - UK Marine Policy Statement (UK Government, 2011);
  - Marine and Coastal Access Act 2009;
  - The Water Environment (WFD) (England and Wales) Regulations 2017;
  - North East Inshore and North East Offshore Marine Plan (DEFRA, 2021b).

Assessment of Effects

6.11.8.4 The offshore water quality assessment will follow the methodology set out in **part 1, section 5** of this EIA Scoping Report. Consultation with stakeholders throughout the consultation process will be used to inform the approach and focus of these impact assessments.

6.11.8.5 A baseline characterisation of offshore water quality for the Offshore Transmission Infrastructure will be presented as part of the benthic subtidal and intertidal ecology technical report of the ES, which will provide latest information specific to the Offshore Transmission Infrastructure project, adding to the high-level baseline characterisation presented in this EIA Scoping Report.

Cumulative Effects and Inter-related Effects

6.11.8.6 The Cumulative Effects Assessment (CEA) for offshore water quality will follow the general methodology set out in **part 1, section 5**. The offshore water quality chapter of the ES will also consider inter-related effects arising from the Offshore Transmission Infrastructure, including potential project lifetime and receptor-led effects. This assessment will be undertaken in accordance with the standard industry guidance and approach, as outlined in **part 1, section 5** of the EIA Scoping Report.

Transboundary Impacts

6.11.8.7 The approach to transboundary impacts is set out in **part 1, section 5.10** of this EIA Scoping Report. **Part 5, appendix 5.1** of this EIA Scoping Report presents the transboundary impacts screening which has been carried out for the Offshore Transmission Infrastructure. All predicted impacts on offshore water quality are likely to be limited in extent to the water quality study area. Therefore, it is considered that any potential impacts associated with the Offshore Transmission Infrastructure will not affect offshore water quality receptors in any European Economic Area (EEA) state. As such, no significant transboundary effects are anticipated, and transboundary impacts on offshore water quality are proposed to be scoped out of the ES.

Relevant Consultations

6.11.8.8 The Applicant has undertaken early consultation with selected offshore energy project developers in the vicinity of the Offshore Scoping Boundary. Consultation with these developers will continue throughout the PEIR and ES phases via ad-hoc meetings and will inform the water quality chapter in the ES as relevant.

6.11.9 Next Steps

6.11.9.1 The next steps for the offshore water quality topic are:

- to agree with stakeholders upon the approach for the assessment of water quality (including presenting sensitivities of receptors, appropriate monitoring and mitigation);
- to agree with stakeholders upon the potential impacts for assessment in the offshore water quality chapter of the ES;
- to discuss the qualitative assessments with key stakeholders for impacts which cannot be assessed quantitatively; and
- to discuss with stakeholders any potential requirements for additional monitoring.

ANNEX A – GAZETTEER OF KNOWN WRECKS AND OBSTRUCTIONS IN THE MARINE ARCHAEOLOGY STUDY AREAS

Table 6.11.4: Aviation Losses Within the Marine Archaeology Study Area

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 9178	Unknown	Aircraft	Ditched aircraft, 14/03/1995	53 36.984 N	0 18.012 E
UKHO 9088	Unknown	Aircraft	Crashed USAF F15, 27/04/1990	53 41.018 N	0 48.890 E
UKHO 6718	Unknown	Aircraft	Crashed RAF Tornado, 22/06/1998	54 14.247 N	0 33.901 E

Table 6.11.5: Obstructions and Foul Ground Within the Marine Archaeology Study Area (in English Waters)

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 8674	N/A	Explosives/ Flares/ Munitions	N/A	53 29.504 N	0 53.075 E
UKHO 4660	N/A	Fisherman's Fastners	Foul Ground	55 28.927 N	0 1.883 W
UKHO 4672	N/A	Fisherman's Fastners	Foul Ground	55 26.893 N	0 0.767 W
UKHO 4602	N/A	Fisherman's Fastners	Foul Ground	55 24.077 N	0 6.233 W
UKHO 4652	N/A	Fisherman's Fastners	Foul Ground	55 32.435 N	0 0.103 W
UKHO 4657	N/A	Fisherman's Fastners	Foul Ground	55 29.760 N	0 4.650 W
UKHO 4649	N/A	Fisherman's Fastners	Foul Ground	55 31.260 N	0 9.083 W
UKHO 4616	N/A	Fisherman's Fastners	Foul Ground	55 29.077 N	0 11.733 W
UKHO 9107	N/A	Fisherman's Fastners	Foul Ground	53 52.632 N	0 26.676 E
UKHO 9151	N/A	Fisherman's Fastners	N/A	53 31.035 N	0 19.745 E
UKHO 9153	N/A	Fisherman's Fastners	N/A	53 30.019 N	0 19.645 E
UKHO 4622	N/A	Fisherman's Fastners	N/A	55 32.860 N	0 1.783 W
UKHO 4606	N/A	Fisherman's Fastners	N/A	55 25.793 N	0 12.250 W
UKHO 4651	N/A	Fisherman's Fastners	N/A	55 29.427 N	0 10.567 W
UKHO 4608	N/A	Fisherman's Fastners	N/A	55 26.443 N	0 2.050 W
UKHO 4604	N/A	Fisherman's Fastners	N/A	55 24.543 N	0 10.35 W
UKHO 4650	N/A	Fisherman's Fastners	N/A	55 31.143 N	0 6.250 W
UKHO 4658	N/A	Fisherman's Fastners	N/A	55 29.743 N	0 1.433 W
UKHO 4663	N/A	Fisherman's Fastners	N/A	55 27.543 N	0 2.633 W
UKHO 4623	N/A	Fisherman's Fastners	N/A	55 33.027 N	0 8.350 W
UKHO 4610	N/A	Fisherman's Fastners	N/A	55 27.643 N	0 0.200 W
UKHO 4661	N/A	Fisherman's Fastners	N/A	55 28.377 N	0 2.250 W
UKHO 4621	N/A	Fisherman's Fastners	N/A	55 32.310 N	0 7.100 W
UKHO 4607	N/A	Fisherman's Fastners	N/A	55 26.143 N	0 1.067 W
UKHO 4605	N/A	Fisherman's Fastners	N/A	55 25.327 N	0 1.767 W

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 4624	N/A	Fisherman's Fastners	N/A	55 33.493 N	0 11.017 W
UKHO 4670	N/A	Fisherman's Fastners	N/A	55 14.793 N	0 4.983 W
UKHO 4655	N/A	Fisherman's Fastners	N/A	55 29.493 N	0 6.400 W
UKHO 4664	N/A	Fisherman's Fastners	N/A	55 26.393 N	0 4.950 W
UKHO 4667	N/A	Fisherman's Fastners	N/A	55 17.743 N	0 6.300 W
UKHO 4656	N/A	Fisherman's Fastners	N/A	55 30.393 N	0 3.083 W
UKHO 4669	N/A	Fisherman's Fastners	N/A	55 16.327 N	0 0.533 W
UKHO 6526	N/A	Fisherman's Fastners	N/A	54 38.510 N	0 21.890 E
UKHO 4666	N/A	Fisherman's Fastners	N/A	55 19.493 N	0 1.333 W
UKHO 6531	N/A	Fisherman's Fastners	N/A	54 44.409 N	0 20.890 E
UKHO 4668	N/A	Fisherman's Fastners	N/A	55 17.943 N	0 4.933 W
UKHO 9147	N/A	Fisherman's Fastners	N/A	53 36.101 N	0 22.778 E
UKHO 6530	N/A	Fisherman's Fastners	N/A	54 44.259 N	0 4.892 E
UKHO 9097	N/A	Fisherman's Fastners	N/A	53 35.019 N	0 51.892 E
UKHO 9098	N/A	Fisherman's Fastners	N/A	53 35.685 N	0 55.691 E
UKHO 9144	N/A	Fisherman's Fastners	N/A	53 40.018 N	0 24.844 E
UKHO 9152	N/A	Fisherman's Fastners	N/A	53 30.619 N	0 26.245 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 9110	N/A	Fisherman's Fastners	N/A	53 52.516 N	0 29.725 E
UKHO 9111	N/A	Fisherman's Fastners	N/A	53 52.283 N	0 27.176 E
UKHO 6521	N/A	Fisherman's Fastners	N/A	54 32.011 N	0 9.893 E
UKHO 6529	N/A	Fisherman's Fastners	N/A	54 42.759 N	0 9.392 E
UKHO 6528	N/A	Fisherman's Fastners	N/A	54 42.209 N	0 4.992 E
UKHO 6522	N/A	Fisherman's Fastners	N/A	54 34.810 N	0 7.093 E
UKHO 4706	N/A	Fisherman's Fastners	N/A	55 11.293 N	0 0.100 E
UKHO 4810	N/A	Fisherman's Fastners	N/A	55 8.143 N	0 16.617 E
UKHO 4812	N/A	Fisherman's Fastners	N/A	55 4.967 N	0 13.017 E
UKHO 4720	N/A	Fisherman's Fastners	N/A	55 3.250 N	0 5.267 E
UKHO 4816	N/A	Fisherman's Fastners	N/A	55 6.493 N	0 22.000 E
UKHO 4811	N/A	Fisherman's Fastners	N/A	55 8.243 N	0 19.033 E
UKHO 4719	N/A	Fisherman's Fastners	N/A	55 3.167 N	0 17.700 E
UKHO 4807	N/A	Fisherman's Fastners	N/A	55 8.460 N	0 15.233 E
UKHO 4813	N/A	Fisherman's Fastners	N/A	55 5.477 N	0 15.467 E
UKHO 4718	N/A	Fisherman's Fastners	N/A	55 8.189 N	0 17.773 E
UKHO 4820	N/A	Fisherman's Fastners	N/A	55 4.400 N	0 19.583 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 6544	N/A	Fisherman's Fastners	N/A	54 55.008 N	0 6.891 E
UKHO 4809	N/A	Fisherman's Fastners	N/A	55 9.0430 N	0 17.400 E
UKHO 4701	N/A	Fisherman's Fastners	N/A	55 5.250 N	0 11.500 E
UKHO 4814	N/A	Fisherman's Fastners	N/A	55 6.193 N	0 18.933 E
UKHO 4808	N/A	Fisherman's Fastners	N/A	55 8.810 N	0 16.533 E
UKHO 4703	N/A	Fisherman's Fastners	N/A	55 7.500 N	0 1.000 E
UKHO 4818	N/A	Fisherman's Fastners	N/A	55 5.077 N	0 20.017 E
UKHO 4815	N/A	Fisherman's Fastners	N/A	55 5.793 N	0 17.95 E
UKHO 4702	N/A	Fisherman's Fastners	N/A	55 7.250 N	0 5.500 E
UKHO 4819	N/A	Fisherman's Fastners	N/A	55 4.567 N	0 18.617 E
UKHO 4746	N/A	Fisherman's Fastners	N/A	55 31.870 N	0 4.756 E
UKHO 4741	N/A	Fisherman's Fastners	N/A	55 30.703 N	0 2.773 E
UKHO 6540	N/A	Fisherman's Fastners	N/A	54 54.208 N	0 9.391 E
UKHO 4769	N/A	Fisherman's Fastners	N/A	55 19.993 N	0 14.683 E
UKHO 4751	N/A	Fisherman's Fastners	N/A	55 29.610 N	0 4.000 E
UKHO 6542	N/A	Fisherman's Fastners	N/A	54 54.508 N	0 10.891 E
UKHO 4611	N/A	Fisherman's Fastners	N/A	55 27.979 N	0 9.462 W

