



# Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects

Environmental Statement

## **Volume 1**

## Chapter 16 - Petroleum Industry and Other Marine Users

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Prepared by:	
<b>Royal HaskoningDHV</b>	
Approved by:	Date:
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## Volume 3

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## Glossary of Acronyms

AfL	Agreement for Lease
AIS	Automatic Identification System
ARA	Airborne Radar Approaches
BEIS	Department for Business, Energy and Industrial Strategy
BMAPA	British Marine Aggregate Producers Association
CAA	Civil Aviation Authority
CAT	Commercial Air Transport
Cefas	Centre for Environment Fisheries and Aquaculture Science
CIA	Cumulative Impact Assessment
CTV	Crew Transfer Vessel
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
DEL	Dudgeon Extension Limited
DEP	Dudgeon Offshore Wind Farm Extension Project
DML	Deemed Marine Licence
DOW	Dudgeon Offshore Wind Farm
EEA	European Economic Area
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIFCA	Eastern Inshore Fisheries & Conservation Authority
EPP	Evidence Plan Process
ERRV	Emergency Response and Rescue Vessel
ES	Environmental Statement
ESCA	European Subsea Cable UK Association
FSA	Formal Safety Assessment
ft	feet
GBS	Gravity Base Structure
GW	gigawatt
HDD	Horizontal Directional Drilling
HLV	Heavy Lift Vessel
HVAC	High Voltage Alternating Current
IMC	Instrument Meteorological Conditions

IMO	International Maritime Organisation
IOG	Independent Oil and Gas
ICPC	The International Cable Protection Committee
IPMP	In-Principle Monitoring Plan
km	kilometer
m	meter
MCA	Maritime and Coastguard Agency
MCZ	Marine Conservation Zone
MGN	Marine Guidance Note
MMO	Marine Management Organisation
MoD	Ministry of Defence
MRV	Multi Role Vessel
MW	Megawatts
NE	Natural England
NGI	Norwegian Geotechnical Institute
NM	Nautical Miles
NNDC	North Norfolk District Council
NRA	Navigation Risk Assessment
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
NUI	Normally Unmanned Installation
O&G	Oil and Gas
O&M	Operation and Maintenance
OGA	Oil and Gas Authority
OSP	Offshore Substation Platform
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
OWF	Offshore Windfarm
PEIR	Preliminary Environmental Information Report
POB	Personnel on Board
RLB	Red Line Boundary
RYA	Royal Yachting Association
SAR	Search and Rescue
SEL	Scira Extension Limited

SEP	Sheringham Shoal Offshore Wind Farm Extension Project
UK	United Kingdom
SOW	Sheringham Shoal Offshore Wind Farm
TWA	Temporary Works Area
UXO	Unexploded Ordinance
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions

## Glossary of Terms

Order Limits	The area subject to the application for development consent, including all permanent and temporary works for SEP and DEP.
Dudgeon Offshore Wind Farm Extension Project (DEP)	The Dudgeon Offshore Wind Farm Extension onshore and offshore sites including all onshore and offshore infrastructure.
DEP offshore site	The Dudgeon Offshore Wind Farm Extension consisting of the DEP wind farm site, interlink cable corridors and offshore export cable corridor (up to mean high water springs).
DEP North array area	The wind farm site area of the DEP offshore site located to the north of the existing Dudgeon Offshore Wind Farm
DEP South array area	The wind farm site area of the DEP offshore site located to the south of the existing Dudgeon Offshore Wind Farm
DEP wind farm site	The offshore area of DEP within which wind turbines, infield cables and offshore substation platform/s will be located and the adjacent Offshore Temporary Works Area. This is also the collective term for the DEP North and South array areas.
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach, and information to support, the EIA and HRA for certain topics.
Grid option	Mechanism by which SEP and DEP will connect to the existing electricity network. This may either be an integrated grid option providing transmission infrastructure which serves both of the wind farms, or a separated grid option, which allows SEP and DEP to transmit electricity entirely separately.
Horizontal directional drilling (HDD) zones	The areas within the onshore cable route which would house HDD entry or exit points.
Infield cables	Cables which link the wind turbine generators to the offshore substation platform(s).
Interlink cables	Cables linking two separate project areas. This can be cables linking: <ul style="list-style-type: none"> <li>1) DEP South array area and DEP North array area</li> <li>2) DEP South array area and SEP</li> <li>3) DEP North array area and SEP</li> </ul>