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 6546	N/A	Fisherman's Fastners	N/A	54 55.608 N	0 7.391 E
UKHO 4782	N/A	Fisherman's Fastners	N/A	55 16.177 N	0 16.150 E
UKHO 6547	N/A	Fisherman's Fastners	N/A	54 57.007 N	0 7.891 E
UKHO 4740	N/A	Fisherman's Fastners	N/A	55 31.920 N	0 1.073 E
UKHO 4743	N/A	Fisherman's Fastners	N/A	55 28.310 N	0 1.167 E
UKHO 4735	N/A	Fisherman's Fastners	N/A	55 29.953 N	0 4.906 E
UKHO 4756	N/A	Fisherman's Fastners	N/A	55 26.143 N	0 7.467 E
UKHO 4728	N/A	Fisherman's Fastners	N/A	55 17.083 N	0 1.600 E
UKHO 4753	N/A	Fisherman's Fastners	N/A	55 29.177 N	0 5.117 E
UKHO 4772	N/A	Fisherman's Fastners	N/A	55 19.077 N	0 12.083 E
UKHO 4731	N/A	Fisherman's Fastners	N/A	55 22.517 N	0 12.050 E
UKHO 4775	N/A	Fisherman's Fastners	N/A	55 16.693 N	0 7.083 E
UKHO 4745	N/A	Fisherman's Fastners	N/A	55 20.043 N	0 2.717 E
UKHO 4744	N/A	Fisherman's Fastners	N/A	55 19.677 N	0 0.317 E
UKHO 4763	N/A	Fisherman's Fastners	N/A	55 19.327 N	0 9.383 E
UKHO 6545	N/A	Fisherman's Fastners	N/A	54 55.008 N	0 8.891 E
UKHO 6548	N/A	Fisherman's Fastners	N/A	54 57.407 N	0 10.291 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 4742	N/A	Fisherman's Fastners	N/A	55 29.543 N	0 2.033 E
UKHO 4754	N/A	Fisherman's Fastners	N/A	55 25.543 N	0 4.683 E
UKHO 4724	N/A	Fisherman's Fastners	N/A	55 13.300 N	0 3.533 E
UKHO 4725	N/A	Fisherman's Fastners	N/A	55 13.933 N	0 2.950 E
UKHO 4762	N/A	Fisherman's Fastners	N/A	55 18.093 N	0 5.433 E
UKHO 4752	N/A	Fisherman's Fastners	N/A	55 30.260 N	0 5.783 E
UKHO 6536	N/A	Fisherman's Fastners	N/A	54 49.758 N	0 6.392 E
UKHO 4825	N/A	Fisherman's Fastners	N/A	55 26.727 N	0 1.683 E
UKHO 4768	N/A	Fisherman's Fastners	N/A	55 19.510 N	0 11.933 E
UKHO 6535	N/A	Fisherman's Fastners	N/A	54 49.708 N	0 10.141 E
UKHO 4766	N/A	Fisherman's Fastners	N/A	55 19.610 N	0 11.517 E
UKHO 4774	N/A	Fisherman's Fastners	N/A	55 18.960 N	0 13.283 E
UKHO 4726	N/A	Fisherman's Fastners	N/A	55 14.455 N	0 5.591 E
UKHO 4761	N/A	Fisherman's Fastners	N/A	55 21.027 N	0 5.950 E
UKHO 9484	N/A	Fisherman's Fastners	N/A	53 38.019 N	1 0.224 E
UKHO 9485	N/A	Fisherman's Fastners	N/A	53 38.169 N	1 1.890 E

Table 6.11.6: Known Wrecks Within the Marine Archaeology Study Area (in English Waters)

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 8749	AC 9	Wreck	Barge	53 33.104 N	0 27.104 E
UKHO 6690	N/A	Wreck	Beam trawler	54 11.264 N	0 27.442 E
UKHO 4699	GAPERN	Wreck	Carrier	55 3.407 N	0 4.641 E
UKHO 8978	HARNIS	Wreck	Carrier	53 57.015 N	0 25.892 E
UKHO 9008	HARNIS (PROBABLY)	Wreck	Carrier	53 55.822 N	0 23.799 E
UKHO 85878	N/A	Wreck	Catamaran	53 45.376 N	0 37.873 E
UKHO 67177	N/A	Wreck	Container	53 41.017 N	0 33.892 E
UKHO 8683	HMS PINTAIL	Wreck	corvette	53 30.544 N	0 52.655 E
UKHO 9037	HMS SPEEDY (PROBABLY)	Wreck	Destroyer	53 41.101 N	0 59.072 E
UKHO 6687	HMS FALCON (STERN SECTION)	Wreck	Destroyer	54 1.250 N	0 20.568 E
UKHO 9338	HMS QUEENWORTH	Wreck	Destroyer	53 33.969 N	1 0.241 E
UKHO 61189	HMS LINSDELL	Wreck	Drifter	53 41.218 N	0 59.139 E
UKHO 6532	JOHNNY BOY (PROBABLY)	Wreck	fishing vessel	54 45.434 N	0 10.175 E
UKHO 9180	CA NE FAIT RIEN	Wreck	fishing vessel	53 34.818 N	0 21.895 E
UKHO 8663	GIRL KITTY (POSSIBLY)	Wreck	fishing vessel	53 26.856 N	0 14.010 E
UKHO 9342	SIOUX	Wreck	fishing vessel	53 34.819 N	1 0.689 E
UKHO 8887	ABY (POSSIBLY)	Wreck	fishing vessel	53 43.351 N	0 40.609 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 9072	SARAH VISHOLM	Wreck	fishing vessel	53 35.426 N	0 24.295 E
UKHO 8924	ELEANOR	Wreck	fishing vessel	53 49.017 N	0 28.893 E
UKHO 8710	MATANUSKA (PROBABLY)	Wreck	fishing vessel	53 30.093 N	0 38.156 E
UKHO 8910	INGE MARGUERITE (POSSIBLY)	Wreck	fishing vessel	53 45.284 N	0 40.408 E
UKHO 4601	KIA-ORA (POSSIBLY)	Wreck	fishing vessel	55 24.004 N	0 10.108 W
UKHO 9033	WHITE KNIGHT (POSSIBLY)	Wreck	fishing vessel	53 40.518 N	0 27.227 E
UKHO 8673	VENTURE (POSSIBLY)	Wreck	fishing vessel	53 28.404 N	0 16.789 E
UKHO 9095	ELO	Wreck	fishing vessel	53 35.230 N	0 18.720 E
UKHO 6480	CORONATION	Wreck	fishing vessel	54 5.014 N	0 16.893 E
UKHO 9060	SONIA JANE (POSSIBLY)	Wreck	fishing vessel	53 47.017 N	0 31.893 E
UKHO 8832	REVIGO	Wreck	fishing vessel	53 35.652 N	0 57.208 E
UKHO 9100	HESPERIAN	Wreck	fishing vessel	53 46.017 N	0 25.894 E
UKHO 4827	AVONDALE	Wreck	fishing vessel	55 30.003 N	0 9.889 E
UKHO 6602		Wreck	fishing vessel	54 6.332 N	0 37.091 E
UKHO 8865	PESHELO (GY364)	Wreck	fishing vessel	53 40.018 N	0 22.395 E
UKHO 8645		Wreck	fishing vessel	53 21.353 N	0 33.394 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 6481	DAMAR	Wreck	fishing vessel	54 20.012 N	0 24.891 E
UKHO 67166	WHITE ROSE	Wreck	fishing vessel	53 43.000 N	0 32.000 E
UKHO 70566	FLOURISH	Wreck	fishing vessel	53 50.979 N	0 35.542 E
UKHO 6619	RENATE S	Wreck	fishing vessel	54 38.510 N	0 14.191 E
UKHO 9184	PETROSWIFT	Wreck	launch	53 28.819 N	0 42.993 E
UKHO 8899	LIGHTSHIP NO 83	Wreck	light ship	53 44.783 N	0 35.554 E
UKHO 8915	PILSUDSKI	Wreck	liner	53 46.265 N	0 45.554 E
UKHO 8841	NAUTILUS	Wreck	minelayer	53 36.520 N	0 26.020 E
UKHO 73566	HOLMAR I	Wreck	motor vessel	54 18.512 N	0 13.393 E
UKHO 6520	STRALSUND	Wreck	motor vessel	54 28.977 N	0 18.342 E
UKHO 8746	HMS PRINCESS VICTORIA	Wreck	motor vessel	53 33.275 N	0 20.948 E
UKHO 8705	BUOYANT	Wreck	motor vessel	53 31.602 N	0 14.528 E
UKHO 8644	RIVERGATE	Wreck	motor vessel	53 21.318 N	0 31.457 E
UKHO 6620	RENATE S	Wreck	motor vessel	54 40.01 N	0 13.391 E
UKHO 8863	REVI	Wreck	motor vessel	53 39.723 N	0 22.979 E
UKHO 8617	ARDUITY	Wreck	motor vessel	53 15.620 N	0 24.413 E
UKHO 8935	BRITISH PRINCE	Wreck	motor vessel	53 51.690 N	0 25.233 E
UKHO 9026	SIRI MARIA	Wreck	motor vessel	53 33.459 N	0 55.247 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 6706	RENATE S (POSSIBLY)	Wreck	motor vessel	54 40.276 N	0 16.116 E
UKHO 6487	JOSEPH AND WILLIAM	Wreck	sailing vessel	54 6.914 N	0 25.792 E
UKHO 67154	SPRAY	Wreck	sailing vessel	53 37.718 N	0 32.692 E
UKHO 8982	LILY OF THE VALLEY	Wreck	sailing vessel	53 58.615 N	0 27.342 E
UKHO 67143	MILO	Wreck	sailing vessel	53 34.418 N	0 31.043 E
UKHO 8691	BEELSBY	Wreck	sailing vessel	53 31.019 N	0 31.394 E
UKHO 8668	VINETA	Wreck	sailing vessel	53 27.969 N	0 32.894 E
UKHO 67145	OTTER	Wreck	sailing vessel	53 34.369 N	0 48.891 E
UKHO 6543	SPEKULATION	Wreck	sailing vessel	54 55.008 N	0 14.890 E
UKHO 6512	FLORENCE	Wreck	sailing vessel	54 14.513 N	0 26.891 E
UKHO 9359	YOUNG HARRY	Wreck	sailing vessel	53 47.617 N	1 0.988 E
UKHO 8637	STAR	Wreck	sailing vessel	53 20.120 N	0 22.696 E
UKHO 67146	LOTTIE (POSSIBLY)	Wreck	sailing vessel	53 33.312 N	0 23.479 E
UKHO 8801	EDMUND DENISON	Wreck	sailing vessel	53 34.418 N	0 43.391 E
UKHO 67159	ESK	Wreck	sailing vessel	53 41.417 N	0 34.592 E
UKHO 8929	SAPPHO	Wreck	sailing vessel	53 50.233 N	0 35.491 E
UKHO 8694	THOMAS CAMPBELL	Wreck	sailing vessel	53 31.052 N	0 17.096 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 67144	REBECCA SLEIGHT	Wreck	sailing vessel	53 34.418 N	0 26.693 E
UKHO 67184	ARTHUR & FANNY	Wreck	sailing vessel	53 45.633 N	0 25.543 E
UKHO 8949	TOBIT AND ANNIE	Wreck	sailing vessel	53 53.566 N	0 31.292 E
UKHO 67164	SECRET	Wreck	sailing vessel	53 34.418 N	0 31.043 E
UKHO 8649	ROSEBUD (POSSIBLY)	Wreck	sailing vessel	53 21.446 N	0 30.084 E
UKHO 8664	LIZZIE CARTER	Wreck	sailing vessel	53 27.136 N	0 18.696 E
UKHO 8627	EXPRESS	Wreck	sailing vessel	53 18.020 N	0 30.895 E
UKHO 8874		Wreck	sailing vessel	53 41.281 N	0 49.596 E
UKHO 8868	NORFOLK (POSSIBLY)	Wreck	sailing vessel	53 40.329 N	0 51.895 E
UKHO 8856	CECIL (POSSIBLY)	Wreck	sailing vessel	53 38.216 N	0 39.550 E
UKHO 8858	SILVER QUEEN	Wreck	sailing vessel	53 38.851 N	0 51.723 E
UKHO 8920	JANE (POSSIBLY)	Wreck	sailing vessel	53 47.895 N	0 30.172 E
UKHO 6715		Wreck	sailing vessel	54 27.088 N	0 11.165 E
UKHO 8638		Wreck	sailing vessel	53 20.470 N	0 34.394 E
UKHO 8905	EDITH (POSSIBLY)	Wreck	smack	53 44.917 N	0 49.973 E
UKHO 8690	RHUYS	Wreck	steam ship	53 30.805 N	0 22.999 E
UKHO 8821	ANDARINA	Wreck	steam ship	53 35.369 N	0 59.157 E
UKHO 8866	BENMACDHUI	Wreck	steam ship	53 40.159 N	0 30.321 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 6510	AGNES	Wreck	steam ship	54 13.060 N	0 20.927 E
UKHO 8730	STYLIANOS CHANDRIS	Wreck	steam ship	53 32.599 N	0 30.838 E
UKHO 8679	RIVAULX	Wreck	steam ship	53 29.852 N	0 15.737 E
UKHO 8852	ROYSTON	Wreck	steam ship	53 37.534 N	0 39.488 E
UKHO 8681	MARIE DAWN	Wreck	steam ship	53 30.419 N	0 37.059 E
UKHO 8778	FOWBERRY TOWER (PART OF)	Wreck	steam ship	53 33.968 N	0 20.895 E
UKHO 9146	REVIGO (POSSIBLY)	Wreck	steam ship	53 36.385 N	0 48.525 E
UKHO 67163	SCHIELAND	Wreck	steam ship	53 32.185 N	0 33.726 E
UKHO 8726	SCHIELAND (POSSIBLY)	Wreck	steam ship	53 32.761 N	0 37.162 E
UKHO 8670	FAUNUS	Wreck	steam ship	53 28.121 N	0 17.024 E
UKHO 8864	MERCHISTON	Wreck	steam ship	53 39.616 N	0 31.425 E
UKHO 8667	FRYKEN	Wreck	steam ship	53 27.651 N	0 26.136 E
UKHO 8686	RIEVAULX ABBEY	Wreck	steam ship	53 30.654 N	0 17.721 E
UKHO 8893	GRANGEMOUTH	Wreck	steam ship	53 44.492 N	0 27.705 E
UKHO 9053	NORFOLK COAST	Wreck	steam ship	53 59.899 N	0 26.059 E
UKHO 9395	NIEUWLAND	Wreck	steam ship	53 39.601 N	1 2.389 E
UKHO 8666	POLZELLA (POSSIBLY)	Wreck	steam ship	53 27.724 N	0 38.735 E
UKHO 6597	KIELDRECHT (POSSIBLY)	Wreck	steam ship	54 5.281 N	0 27.326 E
UKHO 8860	CATFORD	Wreck	steam ship	53 38.948 N	0 41.154 E
UKHO 8724	BOX HILL	Wreck	steam ship	53 32.486 N	0 24.959 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 8903	LARCHWOOD (POSSIBLY)	Wreck	steam ship	53 41.718 N	0 54.539 E
UKHO 8776	FOWBERRY TOWER (PART)	Wreck	steam ship	53 33.920 N	0 20.940 E
UKHO 8772	FOWBERRY TOWER (PART)	Wreck	steam ship	53 33.735 N	0 21.195 E
UKHO 8768	FOWBERRY TOWER (PART)	Wreck	steam ship	53 33.685 N	0 21.453 E
UKHO 8684	ROYAL SCOTT	Wreck	steam ship	53 30.614 N	0 52.899 E
UKHO 8661	HMS CORFIELD	Wreck	steam ship	53 26.940 N	0 18.899 E
UKHO 9071	THESSALY	Wreck	steam ship	53 31.009 N	0 23.106 E
UKHO 9031	London	Wreck	steam ship	53 32.059 N	0 50.234 E
UKHO 8791	RAYFORD	Wreck	steam ship	53 34.238 N	0 22.326 E
UKHO 8677	MARIE DAWN	Wreck	steam ship	53 30.083 N	0 37.464 E
UKHO 8826	KATINA BULGARI	Wreck	steam ship	53 35.488 N	0 31.241 E
UKHO 8656	ONESTA	Wreck	steam ship	53 24.202 N	0 36.068 E
UKHO 8847	FERMAIN (POSSIBLY)	Wreck	steam ship	53 36.343 N	0 52.943 E
UKHO 8743	IGHTHAM (POSSIBLY)	Wreck	steam ship	53 33.122 N	0 27.819 E
UKHO 67200	GLUCKAUF (POSSIBLY)	Wreck	steam ship	53 40.018 N	0 32.926 E
UKHO 8747	KYMA	Wreck	steam ship	53 33.298 N	0 24.419 E
UKHO 8665	KHARTOUM	Wreck	steam ship	53 27.219 N	0 38.194 E
UKHO 8767	CAVEHILL	Wreck	steam ship	53 33.619 N	0 58.089 E
UKHO 6508	KENNINGTON	Wreck	steam ship	54 11.597 N	0 20.892 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 6495	KIELDRECHT	Wreck	steam ship	54 7.115 N	0 30.892 E
UKHO 8653		Wreck	steam ship	53 23.155 N	0 27.947 E
UKHO 8678	RAVONIA (PART)	Wreck	steam ship	53 29.964 N	0 24.949 E
UKHO 3196	BOGO	Wreck	steam ship	56 17.997 N	0 21.110 W
UKHO 8706	FLASHLIGHT (PROBABLY)	Wreck	steam ship	53 31.886 N	0 47.642 E
UKHO 8675	DROMORE CASTLE	Wreck	steam ship	53 29.536 N	0 52.258 E
UKHO 8837	ALBANIA (POSSIBLY)	Wreck	steam ship	53 36.001 N	0 20.295 E
UKHO 8838	B O BORJESSON	Wreck	steam ship	53 36.092 N	0 20.625 E
UKHO 8642	VERNON	Wreck	steam ship	53 20.987 N	0 36.061 E
UKHO 8803	WILLIAM BALLS (PROBABLY)	Wreck	steam ship	53 34.448 N	0 46.891 E
UKHO 8878	HOMER	Wreck	steam ship	53 42.112 N	0 32.380 E
UKHO 8877	CORLAND	Wreck	steam ship	53 41.976 N	0 38.199 E
UKHO 8886	VECHSTROOM	Wreck	steam ship	53 43.523 N	0 33.930 E
UKHO 8926	GLUCKAUF (POSSIBLY)	Wreck	steam ship	53 48.935 N	0 33.951 E
UKHO 8943	CORHAMPTON	Wreck	steam ship	53 53.051 N	0 27.358 E
UKHO 8975	ACKLAMD (POSSIBLY)	Wreck	steam ship	53 56.634 N	0 25.569 E
UKHO 8879	KEYNES	Wreck	steam ship	53 42.107 N	0 44.821 E
UKHO 67153	AUTUMN	Wreck	steam ship	53 37.651 N	0 18.344 E
UKHO 8891		Wreck	steam ship	53 44.168 N	0 50.341 E
UKHO 6519		Wreck	steam ship	54 16.408 N	0 28.085 E
UKHO 8662	WHINSTONE	Wreck	steam ship	53 27.019 N	0 12.297 E
UKHO 9099		Wreck	steam ship	53 47.300 N	0 33.843 E
UKHO 9040		Wreck	steam ship	53 41.968 N	0 54.639 E
UKHO 9390		Wreck	steam ship	53 39.901 N	1 0.655 E
UKHO 9044	VEREINGTE (POSSIBLY)	Wreck	steam ship	53 45.917 N	0 43.441 E
UKHO 9038		Wreck	steam ship	53 39.301 N	0 59.839 E
UKHO 8676	RAVONIA (PART) (POSSIBLY)	Wreck	steam ship	53 29.347 N	0 24.507 E
UKHO 9036		Wreck	steam ship	53 30.192 N	0 51.795 E
UKHO 8923	Maggie	Wreck	steam ship	53 48.658 N	0 25.54 E
UKHO 9392	SIOUX (PROBABLY)	Wreck	stern trawler	53 36.602 N	1 0.540 E
UKHO 6604	UC 47	Wreck	submarine	54 0.449 N	0 23.576 E
UKHO 8765	AUDACITY	Wreck	tanker	53 33.571 N	0 22.369 E
UKHO 8641	DEODATA	Wreck	tanker	53 20.887 N	0 36.346 E
UKHO 8957	REALF	Wreck	tanker	53 54.651 N	0 24.981 E
UKHO 6515	CASORIA (POSSIBLY)	Wreck	trawler	54 15.814 N	0 34.574 E
UKHO 6524	CONDOR (POSSIBLY)	Wreck	trawler	54 34.103 N	0 16.783 E
UKHO 8672	HMS CAPE SPARTEL (PROBABLY)	Wreck	trawler	53 29.210 N	0 50.211 E
UKHO 8773	HMS LORMONT	Wreck	trawler	53 33.812 N	0 18.868 E
UKHO 9078	LEONORA	Wreck	trawler	53 58.616 N	0 32.092 E
UKHO 8913	AJAX	Wreck	trawler	53 46.017 N	0 51.890 E
UKHO 8918	REBONO (PROBABLY)	Wreck	trawler	53 47.834 N	0 54.774 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 8857	REBONO (POSSIBLY)	Wreck	trawler	53 37.835 N	0 56.607 E
UKHO 8916	REVIGO (POSSIBLY)	Wreck	trawler	53 48.267 N	0 37.508 E