	<p>1 is relevant if DEP is constructed in isolation or first in a phased development.</p> <p>2 and 3 are relevant where both SEP and DEP are built.</p>
Interlink cable corridor	This is the area which will contain the interlink cables between offshore substation platform/s and the adjacent Offshore Temporary Works Area.
Landfall	The point at the coastline at which the offshore export cables are brought onshore, connecting to the onshore cables at the transition joint bay above mean high water.
Offshore cable corridor	An area which will contain cables outside of a wind farm site(s), either interlink cables or offshore export cables.
Offshore export cable corridor	This is the area which will contain the offshore export cables between offshore substation platform/s and landfall, including the adjacent Offshore Temporary Works Area.
Offshore export cables	The cables which would bring electricity from the offshore substation platform(s) to the landfall (220 – 230kV).
Offshore substation platform (OSP)	A fixed structure located within the wind farm area, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore.
Offshore Temporary Works Area	An Offshore Temporary Works Area within the DCO order limits in which vessels are permitted to carry out activities during construction, operation and decommissioning encompassing a 200m buffer around the wind farm sites and a 750m buffer around the offshore cable corridors. No permanent infrastructure would be installed within the Offshore Temporary Works Area.
Sheringham Shoal Offshore Wind Farm Extension Project (SEP)	The Sheringham Shoal Offshore Wind Farm Extension onshore and offshore sites including all onshore and offshore infrastructure.
SEP wind farm site	The offshore area of SEP within which wind turbines, infield cables and offshore substation platform/s will be located and the adjacent Offshore Temporary Works Area.

Study area	Area where potential impacts from the project could occur, as defined for each individual Environmental Impact Assessment (EIA) topic.
The Applicant	Equinor New Energy Limited

## 16 PETROLEUM INDUSTRY AND OTHER MARINE USERS

### 16.1 Introduction

1. This chapter of the Environmental Statement (ES) describes the potential impacts of the proposed Sheringham Shoal Offshore Wind Farm Extension Project (SEP) and Dudgeon Offshore Wind Farm Extension Project (DEP) on petroleum industry and other marine users including existing and planned offshore infrastructure. The chapter provides an overview of the existing environment for the proposed offshore sites, followed by an assessment of the potential impacts and associated mitigation for the construction, operation, and decommissioning phases of SEP and DEP.
2. This chapter has been written by Royal Haskoning DHV, with the assessment undertaken with specific reference to the relevant legislation and guidance, of which the primary source are the National Policy Statements (NPS). Details of these, and the methodology used for the Environmental Impact Assessment (EIA) and Cumulative Impact Assessment (CIA), are presented in **Chapter 5 EIA Methodology** and **Section 16.4**. Helicopter and vessel access studies have also been undertaken (**Appendix 16.1** and **Appendix 16.2**) by Anatec Limited (Anatec) to inform the assessment of potential access interference with oil and gas operators and are referred to in the chapter.
3. Activities and users considered include those associated with the petroleum industry (also defined as the offshore Oil and Gas (O&G) industry) including platforms, and subsea infrastructure including pipelines; other offshore wind infrastructure; telecommunications cables and interconnector cables; marine aggregate extraction; disposal sites; aquaculture and recreational activities.
4. The assessment should be read in conjunction with the following linked chapters:
  - **Chapter 12 Commercial Fisheries;**
  - **Chapter 13 Shipping and Navigation;** and
  - **Chapter 15 Aviation and Radar.**
5. Additional information to support the petroleum industry and other marine users assessment includes:
  - **Appendix 16.1 Vessel Access Study;** and
  - **Appendix 16.2 Helicopter Access Study.**

### 16.2 Consultation

6. Consultation with regard to petroleum industry and other marine users has been undertaken in line with the general process described in **Chapter 5 EIA Methodology** and the **Consultation Report** (document reference 5.1). The key elements to date have included scoping, consultation undertaken as part of the ongoing Evidence Plan Process (EPP), including targeted consultation with stakeholders with assets in proximity to SEP and DEP and Preliminary Environmental Information Report (PEIR) consultation.

7. The feedback received throughout this process has been considered in preparing the ES. This chapter has been updated following consultation in order to produce the final assessment submitted within the Development Consent Order (DCO) application. **Table 16-1** provides a summary of how the consultation responses received to date relevant to this topic, and details of how the Project team has had regard to each comment and how these have been addressed within this chapter.
8. The consultation process is described further in **Chapter 5 EIA Methodology**. Full details of the consultation process is presented in the **Consultation Report** (document reference 5.1), which has been submitted as part of the DCO application.