UKHO 8968	DEVONIAN	Wreck	trawler	53 56.216 N	0 46.490 E
UKHO 6464	CYNTHIA	Wreck	trawler	54 0.965 N	0 33.291 E
UKHO 8814	REX	Wreck	trawler	53 34.701 N	0 18.844 E
UKHO 8883	JERSEY (PROBABLY)	Wreck	trawler	53 42.906 N	0 37.223 E
UKHO 6489	ALBATROSS	Wreck	trawler	54 6.914 N	0 29.091 E
UKHO 8981	DEVONSHIRE (POSSIBLY)	Wreck	trawler	53 55.916 N	0 53.757 E
UKHO 8850	LADAS (POSSIBLY)	Wreck	trawler	53 37.521 N	0 22.657 E
UKHO 8953	ROCHESTER (POSSIBLY)	Wreck	trawler	53 53.283 N	0 42.207 E
UKHO 8818	HMS EGRET	Wreck	trawler	53 34.831 N	0 17.240 E
UKHO 8762	LUCERNE	Wreck	trawler	53 33.511 N	0 16.886 E
UKHO 8873	REVELLO	Wreck	trawler	53 41.418 N	0 29.732 E
UKHO 8698	HMS DERVISH	Wreck	trawler	53 31.277 N	0 23.688 E
UKHO 8764	HMS CORTINA	Wreck	trawler	53 33.575 N	0 19.117 E
UKHO 8697	HMS SUSARION	Wreck	trawler	53 31.252 N	0 22.546 E
UKHO 8734	HMS STRATHBORVE	Wreck	trawler	53 32.852 N	0 18.045 E
UKHO 8737	HMS STRATHBORVE (PART)	Wreck	trawler	53 32.982 N	0 18.109 E
UKHO 8940	LISMORE	Wreck	trawler	53 52.316 N	0 42.740 E
UKHO 8964	LISMORE	Wreck	trawler	53 54.499 N	0 37.124 E
UKHO 6595	ARCTIC VIKING	Wreck	trawler	54 18.510 N	0 21.552 E
UKHO 8647	AMELIE-MATHILDE	Wreck	trawler	53 22.095 N	0 29.227 E
UKHO 8928	MAGNOLIA	Wreck	trawler	53 49.433 N	0 35.458 E
UKHO 6488	APHELION	Wreck	trawler	54 6.914 N	0 29.091 E
UKHO 9055	HMS KOS XVI (PROBABLY)	Wreck	trawler	53 50.983 N	0 34.958 E
UKHO 6525	STRATHORD (PROBABLY)	Wreck	trawler	54 37.178 N	0 30.665 E
UKHO 8759	LANCASTER	Wreck	trawler	53 33.519 N	0 34.294 E
UKHO 8994	LANCASTER (POSSIBLY)	Wreck	trawler	53 32.172 N	0 32.295 E
UKHO 9091	STRATON (POSSIBLY)	Wreck	trawler	53 38.302 N	0 43.359 E
UKHO 6517	RUBICO	Wreck	trawler	54 16.513 N	0 35.307 E
UKHO 8704	SHEPHERD LAD	Wreck	trawler	53 31.828 N	0 46.435 E
UKHO 67142	HARWICH	Wreck	trawler	53 31.018 N	0 16.995 E
UKHO 8984	EUROPE	Wreck	trawler	53 58.766 N	0 33.292 E
UKHO 8966	TWO BROTHERS	Wreck	trawler	53 55.416 N	0 37.924 E
UKHO 67171	JENNIE BULLER	Wreck	trawler	53 38.968 N	0 35.892 E
UKHO 8846	OPHIR II (POSSIBLY)	Wreck	trawler	53 36.903 N	0 24.959 E
UKHO 67175	ROVER	Wreck	trawler	53 38.968 N	0 35.892 E
UKHO 9101	FITTONIA (POSSIBLY)	Wreck	trawler	53 29.494 N	0 52.708 E
UKHO 8680	RHENO	Wreck	trawler	53 30.219 N	0 41.893 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 8851	HMS BENVOLIO	Wreck	trawler	53 37.585 N	0 20.787 E
UKHO 8796	KILMARNOCK (POSSIBLY)	Wreck	trawler	53 32.419 N	0 58.508 E
UKHO 8854	SCOTIA (POSSIBLY)	Wreck	trawler	53 38.639 N	0 43.601 E
UKHO 8842	VIRGINIAN	Wreck	trawler	53 40.855 N	0 48.648 E
UKHO 8882	SEA PEARL	Wreck	trawler	53 42.703 N	0 36.765 E
UKHO 8889	JANET HELEN (POSSIBLY)	Wreck	trawler	53 44.002 N	0 26.238 E
UKHO 8933	HMS BOTANIC	Wreck	trawler	53 51.264 N	0 26.515 E
UKHO 8921	HMS WARLAND (POSSIBLY)	Wreck	trawler	53 47.884 N	0 34.150 E
UKHO 9045	RADO (POSSIBLY)	Wreck	trawler	53 41.45 N	0 39.575 E
UKHO 8973	KINGSTON CAMEO	Wreck	trawler	53 57.968 N	0 20.922 E
UKHO 9056	LAUREL (POSSIBLY)	Wreck	trawler	53 51.901 N	0 30.012 E
UKHO 9394		Wreck	trawler	53 39.635 N	1 1.205 E
UKHO 9030		Wreck	trawler	53 39.064 N	0 40.369 E
UKHO 6601		Wreck	trawler	54 10.464 N	0 36.758 E
UKHO 9148	KILMARNOCK (POSSIBLY)	Wreck	trawler	53 34.186 N	0 58.324 E
UKHO 9080	HERCULES (POSSIBLY)	Wreck	trawler	53 54.716 N	0 25.992 E
UKHO 9079	N/A	Wreck	trawler	53 56.815 N	0 31.891 E
UKHO 9041	N/A	Wreck	trawler	53 41.934 N	0 54.923 E
UKHO 8855	N/A	Wreck	trawler	53 37.892 N	0 27.968 E
UKHO 8904	N/A	Wreck	trawler	53 45.040 N	0 32.894 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 8643	NOORDERBLIK	Wreck	trawler	53 21.170 N	0 34.428 E
UKHO 6612	Unknown	Wreck	Unknown	54 47.142 N	0 29.789 E
UKHO 67092	Unknown	Wreck	Unknown	53 28.052 N	0 32.044 E
UKHO 8996	Unknown	Wreck	Unknown	53 27.802 N	0 32.094 E
UKHO 9164	Unknown	Wreck	Unknown	53 22.387 N	0 37.202 E
UKHO 9069	Unknown	Wreck	Unknown	53 52.417 N	0 55.190 E
UKHO 9051	Unknown	Wreck	Unknown	53 25.020 N	0 42.893 E
UKHO 85316	Unknown	Wreck	Unknown	53 16.022 N	0 23.589 E
UKHO 8998	Unknown	Wreck	Unknown	53 17.154 N	0 26.279 E
UKHO 8999	Unknown	Wreck	Unknown	53 15.754 N	0 27.012 E
UKHO 8659	VICTORIA	Wreck	Unknown	53 25.637 N	0 43.044 E
UKHO 9165	Unknown	Wreck	Unknown	53 25.024 N	0 38.630 E
UKHO 87274	Unknown	Wreck	Unknown	53 42.169 N	0 48.279 E
UKHO 87269	Unknown	Wreck	Unknown	53 38.897 N	0 43.920 E
UKHO 8946	Unknown	Wreck	Unknown	53 53.251 N	0 29.948 E
UKHO 9126	Unknown	Wreck	Unknown	53 49.986 N	0 30.513 E
UKHO 85882	Unknown	Wreck	Unknown	53 42.832 N	0 37.264 E
UKHO 85884	Unknown	Wreck	Unknown	53 48.334 N	0 26.831 E
UKHO 8987	Unknown	Wreck	Unknown	53 59.795 N	0 20.548 E
UKHO 9054	Unknown	Wreck	Unknown	53 53.667 N	0 25.590 E
UKHO 85879	Unknown	Wreck	Unknown	53 44.496 N	0 37.128 E
UKHO 9057	Unknown	Wreck	Unknown	53 50.916 N	0 29.147 E
UKHO 85881	Unknown	Wreck	Unknown	53 42.911 N	0 38.598 E
UKHO 85880	Unknown	Wreck	Unknown	53 44.294 N	0 36.703 E
UKHO 85442	Unknown	Wreck	Unknown	53 28.315 N	0 47.769 E
UKHO 84971	Unknown	Wreck	Unknown	53 30.084 N	0 42.401 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 84972	Unknown	Wreck	Unknown	53 30.099 N	0 43.378 E
UKHO 4709	Unknown	Wreck	Unknown	55 26.903 N	0 0.890 E
UKHO 72954	Unknown	Wreck	Unknown	55 49.555 N	0 15.842 W
UKHO 72207	Unknown	Wreck	Unknown	55 42.520 N	0 0.461 W
UKHO 9058	Unknown	Wreck	Unknown	53 51.233 N	0 39.891 E
UKHO 9391	Unknown	Wreck	Unknown	53 42.951 N	1 0.705 E
UKHO 73369	Unknown	Wreck	Unknown	55 37.927 N	0 4.488 W
UKHO 8729	Unknown	Wreck	Unknown	53 32.595 N	0 17.206 E
UKHO 6688	Unknown	Wreck	Unknown	54 7.162 N	0 21.855 E
UKHO 9397	Unknown	Wreck	Unknown	53 39.801 N	1 2.839 E
UKHO 73084	Unknown	Wreck	Unknown	55 8.389 N	0 3.200 W
UKHO 71849	Unknown	Wreck	Unknown	55 33.994 N	0 13.928 W
UKHO 8779	Unknown	Wreck	Unknown	53 34.018 N	0 40.892 E
UKHO 93002	Unknown	Wreck	Unknown	53 39.277 N	0 51.165 E
UKHO 93003	Unknown	Wreck	Unknown	53 35.198 N	0 54.962 E
UKHO 93000	Unknown	Wreck	Unknown	53 40.889 N	0 40.925 E
UKHO 93007	Unknown	Wreck	Unknown	53 32.462 N	0 55.081 E
UKHO 92779	Unknown	Wreck	Unknown	53 32.630 N	0 54.883 E
UKHO 93006	Unknown	Wreck	Unknown	53 38.108 N	0 54.979 E
UKHO 93008	Unknown	Wreck	Unknown	53 37.39 N	0 57.508 E
UKHO 92785	Unknown	Wreck	Unknown	53 32.984 N	0 54.400 E
UKHO 4572	Unknown	Wreck	Unknown	55 8.158 N	0 0.507 W
UKHO 6610	Unknown	Wreck	Unknown	54 38.927 N	0 37.838 E
UKHO 4596	Unknown	Wreck	Unknown	55 18.96 N	0 5.600 W
UKHO 6666	Unknown	Wreck	Unknown	54 19.608 N	0 15.745 E
UKHO 6538	Unknown	Wreck	Unknown	54 52.758 N	0 20.057 E
UKHO 4698	Unknown	Wreck	Unknown	55 1.007 N	0 0.892 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 6596	Unknown	Wreck	Unknown	54 12.514 N	0 27.192 E
UKHO 8980	Unknown	Wreck	Unknown	53 58.016 N	0 54.888 E
UKHO 6603	Unknown	Wreck	Unknown	54 3.299 N	0 36.591 E
UKHO 9380	Unknown	Wreck	Unknown	53 55.017 N	0 59.889 E
UKHO 9105	Unknown	Wreck	Unknown	53 53.883 N	0 42.424 E
UKHO 6549	Unknown	Wreck	Unknown	54 49.708 N	0 2.259 E
UKHO 9358	Unknown	Wreck	Unknown	53 47.318 N	0 59.890 E
UKHO 6635	Unknown	Wreck	Unknown	54 34.630 N	0 11.413 E
UKHO 8925	Unknown	Wreck	Unknown	53 49.017 N	0 57.890 E
UKHO 8922	Unknown	Wreck	Unknown	53 48.017 N	0 49.390 E
UKHO 9135	Unknown	Wreck	Unknown	53 45.634 N	0 45.590 E
UKHO 8714	Unknown	Wreck	Unknown	53 32.135 N	0 16.279 E
UKHO 8713	Unknown	Wreck	Unknown	53 32.018 N	0 16.895 E
UKHO 8717	Unknown	Wreck	Unknown	53 32.185 N	0 16.446 E
UKHO 8997	Unknown	Wreck	Unknown	53 23.269 N	0 24.429 E
UKHO 8995	Unknown	Wreck	Unknown	53 30.485 N	0 31.461 E
UKHO 6682	Unknown	Wreck	Unknown	54 11.363 N	0 14.710 E
UKHO 6673	Unknown	Wreck	Unknown	54 13.763 N	0 14.959 E
UKHO 6684	Unknown	Wreck	Unknown	54 9.347 N	0 16.126 E
UKHO 6652	Unknown	Wreck	Unknown	54 29.711 N	0 16.475 E
UKHO 6643	Unknown	Wreck	Unknown	54 8.914 N	0 16.426 E
UKHO 6655	Unknown	Wreck	Unknown	54 28.578 N	0 13.125 E
UKHO 6644	Unknown	Wreck	Unknown	54 8.197 N	0 15.893 E
UKHO 6640	Unknown	Wreck	Unknown	54 32.778 N	0 15.792 E
UKHO 6642	Unknown	Wreck	Unknown	54 29.977 N	0 8.309 E
UKHO 6672	Unknown	Wreck	Unknown	54 13.813 N	0 13.260 E
UKHO 6683	Unknown	Wreck	Unknown	54 10.880 N	0 14.993 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 6557	Unknown	Wreck	Unknown	54 20.412 N	0 13.426 E
UKHO 67148	Unknown	Wreck	Unknown	53 34.003 N	0 29.895 E
UKHO 9356	Unknown	Wreck	Unknown	53 46.517 N	1 1.688 E
UKHO 9343	Unknown	Wreck	Unknown	53 34.819 N	1 0.191 E
UKHO 6719	Unknown	Wreck	Unknown	54 20.822 N	0 28.023 E
UKHO 6697	Unknown	Wreck	Unknown	54 28.612 N	0 36.990 E
UKHO 9371	Unknown	Wreck	Unknown	53 50.453 N	1 0.158 E
UKHO 6698	Unknown	Wreck	Unknown	54 24.630 N	0 38.540 E
UKHO 4575	Unknown	Wreck	Unknown	55 9.493 N	0 2.567 W
UKHO 6516	Unknown	Wreck	Unknown	54 16.513 N	0 16.892 E
UKHO 9155	Unknown	Wreck	Unknown	53 33.335 N	0 40.076 E
UKHO 9160	Unknown	Wreck	Unknown	53 33.985 N	0 36.993 E
UKHO 9159	Unknown	Wreck	Unknown	53 34.010 N	0 36.485 E
UKHO 9112	Unknown	Wreck	Unknown	53 52.199 N	0 28.742 E
UKHO 8888	Unknown	Wreck	Unknown	53 43.817 N	0 47.290 E
UKHO 9066	Unknown	Wreck	Unknown	53 40.119 N	0 30.929 E
UKHO 8941	Unknown	Wreck	Unknown	53 52.349 N	0 33.225 E
UKHO 9074	Unknown	Wreck	Unknown	53 23.036 N	0 20.229 E
UKHO 78151	Unknown	Wreck	Unknown	54 7.152 N	0 22.165 E
UKHO 9082	Unknown	Wreck	Unknown	53 52.516 N	0 26.892 E
UKHO 9113	Unknown	Wreck	Unknown	53 51.566 N	0 26.027 E
UKHO 9106	Unknown	Wreck	Unknown	53 53.083 N	0 25.443 E
UKHO 9108	Unknown	Wreck	Unknown	53 52.566 N	0 27.342 E
UKHO 9114	Unknown	Wreck	Unknown	53 51.550 N	0 25.560 E
UKHO 9116	Unknown	Wreck	Unknown	53 51.483 N	0 29.725 E
UKHO 9117	Unknown	Wreck	Unknown	53 51.483 N	0 31.825 E
UKHO 9118	Unknown	Wreck	Unknown	53 51.399 N	0 30.209 E
UKHO 9119	Unknown	Wreck	Unknown	53 51.383 N	0 26.827 E
UKHO 9120	Unknown	Wreck	Unknown	53 51.383 N	0 31.142 E
UKHO 9121	Unknown	Wreck	Unknown	53 50.866 N	0 28.476 E
UKHO 9125	Unknown	Wreck	Unknown	53 50.300 N	0 32.708 E
UKHO 9128	Unknown	Wreck	Unknown	53 48.783 N	0 29.410 E
UKHO 9130	Unknown	Wreck	Unknown	53 48.383 N	0 31.943 E
UKHO 9136	Unknown	Wreck	Unknown	53 44.834 N	0 26.327 E
UKHO 9129	Unknown	Wreck	Unknown	53 48.733 N	0 30.226 E
UKHO 9127	Unknown	Wreck	Unknown	53 48.783 N	0 34.025 E
UKHO 9143	Unknown	Wreck	Unknown	53 41.318 N	0 35.626 E
UKHO 67178	Unknown	Wreck	Unknown	53 43.634 N	0 34.125 E
UKHO 9140	Unknown	Wreck	Unknown	53 43.034 N	0 26.977 E
UKHO 67187	Unknown	Wreck	Unknown	53 43.017 N	0 46.890 E
UKHO 6709	Unknown	Wreck	Unknown	54 12.131 N	0 36.641 E
UKHO 9150	Unknown	Wreck	Unknown	53 33.285 N	0 40.926 E
UKHO 9145	SCOTIA (POSSIBLY)	Wreck	Unknown	53 37.599 N	0 47.341 E
UKHO 8848	Unknown	Wreck	Unknown	53 36.968 N	0 27.078 E
UKHO 8861	Unknown	Wreck	Unknown	53 39.276 N	0 28.587 E
UKHO 9122	Unknown	Wreck	Unknown	53 50.828 N	0 26.390 E
UKHO 80611	Unknown	Wreck	Unknown	53 36.885 N	0 23.935 E
UKHO 86593	Unknown	Wreck	Unknown	53 39.655 N	0 54.364 E
UKHO 8862	Unknown	Wreck	Unknown	53 39.423 N	0 25.342 E
UKHO 6584	Unknown	Wreck	Unknown	54 2.148 N	0 20.977 E
UKHO 6598	Unknown	Wreck	Unknown	54 2.215 N	0 23.360 E
UKHO 6685	Unknown	Wreck	Unknown	54 2.432 N	0 26.076 E
UKHO 9068	Unknown	Wreck	Unknown	53 52.216 N	0 26.227 E

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 8872	Unknown	Wreck	Unknown	53 41.007 N	0 33.358 E
UKHO 9039	Unknown	Wreck	Unknown	53 45.317 N	0 32.193 E
UKHO 6689	Unknown	Wreck	Unknown	54 8.964 N	0 25.925 E
UKHO 4707	Unknown	Wreck	Unknown	55 14.577 N	0 8.933 E
UKHO 9393	Unknown	Wreck	Unknown	53 40.801 N	1 0.039 E
UKHO 8655	Unknown	Wreck	Unknown	53 24.172 N	0 27.123 E
UKHO 6699	Unknown	Wreck	Unknown	54 27.087 N	0 26.932 E
UKHO 9043	Unknown	Wreck	Unknown	53 43.201 N	0 51.074 E
UKHO 9161	Unknown	Wreck	Unknown	53 32.494 N	0 37.446 E
UKHO 9067	Unknown	Wreck	Unknown	53 37.235 N	0 45.575 E
UKHO 6717	Unknown	Wreck	Unknown	54 24.162 N	0 15.637 E
UKHO 80614	Unknown	Wreck	Unknown	53 34.344 N	0 21.982 E
UKHO 81777	Unknown	Wreck	Unknown	53 28.523 N	0 16.349 E
UKHO 6720	Unknown	Wreck	Unknown	54 29.132 N	0 19.477 E
UKHO 6714	Unknown	Wreck	Unknown	54 30.787 N	0 17.40 E
UKHO 6708	Unknown	Wreck	Unknown	54 39.518 N	0 4.693 E
UKHO 8875	Unknown	Wreck	Unknown	53 41.467 N	0 26.127 E
UKHO 81775	Unknown	Wreck	Unknown	53 29.917 N	0 16.831 E
UKHO 81773	Unknown	Wreck	Unknown	53 29.885 N	0 15.725 E
UKHO 81774	Unknown	Wreck	Unknown	53 28.159 N	0 17.067 E
UKHO 81776	Unknown	Wreck	Unknown	53 22.408 N	0 18.783 E
UKHO 80609	Unknown	Wreck	Unknown	53 38.816 N	0 22.727 E
UKHO 80610	Unknown	Wreck	Unknown	53 38.881 N	0 22.675 E
UKHO 8867	Unknown	Wreck	Unknown	53 40.172 N	0 27.916 E
UKHO 67194	Unknown	Wreck	Unknown	53 44.267 N	0 28.143 E
UKHO 8640	Unknown	Wreck	Unknown	53 20.800 N	0 23.100 E
UKHO 8671	Unknown	Wreck	Unknown	53 28.519 N	0 36.044 E
UKHO 67288	Unknown	Wreck	Unknown	53 31.019 N	0 47.391 E
UKHO 93277	Unknown	Wreck	Unknown	53 22.927 N	0 38.433 E
UKHO 93238	Unknown	Wreck	Unknown	53 21.343 N	0 34.491 E
UKHO 8639	Unknown	Wreck	Unknown	53 20.537 N	0 36.436 E
UKHO 94455	Unknown	Wreck	Unknown	53 21.371 N	0 36.201 E
UKHO 94444	Unknown	Wreck	Unknown	53 20.354 N	0 31.288 E
UKHO 93634	Unknown	Wreck	Unknown	53 19.847 N	0 29.384 E
UKHO 9042	Unknown	Wreck	Unknown	53 31.934 N	0 47.750 E
UKHO 94757	Unknown	Wreck	Unknown	53 16.319 N	0 19.833 E
UKHO 9089	Unknown	Wreck	Unknown	53 29.732 N	0 52.151 E
UKHO 9156	Unknown	Wreck	Unknown	53 28.154 N	0 50.376 E
UKHO 9157	Unknown	Wreck	Unknown	53 27.776 N	0 50.126 E
UKHO 96344	Unknown	Wreck	Unknown	53 30.442 N	0 50.564 E
UKHO 97228	Unknown	Wreck	Unknown	53 36.380 N	0 19.539 E
UKHO 97884	Unknown	Wreck	Unknown	53 56.789 N	0 30.571 E
UKHO 101010	Unknown	Wreck	Unknown	53 57.442 N	0 30.233 E
UKHO 103434	Unknown	Wreck	Unknown	53 37.860 N	0 37.860 E
UKHO 93004	Unknown	Wreck	Unknown	53 37.969 N	0 55.813 E