**Table 16-1: Consultation Responses**

Consultee	Date	Comment Received	Project Response
<b>Scoping Responses</b>			
The Planning Inspectorate	19/11/19	<p>The Scoping Report proposes to scope out potential interference with other wind farms, however, it explains that the proposed export cable corridor options are likely to cross over the existing Dudgeon export cables and the Hornsea Project Three offshore wind farm (if consented).</p> <p>The Inspectorate welcomes that crossing agreements will be sought with cable owners and operators and appropriate installation and protection measures developed. The Inspectorate considers that any likely significant effects should be assessed in the ES.</p>	<p>The impact on subsea cables associated with other offshore wind farms is assessed in <a href="#">Section 16.6</a>.</p> <p>See also <a href="#">Section 16.5.4</a> for details of other offshore wind farms considered.</p>
The Planning Inspectorate	19/11/19	<p>Further consultation is proposed to identify potential sensitive receptors; therefore, the Inspectorate considers that the ES should assess potential impacts to telecommunication cables and interconnectors where significant effects are likely.</p>	<p>The impact on subsea cables and pipelines has been scoped into this assessment and is addressed in <a href="#">Section 16.6</a>.</p>
The Planning Inspectorate	19/11/19	<p>On the basis that there is no overlap of known aggregate licence areas or disposal sites with the extension areas or export cable corridors, the Scoping Report scopes out an assessment of effects. However, section 2.13.3 of the Scoping Report proposes that the ES will identify aggregate sites and disposal sites in the baseline environment. Should the desk-based assessment identify any previously unknown disposal sites or aggregate sites, the ES should assess any likely significant effects to these receptors that could arise from the Proposed Development.</p> <p>The Inspectorate welcomes that any impacts from proposed dredger transit activities will be assessed as part the Shipping and Navigation aspect.</p>	<p>No additional disposal sites or aggregate sites have been identified since the publication of the Scoping Report. <a href="#">Figure 16.5</a> shows that there are no disposal sites or aggregate sites within the wind farm sites or proposed offshore cable corridors.</p> <p>Impacts associated with dredger transits are addressed in <a href="#">Chapter 13 Shipping and Navigation</a>.</p>

Consultee	Date	Comment Received	Project Response
The Planning Inspectorate	19/11/19	<p>The Scoping Report states that detailed geophysical survey and investigation would identify any UXO and measures would be taken to mitigate risks of detonation. The Scoping Report considers this is a health and safety risk rather than being an environmental issue and notes that potential impacts to other receptors will be assessed where relevant (e.g. fish and marine mammal ecology).</p> <p>The EIA Regulations 2017 require an assessment of the likely significant effects to population and health, and resulting from the vulnerability of the Proposed Development to risks of major accidents and/or disasters.</p>	The potential impact on population and health from UXO is addressed in <b>Chapter 28 Health</b> .
The Planning Inspectorate	19/11/19	The Inspectorate considers that given the location of the Proposed Development, significant transboundary effects to other marine users are unlikely and that this matter can be scope out of the ES. This is on the basis that transboundary impacts on commercial fishing and shipping and navigation are assessed in their respective aspect chapters.	Transboundary effects have been assessed in <b>Chapter 12 Commercial Fisheries</b> and <b>Chapter 13 Shipping and Navigation</b> in line with the Planning Inspectorate's recommendations.
<b>Section 42 Responses</b>			
Independent Oil and Gas (IOG)	10/06/2021	<p>The Blythe development includes a normally unmanned offshore production platform with a single production well drilled from the platform. A single subsea well will also be developed on the Elgood field, to the north-west of the Blythe installation, and will be tied back to the platform via a 9.1km 6" subsea gas flowline and umbilical. Gas export from the Blythe platform will be via a 24.5km 12" gas export pipeline that connects to the Thames (Southwark) 24" gas export pipeline to the south of the Dudgeon Extension Project (North). The developments remain on schedule, with the Blythe platform successfully installed in June 2021, and the Noble Hans Deul jack up rig currently on location at the Elgood gas field, drilling the 48/22c-7 well. First-gas from the Blythe and Elgood gas fields is anticipated late in Q3 2021.</p>	Noted. Consideration has been given to both Blythe and Elgood within the assessment ( <b>Section 16.5.1 and Section 16.6</b> )