Table 6.11.7: Known Wrecks in the Marine Archaeology Study Area (in Scottish Waters)

Identifier	Name	Type	Description	Latitude	Longitude
Canmore 372955	N/A	Wreck	Marine Craft (Period Unknown)	55 41.480 N	1 5.960 E
Canmore 372595	N/A	Wreck	Marine Craft (Period Unknown)	55 40.100 N	2 0.450 E

Table 6.11.8: Obstructions and Foul Ground in the Marine Archaeology Study Area (in Scottish Waters)

Identifier	Name	Type	Description	Latitude	Longitude
UKHO 101790	N/A	Obstruction	Foul Ground	56 51.797 N	0 48.277 W

Table 6.11.9: Recorded Losses in the Marine Archaeology Study Area (in Scottish Waters)

Identifier	Name	Description	Date Sunk
Canmore 313238	Scottish Queen	Steam Trawler	1915
Canmore 313790	Duva	Steamship	1926
Canmore 328826	Titan	Trawler	1916
Canmore 314131	Svein Jarl	Steel Steamship	1915

Table 6.11.10: Geophysical Anomalies in the Marine Archaeology Study Area (in Scottish Waters)

ID	Potential	Description	AEZ (m)	AEZ (type)	Longitude	Latitude
OS23_001	Low	Potential debris			56 51.8252 N	0 48.5659 W
OS23_002	Low	Potential debris			56 50.5489 N	0 36.7918 W
OS23_003	Low	Potential debris			56 50.7102 N	0 39.3584 W
OS23_004	Low	Potential debris			56 50.1405 N	0 37.9233 W
OS23_005	Low	Debris			56 48.3587 N	0 27.5326 W
OS23_006	Low	Potential debris			56 47.0828 N	0 23.1139 W
OS23_007	Low	Likely geological			56 47.1780 N	0 25.6849 W
OS23_008	Low	Potential debris			56 46.4848 N	0 39.9791 W
OS23_010	Low	Potential debris			56 47.2536 N	0 35.9374 W
OS23_011	Low	Potential debris			56 47.0986 N	0 33.3423 W
OS23_012	Low	Potential debris			56 45.8111 N	0 29.0936 W
OS23_013	Low	Seabed disturbance			56 45.9742 N	0 32.5932 W
OS23_014	Low	Potential debris			56 45.2199 N	0 37.3633 W
OS23_015	Low	Potential debris			56 44.8916 N	0 32.3829 W
OS23_016	Low	Potential debris			56 43.7949 N	0 23.7030 W
OS23_017	Low	Likely geological			56 43.3570 N	0 16.4064 W
OS23_018	Low	Chain, cable, or rope			56 44.0650 N	0 36.8239 W
OS23_019	Low	Likely geological			56 43.5922 N	0 29.0690 W
OS23_020	Low	Seabed disturbance			56 43.7568 N	0 22.5448 W
OS23_021	Low	Potential debris			56 43.3313 N	0 15.0346 W
OS23_022	Low	Fishing gear			56 43.5333 N	0 18.9526 W
OS23_023	Low	Likely geological			56 42.9505 N	0 18.4040 W
OS23_024	Low	Potential debris			56 42.0137 N	0 11.3928 W
OS23_025	Low	Chain, cable, or rope			56 41.6363 N	0 14.2207 W
OS23_026	Low	Potential debris			56 47.3975 N	0 29.1055 W
OS23_027	Low	Debris			56 47.2770 N	0 26.3433 W
OS23_028	Low	Likely geological			56 44.0365 N	0 26.5654 W
OS23_029	Low	Potential debris			56 47.7790 N	0 25.2808 W
OS23_030	Low	Potential debris			56 47.0611 N	0 32.6267 W
OS23_031	Low	Potential debris			56 41.2952 N	0 08.7675 W
OS23_032	Low	Chain, cable, or rope			56 41.247 N	0 08.3787 W
OS23_033	Low	Chain, cable, or rope			56 41.2248 N	0 08.3589 W
OS23_034	Low	Potential debris			56 46.0805 N	000 24.7274 W
OS23_035	Medium	Debris	50	Radius	56 42.6898 N	0 31.1357 W

ID	Potential	Description	AEZ (m)	AEZ (type)	Longitude	Latitude
OS23_036	Low	Potential debris			56 42.8280 N	0 24.8860 W
OS23_037	Medium	Debris	25	Extents	56 41.2856 N	0 17.0082 W
OS23_038	Low	Likely geological			56 39.8536 N	0 03.2211 W
OS23_039	Low	Chain, cable, or rope			56 39.6062 N	0 08.0985 W
OS23_040	Low	Potential debris			56 40.4868 N	0 31.4135 W
OS23_041	Low	Chain, cable, or rope			56 39.9080 N	0 11.9953 W
OS23_042	Low	Linear feature			56 38.6396 N	0 09.6517 W
OS23_043	Low	Likely geological			56 39.6405 N	0 25.8421 W
OS23_044	Low	Likely geological			56 39.1607 N	0 26.8072 W
OS23_045	Low	Chain, cable, or rope			56 36.9724 N	0 00.5514 W
OS23_047	Low	Chain, cable, or rope			56 37.6183 N	0 10.1825 W
OS23_048	Low	Chain, cable, or rope			56 38.0206 N	0 16.5002 W
OS23_049	Medium	Debris	25	Extents	56 38.3862 N	0 22.4163 W
OS23_050	Low	Likely geological			56 36.8328 N	0 07.2594 W
OS23_051	Low	Potential debris			56 36.5865 N	0 11.9056 W
OS23_052	Low	Likely geological			56 35.8870 N	0 09.9132 W
OS23_053	Low	Chain, cable, or rope			56 36.6060 N	0 29.5672 W
OS23_054	Low	Chain, cable, or rope			56 34.4736 N	0 20.6709 W
OS23_055	Low	Chain, cable, or rope			56 34.5999 N	0 23.5286 W
OS23_056	Low	Chain, cable, or rope			56 34.7290 N	0 24.7736 W
OS23_057	Low	Chain, cable, or rope			56 32.9727 N	0 13.9448 W
OS23_058	Low	Potential debris			56 32.7961 N	0 20.7194 W
OS23_059	Medium	Debris	25	Radius	56 32.5306 N	0 16.3647 W
OS23_060	Low	Chain, cable, or rope			56 31.8972 N	0 14.4684 W
OS23_061	Low	Likely geological			56 31.5674 N	0 19.1124 W
OS23_062	Medium	Debris	25	Extents	56 30.2109 N	0 22.8133 W
OS23_063	Low	Debris			56 50.5301 N	0 48.0566 W
OS23_064	Low	Likely geological			56 49.9242 N	0 47.2100 W
OS23_065	Low	Chain, cable, or rope			56 50.4531 N	0 46.3538 W
OS23_066	Low	Potential debris			56 50.2965 N	0 44.1579 W
OS23_067	Low	Seabed disturbance			56 50.6023 N	0 44.5943 W
OS23_068	Low	Chain, cable, or rope			56 51.9419 N	0 44.9652 W
OS23_069	Low	Chain, cable, or rope			56 51.8670 N	0 45.0554 W
OS23_070	Low	Chain, cable, or rope			56 51.27953877 N	0 43.7014 W
OS23_071	Low	Chain, cable, or rope			56 53.0663 N	0 43.1639 W
OS23_072	Low	Potential debris			56 48.2695 N	0 41.9163 W
OS23_073	Low	Debris			56 47.8803 N	0 42.0700 W
OS23_074	Low	Chain, cable, or rope			56 51.7997 N	0 40.6268 W