Consultee	Date	Comment Received	Project Response
IOG	10/06/2021	Line of sight communication is currently in place between the Blythe platform and the Bacton gas terminal. We would appreciate confirmation that this line of communication remains in place and unobstructed by any individual wind turbines of the Dudgeon Extension Project. IOG would be open to discussing alternative communication systems, such as the use of existing optical fibre, that may already be planned by Equinor for its own communication requirements.	Line of sight communications between the Blythe platform and Bacton gas terminal will be maintained and incorporated into the final layout design. The turbine layout will be finalised post-consent.
IOG	10/06/2021	The appropriate crossing agreements will be required between IOG and Equinor should any of our asset infrastructure be crossed, for instance, inter-turbine (array) cables across gas export pipelines and umbilicals. Any activity undertaken within the Blythe platform 500m zone, the Elgood well 500m zone, or within the safety zones of the gas export pipelines, will also require an appropriate proximity agreement prior to works execution.	Noted. The Applicant will seek to secure crossing and proximity agreements with owners and operators of asset infrastructure where required prior to construction.
IOG	10/06/2021	IOG is keen to support the United Kingdom (UK) Government's Net Zero emissions target, and undertake its activities in line with the Oil and Gas Authority (OGA) Strategy, so legislated for under the Petroleum Act 1998. IOG is keen to discuss how the presence of the Dudgeon Extension Project may provide an opportunity for asset electrification, via offshore substations (where present) or direct from wind turbine. IOG would like to understand if the Dudgeon Extension Project will include such elements that do not preclude access to offshore wind energy that could support other offshore stakeholders in the future.	The Applicant has currently not planned for external asset electrification but is willing to discuss and explore its feasibility and economics.
North Norfolk District Council (NNDC)	10/06/2021	NNDC would defer to the advice of the other experts in respect of matters within this Chapter of the PEIR particularly concerning existing infrastructure.	Noted. The Applicant has and continues to consult with the relevant operators of nearby assets with regards to impacts on existing infrastructure. This has included dedicated assessments of marine and helicopter access to the assets ( <a href="#">Appendix 16.1</a> and <a href="#">Appendix 16.2</a> ).

Consultee	Date	Comment Received	Project Response
Natural England (NE)	10/06/2021	<p>There is a potential clash with the timelines of DEP &amp; SEP and Planned Blythe Hub surface and subsea infrastructure which is located near to the DEP Offshore Windfarm . Its pipeline will route directly north of DEP (S), stopping S of DEP (N). This raises the prospect of in-combination issues. Elgood is the first of five planned development wells in IOG's Phase 1 project and is expected to take approx. three months to drill and complete, after which the rig will move on to Blythe in early Q3. The production of 'first gas' is scheduled for Q3 2021. The assessment should consider the implications of a potential clash with construction and/or O&amp;M activities for the Blythe Hub and subsea infrastructure near DEP OWF.</p>	<p>The Applicant has consulted with IOG who advised that the Blythe platform was successfully installed in June 2021, and that the Noble Hans Deul jack up rig was on location at the Elgood gas field in June 2021. The projects remain on schedule with flow testing undertaken in Q3 2021. The earliest commencement of construction activities for SEP and DEP are not planned until 2025.</p> <p>Consideration has been given to the potential operational impacts to both Blythe and Elgood within the assessment (<a href="#">Section 16.5.1</a> and <a href="#">Section 16.6</a>) and within the access studies (<a href="#">Appendix 16.1</a> and <a href="#">Appendix 16.2</a>).</p>
NE	10/06/2021	<p>There is a concentration of pipelines to the east of DEP and SEP, linking southern North Sea gas fields to the Bacton Gas Terminal on the Norfolk Coast. The most easterly of these pipelines traverse the DEP South array area wind farm site. They are the Perenco operated Lancelot to Bacton gas export pipeline (PL876), the Bacton to Lancelot chemical pipeline (PL877) and the Shell operated Shearwater to Bacton gas pipeline (PL1570).</p> <p>The Durango to Waveney gas production pipeline, operated by Perenco, also traverses the DEP North array area wind farm site. Gas pipeline PL27, linking the Viking gas field in the east and the Threddlethorpe Gas Terminal on the Lincolnshire coast.</p> <p>The assessment should consider whether O&amp;M activities will be needed for the pipelines which traverse the DEP sites and identify any potential in-combination effects.</p>	<p>Noted.</p> <p>Consultation is ongoing with relevant O&amp;G stakeholders.</p> <p>Gas pipelines PL876, PL877 and PL1570 have been considered within the CIA.</p> <p>Gas pipeline PL27 was approved for decommissioning in 2019. PL27 is out of use but remains in-situ. PL27 routes parallel to, and approximately 500m north of the northern boundary of the DEP North array area and is no longer in use and as such has been excluded from the CIA.</p>



Consultee	Date	Comment Received	Project Response
			It is also noted that a dedicated marine access study ( <a href="#">Appendix 16.1</a> ) has been undertaken that includes consideration of pipelines within or near the wind farm sites.
NE	10/06/2021	Volume 1 Chapter 17 Petroleum Industry and Other Marine Users Section 18.5.3 Point 46 Last sentence does not make sense	Noted. Sentence clarified.
NE	10/06/2021	DEP and SEP overlap with an area identified as a High Potential Aggregate Resource (AGG3 zone). This area is covered by Policy AGG3 in the East Inshore and East Offshore Marine Plans (2014). The site is not a licensed aggregate extraction area itself. This will need to be considered in the ES.	Zone AGG3 has been identified in <a href="#">Section 16.5.6</a> . It is noted that an Agreement for Lease (AFL) has been granted by The Crown Estate for SEP and DEP which takes precedence over any future potential aggregate extraction that may have occurred within the AFL areas. See also <a href="#">Section 16.5.6</a> .
NE	10/06/2021	PEIR Section 18.12 Table 18-15 (Construction, Operation and Decommissioning Phases) Impact 1 & Impact 3 are dependent upon Equinor reaching an agreement with operators as part of the embedded mitigation – residual impact to be confirmed for the former and is described as minor adverse for the latter.  There is the potential risk that an agreement cannot be reached with the other operators. This should inform the worst case scenario.	Noted.  <a href="#">Table 16-16</a> has been re-worded to clarify distinction between embedded and additional mitigation measures.  Impact 3 pre-mitigation impact is minor.  It is noted that marine and helicopter access studies <a href="#">Appendix 16.1</a> and <a href="#">Appendix 16.2</a> have been undertaken to inform Impact 1, and that consultation is ongoing with the relevant operators.
Eastern Inshore Fisheries &	10/06/2021	The Marine Management Organisation (MMO) document “Spatial trends in aquaculture potential in the South and East inshore and offshore marine plan areas” (2013) seems to identify locations within	A review of future trends including aquaculture potential is presented in <a href="#">Section 16.5.11</a> .

Consultee	Date	Comment Received	Project Response
Conservation Authority (EIFCA)		the area likely to be affected by the proposed project as offering potential for a range of aquaculture activities - lobster re-stocking (Fig 5), rope grown bivalve shellfish culture (Fig. 21), macro-algae culture production (Fig. 23) and marine finfish cage culture (Fig. 27). We could not find reference to examination of the potential interactions between the proposed project and features such as would support such aquaculture activities, and request that this be supplied.	
<b>Access Studies Consultation</b>			
Boston Putford	06/10/2020	The proposed NE and SE corners of the DEP wind farm site impact the passage between Great Yarmouth and the LAPS Field and passage would need to be adjusted to pass east of Lancelot.	Impacts to vessel access including required deviations are assessed within the vessel access study in <a href="#">Appendix 16.1</a> and <a href="#">Section 16.6</a> .
Boston Putford	06/10/2020	Concern over the extent to which the extension would narrow the approach to the Outer Dowsing Channel between the two wind farms.	Further information and an assessment of sea room is contained within <a href="#">Chapter 13 Shipping and Navigation</a> and <a href="#">Appendix 13.1</a> .
Boston Putford	06/10/2020	The regular support vessel for the Waveney platform presently uses the Dudgeon light buoy area as a main waypoint, whereby the vessel's course is altered to pass between Cromer Knoll Bank & the Outer Dowsing Bank before proceeding to Waveney or the other LAPS Fields. The proposed Dudgeon extension to the NW would close off this route.	Deviation impacts are assessed within <a href="#">Section 16.6.2</a> and detailed in the vessel access study in <a href="#">Appendix 16.1</a> ,
Boston Putford	06/10/2020	Unlikely vessels would consider choosing a passage through the array of structures without prior extensive risk assessments completed by asset operator.	It has been assumed that O&G vessels will not enter the wind farm sites for the purposes of the deviation assessment ( <a href="#">Appendix 16.1</a> ).
Boston Putford	06/10/2020	Changes to passage planning to Waveney caused by DEP will not have a major cost element or at least no more than changes to passage planning due to other factors, e.g., weather conditions.	Noted.