ID	Potential	Description	AEZ (m)	AEZ (type)	Longitude	Latitude
OS23_075	Low	Chain, cable, or rope			56 47.1655 N	0 40.2304 W
OS23_076	Low	Likely geological			56 47.8980 N	0 39.9328 W
OS23_077	Low	Potential debris			56 48.3998 N	0 39.5879 W
OS23_078	Low	Potential debris			56 48.6314 N	0 39.5679 W
OS23_079	Low	Chain, cable, or rope			56 51.1123 N	0 38.7815 W
OS23_080	Low	Chain, cable, or rope			56 50.6999 N	0 38.6628 W
OS23_082	Low	Potential debris			56 45.8805 N	0 38.6074 W
OS23_083	Low	Chain, cable, or rope			56 45.1111 N	0 38.5048 W
OS23_084	Medium	Debris	35	Radius	56 49.1091 N	0 36.7019 W
OS23_085	Low	Chain, cable, or rope			56 43.9960 N	0 37.5893 W
OS23_086	Low	Chain, cable, or rope			56 49.3680 N	0 35.9447 W
OS23_087	Low	Chain, cable, or rope			56 44.5311 N	0 36.0240 W
OS23_088	Low	Chain, cable, or rope			56 44.0983 N	0 35.8398 W
OS23_089	Low	Chain, cable, or rope			56 44.8804 N	0 34.6740 W
OS23_090	Low	Debris			56 42.0954 N	0 34.9418 W
OS23_091	Low	Likely geological			56 41.4670 N	0 34.2679 W
OS23_092	High	Potential wreck			56 52.7334 N	0 49.5279 W
OS23_093	Low	Chain, cable, or rope			56 50.9144 N	0 48.8070 W
OS23_094	Low	Debris			56 51.2818 N	0 41.8978 W
OS23_095	Low	Chain, cable, or rope			56 47.2805 N	0 40.7343 W
OS23_096	Low	Likely geological			56 42.4370 N	0 33.8568 W
OS23_097	Low	Likely geological			56 47.3116 N	0 32.2949 W
OS23_098	Low	Potential debris			56 49.1329 N	0 31.8729 W
OS23_099	Low	Chain, cable, or rope			56 43.9467 N	0 32.8779 W
OS23_100	Low	Chain, cable, or rope			56 43.9554 N	0 32.8996 W
OS23_101	Medium	Potential debris	25	Radius	56 49.3779 N	0 31.6088 W
OS23_102	Low	Chain, cable, or rope			56 47.6425 N	0 31.9404 W
OS23_103	Low	Potential debris			56 48.6609 N	0 31.3661 W
OS23_104	Low	Potential debris			56 41.4373 N	0 32.3982 W
OS23_105	Low	Chain, cable, or rope			56 43.5201 N	0 31.3361 W
OS23_106	Low	Chain, cable, or rope			56 45.5411 N	0 30.6708 W
OS23_107	Low	Chain, cable, or rope			56 43.1674 N	0 30.7432 W
OS23_108	Low	Chain, cable, or rope			56 48.2653 N	0 29.3917 W
OS23_109	Low	Chain, cable, or rope			56 44.2571 N	0 29.5593 W
OS23_110	Low	Chain, cable, or rope			56 40.8049 N	0 29.8965 W
OS23_111	Low	Chain, cable, or rope			56 39.3788 N	0 29.9449 W

ID	Potential	Description	AEZ (m)	AEZ (type)	Longitude	Latitude
OS23_112	Low	Chain, cable, or rope			56 40.5895 N	0 29.7933 W
OS23_113	Low	Chain, cable, or rope			56 39.3521 N	0 29.7753 W
OS23_114	Low	Chain, cable, or rope			56 39.3915 N	0 29.8672 W
OS23_115	Low	Chain, cable, or rope			56 48.1928 N	0 27.5069 W
OS23_116	Low	Linear feature			56 39.9098 N	0 28.8374 W
OS23_117	Low	Chain, cable, or rope			56 37.9046 N	0 28.8801 W
OS23_118	Low	Chain, cable, or rope			56 47.6308 N	0 26.9918 W
OS23_119	Medium	Debris	25	Extents	56 37.7691 N	0 28.5212 W
OS23_120	Low	Chain, cable, or rope			56 39.1949 N	0 28.2433 W
OS23_121	Low	Chain, cable, or rope			56 36.2272 N	0 28.4266 W
OS23_122	Low	Linear feature			56 38.6262 N	0 27.3549 W
OS23_123	Low	Linear feature			56 39.9323 N	0 26.9869 W
OS23_124	Low	Chain, cable, or rope			56 38.0485 N	0 27.2774 W
OS23_125	Low	Chain, cable, or rope			56 43.0346 N	0 26.0503 W
OS23_126	Low	Chain, cable, or rope			56 38.9112 N	0 26.7966 W
OS23_127	Low	Chain, cable, or rope			56 37.6955 N	0 26.9493 W

ID	Potential	Description	AEZ (m)	AEZ (type)	Longitude	Latitude
OS23_128	Low	Chain, cable, or rope			56 37.3182 N	0 26.4696 W
OS23_129	Low	Potential debris			56 35.7580 N	0 26.6333 W
OS23_130	Low	Linear feature			56 34.2844 N	0 26.7467 W
OS23_131	Low	Chain, cable, or rope			56 50.4462 N	0 32.1657 W
OS23_132	Low	Likely geological			56 43.1822 N	0 31.5638 W
OS23_133	Low	Potential debris			56 43.6921 N	0 30.5667 W
OS23_134	Low	Chain, cable, or rope			56 43.2259 N	0 30.6721 W
OS23_135	Low	Linear feature			56 41.2558 N	0 30.0577 W
OS23_136	Low	Chain, cable, or rope			56 42.8130 N	0 29.6411 W
OS23_137	Low	Chain, cable, or rope			56 38.7601 N	0 29.5017 W
OS23_138	Low	Chain, cable, or rope			56 47.9294 N	0 25.7896 W
OS23_139	Low	Linear feature			56 47.0480 N	0 25.8626 W
OS23_140	Low	Chain, cable, or rope			56 38.9010 N	0 27.5622 W
OS23_141	Low	Potential debris			56 40.6050 N	0 26.1559 W
OS23_142	Low	Chain, cable, or rope			56 44.3930 N	0 24.9920 W
OS23_143	Low	Chain, cable, or rope			56 42.9052 N	0 25.1896 W
OS23_144	Low	Linear feature			56 40.9185 N	0 25.4285 W

ID	Potential	Description	AEZ (m)	AEZ (type)	Longitude	Latitude
OS23_145	Low	Chain, cable, or rope			56 38.1628 N	0 25.4555 W
OS23_146	Low	Chain, cable, or rope			56 41.3648 N	0 24.5509 W
OS23_147	Low	Potential debris			56 33.8750 N	0 25.7519 W
OS23_148	Low	Chain, cable, or rope			56 39.9619 N	0 24.5152 W
OS23_149	Low	Likely geological			56 44.3745 N	0 23.1124 W
OS23_150	Low	Debris			56 40.5343 N	0 23.4958 W
OS23_151	Low	Potential debris			56 42.6061 N	0 22.6084 W
OS23_152	Low	Potential debris			56 39.0715 N	0 23.3378 W
OS23_153	Low	Linear feature			56 36.5878 N	0 23.6854 W
OS23_154	Low	Chain, cable, or rope			56 36.6919 N	0 23.6078 W
OS23_155	Low	Potential debris			56 37.7736 N	0 23.3602 W
OS23_156	Low	Linear feature			56 43.1701 N	0 22.2830 W
OS23_157	Low	Debris			56 37.4929 N	0 23.2696 W
OS23_158	Low	Potential debris			56 35.7883 N	0 23.6183 W
OS23_159	Low	Chain, cable, or rope			56 33.4816 N	0 24.1568 W
OS23_160	Low	Chain, cable, or rope			56 33.4291 N	0 24.1839 W
OS23_161	Low	Debris			56 37.4401 N	0 23.1599 W
OS23_162	Low	Chain, cable, or rope			56 41.3534 N	0 22.3331 W
OS23_163	Low	Chain, cable, or rope			56 45.0929 N	0 21.5136 W
OS23_164	Low	Potential debris			56 40.4860 N	0 21.8370 W
OS23_165	Low	Chain, cable, or rope			56 40.5499 N	0 21.8464 W
OS23_166	Low	Potential debris			56 41.1913 N	0 21.7918 W
OS23_167	Low	Potential debris			56 43.9951 N	0 21.0375 W
OS23_168	Medium	Potential debris	25	Radius	56 34.4638 N	0 22.7250 W
OS23_169	Low	Potential debris			56 36.7292 N	0 22.3084 W
OS23_170	Low	Chain, cable, or rope			56 45.4002 N	0 20.5606 W
OS23_171	Low	Chain, cable, or rope			56 35.3419 N	0 22.0033 W
OS23_172	Low	Chain, cable, or rope			56 35.4981 N	0 21.8819 W
OS23_173	Low	Chain, cable, or rope			56 29.4844 N	0 23.1533 W
OS23_174	Low	Potential debris			56 41.7245 N	0 20.4278 W
OS23_175	Low	Chain, cable, or rope			56 31.2935 N	0 22.5298 W
OS23_176	Low	Linear feature			56 33.5716 N	0 21.9500 W
OS23_177	Low	Likely geological			56 40.6643 N	0 20.4453 W
OS23_178	Low	Chain, cable, or rope			56 43.1887 N	0 19.9171 W
OS23_179	Low	Linear feature			56 43.4808 N	0 19.5731 W
OS23_180	Low	Chain, cable, or rope			56 37.6143 N	0 20.7545 W
OS23_181	Medium	Debris	50	Extents	56 34.5570 N	0 21.0965 W
OS23_182	Low	Potential debris			56 43.3441 N	0 19.2787 W
OS23_183	Low	Potential debris			56 40.8994 N	0 19.6864 W

ID	Potential	Description	AEZ (m)	AEZ (type)	Longitude	Latitude
OS23_184	Medium	Debris	25	Radius	56 44.4336 N	0 18.9754 W
OS23_185	Low	Potential debris			56 32.1155 N	0 21.2336 W
OS23_186	Low	Chain, cable, or rope			56 36.6490 N	0 19.9585 W
OS23_187	Low	Chain, cable, or rope			56 33.4234 N	0 20.6205 W
OS23_188	Low	Chain, cable, or rope			56 35.3403 N	0 19.9162 W
OS23_189	Low	Chain, cable, or rope			56 36.7703 N	0 19.6390 W
OS23_190	Low	Linear feature			56 38.5657 N	0 19.1852 W
OS23_191	Low	Debris			56 38.0030 N	0 19.0958 W
OS23_192	Low	Seabed disturbance			56 31.0913 N	0 20.0320 W
OS23_193	Low	Chain, cable, or rope			56 34.9378 N	0 19.1289 W
OS23_194	Low	Linear feature			56 35.0316 N	0 19.1092 W
OS23_195	Low	Chain, cable, or rope			56 31.4957 N	0 19.6302 W
OS23_196	Low	Chain, cable, or rope			56 43.5594 N	0 16.8711 W
OS23_197	Low	Chain, cable, or rope			56 32.6635 N	0 19.1631 W
OS23_198	Low	Chain, cable, or rope			56 35.2417 N	0 18.6683 W
OS23_199	Low	Linear feature			56 36.0714 N	0 18.4263 W
OS23_200	Low	Likely geological			56 38.5874 N	0 18.0034 W
OS23_201	Low	Chain, cable, or rope			56 42.6010 N	0 17.0800 W
OS23_202	Low	Potential debris			56 41.3279 N	0 16.9499 W
OS23_203	Low	Chain, cable, or rope			56 31.7973 N	0 18.9333 W
OS23_204	Low	Seabed disturbance			56 43.0657 N	0 16.4975 W
OS23_205	Low	Chain, cable, or rope			56 36.2874 N	0 17.7668 W
OS23_206	Low	Potential debris			56 40.9265 N	0 16.6545 W
OS23_207	Low	Potential debris			56 40.3406 N	0 16.6572 W
OS23_208	Low	Linear feature			56 31.8568 N	0 17.6146 W
OS23_209	Low	Chain, cable, or rope			56 40.0074 N	0 25.3911 W
OS23_210	Low	Potential debris			56 35.5747 N	0 24.3326 W
OS23_211	Low	Chain, cable, or rope			56 34.0520 N	0 22.6648 W
OS23_212	Medium	Debris	50	Extents	56 32.9003 N	0 22.8959 W
OS23_213	Low	Potential debris			56 39.1354 N	0 20.6301 W
OS23_214	Low	Chain, cable, or rope			56 40.0626 N	0 19.4600 W
OS23_215	Low	Potential debris			56 35.0325 N	0 19.3971 W
OS23_216	Low	Potential debris			56 33.2887 N	0 18.8611 W
OS23_217	Low	Chain, cable, or rope			56 36.9732 N	0 17.1409 W
OS23_218	Low	Chain, cable, or rope			56 42.9963	0 16.2455 W
OS23_219	Low	Chain, cable, or rope			56 42.4593 N	0 15.7514 W

ID	Potential	Description	AEZ (m)	AEZ (type)	Longitude	Latitude
OS23_220	Low	Chain, cable, or rope			56 40.6940 N	0 16.2048 W
OS23_221	Low	Chain, cable, or rope			56 39.1941 N	0 16.3042 W
OS23_222	Low	Potential debris			56 42.1695 N	0 15.5923 W
OS23_223	Low	Linear feature			56 32.8431 N	0 17.1469 W
OS23_224	Low	Potential debris			56 33.8314 N	0 16.9020 W
OS23_225	Low	Likely geological			56 37.8554 N	0 16.1796 W
OS23_226	Low	Chain, cable, or rope			56 41.8099 N	0 15.2660 W
OS23_227	Low	Fishing gear			56 37.0961 N	0 15.8497 W
OS23_228	Low	Potential debris			56 37.8369 N	0 15.5041 W
OS23_229	Low	Chain, cable, or rope			56 40.0706 N	0 14.8631 W
OS23_230	Low	Chain, cable, or rope			56 39.9855 N	0 14.8538 W
OS23_231	Low	Chain, cable, or rope			56 40.3551 N	0 14.5830 W
OS23_232	Low	Linear feature			56 33.2069 N	0 15.7583 W
OS23_233	Low	Potential debris			56 32.8106 N	0 15.8098 W
OS23_234	Low	Chain, cable, or rope			56 35.9129N	0 14.7437 W
OS23_235	Low	Likely geological			56 35.1445 N	0 14.7357 W
OS23_236	Low	Chain, cable, or rope			56 32.0183 N	0 15.0441 W
OS23_237	Low	Chain, cable, or rope			56 35.3252 N	0 14.1418 W

ID	Potential	Description	AEZ (m)	AEZ (type)	Longitude	Latitude
OS23_238	Low	Potential debris			56 35.3033 N	0 13.8684 W
OS23_239	Low	Potential debris			56 35.2941N	0 13.9422 W
OS23_240	Low	Potential debris			56 31.3059 N	0 14.5316 W
OS23_241	Low	Debris			56 31.6324 N	0 14.4772 W
OS23_242	Low	Likely geological			56 35.6489 N	0 12.9137 W
OS23_243	Low	Chain, cable, or rope			56 38.5638 N	0 12.0005 W
OS23_244	Low	Chain, cable, or rope			56 39.1525 N	0 11.5743 W
OS23_245	Low	Chain, cable, or rope			56 32.0259 N	0 13.0457 W
OS23_246	Low	Chain, cable, or rope			56 36.8609 N	0 11.7319 W
OS23_247	Low	Chain, cable, or rope			56 33.4503 N	0 11.7040 W
OS23_248	Medium	Debris	35	Radius	56 37.9553 N	0 10.8463 W
OS23_249	Low	Chain, cable, or rope			56 35.6575 N	0 11.3274 W
OS23_250	Low	Chain, cable, or rope			56 36.3205 N	0 10.6971 W
OS23_251	Low	Chain, cable, or rope			56 35.7427 N	0 10.7230 W
OS23_252	Low	Likely geological			56 34.7007 N	0 10.2573 W
OS23_253	Low	Chain, cable, or rope			56 37.9981 N	0 09.3646 W
OS23_254	Low	Chain, cable, or rope			56 38.6489 N	0 09.1290 W
OS23_255	Low	Chain, cable, or rope			56 35.1549 N	0 09.3591 W

ID	Potential	Description	AEZ (m)	AEZ (type)	Longitude	Latitude
OS23_256	Low	Chain, cable, or rope			56 37.1652 N	0 08.7568 W
OS23_257	Low	Linear feature			56 36.2156 N	0 08.6454 W
OS23_258	Low	Chain, cable, or rope			56 39.0298 N	0 07.6531 W
OS23_259	Low	Chain, cable, or rope			56 35.9869 N	0 07.8963 W
OS23_260	Low	Chain, cable, or rope			56 40.6134 N	0 14.4205 W
OS23_261	Low	Chain, cable, or rope			56 37.8418 N	0 13.9139 W
OS23_262	Low	Potential debris			56 35.7765 N	0 13.3615 W
OS23_263	Low	Chain, cable, or rope			56 33.1617 N	0 11.9176 W
OS23_264	Low	Chain, cable, or rope			56 40.8763 N	0 09.3815 W
OS23_265	Low	Chain, cable, or rope			56 34.5275 N	0 09.6974 W
OS23_266	Low	Chain, cable, or rope			56 38.5602 N	0 07.9714 W
OS23_267	Low	Likely geological			56 40.2724 N	0 06.9398 W
OS23_268	Low	Chain, cable, or rope			56 41.0108 N	0 06.2562 W
OS23_269	Low	Chain, cable, or rope			56 38.1973 N	0 05.8775 W
OS23_270	Low	Chain, cable, or rope			56 35.8300 N	0 05.6959 W
OS23_271	Low	Chain, cable, or rope			56 35.8793 N	0 05.7536 W
OS23_272	Low	Potential debris			56 39.0941 N	0 04.7133 W
OS23_273	Low	Likely geological			56 36.8306 N	0 05.1870 W
OS23_274	Low	Debris			56 39.9860 N	0 04.4318 W
OS23_275	Low	Chain, cable, or rope			56 38.5369 N	0 04.5289 W
OS23_276	Low	Chain, cable, or rope			56 35.9309 N	0 05.1851 W
OS23_277	Low	Chain, cable, or rope			56 35.3533 N	0 04.1418 W
OS23_278	Low	Potential debris			56 35.1585 N	0 02.4926 W
OS23_279	Low	Chain, cable, or rope			56 35.5773 N	0 02.7673 W
OS23_280	Medium	Debris	35	Radius	56 37.6834 N	0 01.9727 W
OS23_281	Low	Linear feature			56 37.4776 N	0 02.0076 W
OS23_282	Low	Chain, cable, or rope			56 37.3294 N	0 02.1408 W
OS23_283	Low	Chain, cable, or rope			56 35.5595 N	0 01.8021 W
OS23_284	Low	Chain, cable, or rope			56 38.9129 N	0 01.9865 W
OS23_285	Low	Potential debris			56 35.4308 N	0 00.1757 W
OS23_286	Low	Chain, cable, or rope			56 36.0388 N	0 00.0270 E
OS23_287	Low	Chain, cable, or rope			56 35.7639 N	0 00.2268 E
OS23_288	Low	Potential debris			56 34.3672 N	0 01.9835 E
OS23_289	Low	Chain, cable, or rope			56 35.0868 N	0 02.2326 E
OS23_290	Low	Debris			56 50.3136 N	0 46.4386 W

ID	Potential	Description	AEZ (m)	AEZ (type)	Longitude	Latitude
OS23_291	Low	Chain, cable, or rope			56 51.5340 N	0 43.4341 W
OS23_292	Low	Chain, cable, or rope			56 48.1447 N	0 40.7236 W
OS23_293	Low	Potential debris			56 53.0953 N	0 38.4089 W
OS23_294	Low	Debris			56 36.6032 N	0 13.9847 W
OS23_295	Low	Chain, cable, or rope			56 37.2848 N	0 08.5604 W
OS23_296	Low	Potential debris			56 39.9531 N	0 07.3750 W
OS23_297	Low	Chain, cable, or rope			56 44.3595 N	0 35.9516 W
OS23_298	Low	Potential debris			56 48.8793 N	0 34.0492 W
OS23_299	Low	Linear feature			56 49.3533 N	0 33.7874 W
OS23_300	Low	Potential debris			56 45.4407 N	0 32.9051 W
OS23_301	Low	Chain, cable, or rope			56 43.2402 N	0 33.3537 W
OS23_302	Low	Chain, cable, or rope			56 43.1942 N	0 33.3493 W
OS23_303	Low	Chain, cable, or rope			56 42.8757 N	0 33.4946 W
OS23_304	Low	Chain, cable, or rope			56 51.3634 N	0 35.9624 W
OS23_305	Low	Potential debris			56 49.0658 N	0 30.8753 W
OS23_306	Low	Potential debris			56 49.0702 N	0 30.8766 W
OS23_307	Low	Potential debris			56 41.7911 N	0 30.5396 W
OS23_308	Low	Potential debris			56 38.5996 N	0 03.9483 W
OS23_309	Low	Linear feature			56 37.5167 N	0 00.4219 W
OS23_310	Low	Chain, cable, or rope			56 42.6974 N	0 27.2191 W
OS23_311	Low	Chain, cable, or rope			56 42.6091 N	0 27.1446 W
OS23_312	High	Wreck	150	Extents	56 36.5408 N	0 00.8002 E
OS23_313	Low	Chain, cable, or rope			56 42.7893 N	0 25.1615 W
OS23_314	High	Wreck	50	Extents	56 46.8086 N	0 29.9848 W
OS23_315	Low	Chain, cable, or rope			56 42.3917 N	0 23.3112 W
OS23_316	Low	Linear feature			56 37.3292 N	0 24.3738 W
OS23_317	Low	Chain, cable, or rope			56 37.2183 N	0 23.8146 W
OS23_318	Low	Chain, cable, or rope			56 42.9040 N	0 20.5621 W
OS23_319	Low	Potential debris			56 45.8460 N	0 20.0898 W
OS23_320	Low	Potential debris			56 30.2207 N	0 21.2900 W
OS23_321	Low	Linear feature			56 35.9097 N	0 19.4280 W
OS23_322	Low	Likely geological			56 30.1788 N	0 20.3224 W
OS23_323	Low	Potential debris			56 41.5266 N	0 17.6728 W
OS23_324	Low	Chain, cable, or rope			56 32.6478 N	0 20.9700 W
OS23_325	Low	Potential debris			56 32.3257 N	0 18.0875 W
OS23_326	Low	Debris			56 52.6557 N	0 41.4125 W
OS23_327	Low	Debris			56 43.9387 N	0 26.9350 W