Consultee	Date	Comment Received	Project Response
Perenco	01/02/2021	Production from Waveney may continue until 2025.	Noted.
Perenco	01/02/2021	Concerns regarding displacement of shipping lanes.	Deviation impacts are assessed within <a href="#">Section 16.6.2</a> and detailed in <a href="#">Appendix 16.1</a> . Further information and an assessment of sea room is provided within <a href="#">Chapter 13 Shipping and Navigation</a> and <a href="#">Appendix 13.1</a> .
Perenco	01/02/2021	No decommissioning plans at present for the nearby installations and pipelines. No exploration activities are planned in the area.	Noted.
Perenco	01/02/2021	Potential concerns with access to Waveney and the neighbouring pipelines (Durango and Bacton-Lancelot).	Vessel and helicopter access studies have been undertaken and are presented in <a href="#">Appendix 16.1</a> and <a href="#">Appendix 16.2</a> . The impact to O&G operations has been assessed in <a href="#">Section 16.6.2.1</a> .
Perenco	01/02/2021	There will be a need for future decommissioning work which will likely require a jack up rig (and 500m safety zone), noting this includes the Durango well. Consideration needs to be given to access in addition to space to undertake the operations.	Impacts to Waveney and Durango are discussed in <a href="#">Section 16.6</a> , <a href="#">Appendix 16.1</a> and <a href="#">Appendix 16.2</a> . SEP and DEP project infrastructure is to be located at least 500m from any platform, pipeline or subsea wellheads.
IOG	23/04/2021	Elgood and Blythe are the key IOG assets to be assessed, noting pipeline access will also need to be considered (Elgood will tie back to Blythe, which will then tie into the Thames pipeline).	Impacts associated with access to Elgood and Blythe are assessed in <a href="#">Section 16.6.2.1</a> , <a href="#">Appendix 16.1</a> and <a href="#">Appendix 16.2</a> .
IOG	23/04/2021	Following completion of drilling, no further well intervention is expected to be needed until later in the field life.	Noted.
IOG	16/07/2021 (Email)	It is anticipated that the field will be visited twice per month for 4-5 days total, reducing to one visit per month for 4-5 days total.	Noted. This has been assumed in the impact assessment ( <a href="#">Section 16.6</a> ).

Consultee	Date	Comment Received	Project Response
IOG	16/07/2021 (Email)	Standard Multi Role Vessels (MRV) will be used, and they will likely mobilise from either Lowestoft or Great Yarmouth.	Noted. This has been assumed in the impact assessment ( <a href="#">Section 16.6</a> ).
IOG	16/07/2021 (Email)	Following drilling at Elgood and installation of Blythe, there are no further rig or jack up operations planned.	Noted.
<b>Navigation Risk Assessment Workshop</b>			
Perenco	10/08/2021	Information received by the Project pertaining to O&G assets will be reviewed by Perenco and feedback provided.	Noted.
IOG	10/08/2021	Will construction buoyage be located within the site boundary?	Buoyage locations will be as directed by Trinity House post consent. More information on navigational issues is contained within <a href="#">Chapter 13 Shipping and Navigation</a> and <a href="#">Appendix 13.1</a> .
IOG	10/08/2021	Concerns were raised regarding impacts to line of sight between Blythe and the Bacton gas terminal.	Line of sight communications between the Blythe platform and Bacton gas terminal will be maintained and incorporated into the final layout design. The turbine layout will be finalised post-consent.
<b>Other</b>			
Perenco / Bristow	10/03/22	Ongoing access to Waveney will be required for routine visits and decommissioning works (decommissioning programme not yet agreed). A drilling rig will be required for decommissioning works, including for the subsea pipeline between Waveney and Durango.	Noted.
Perenco / Bristow	10/03/22	Bristow's policy is that a minimum 0.5nm buffer is available to make a stabilised approach in fair weather. An Airborne Radar Approach in poor weather would not be possible at the site as it is and would require greater than 0.5nm and further discussion.	Noted. An obstacle free 1NM arc around Waveney has been proposed as additional mitigation ( <a href="#">Section 16.6</a> ).

Consultee	Date	Comment Received	Project Response
Perenco / Bristow	10/03/22	As it stands, Perenco could make a bad weather approach from any direction in 0.75 visibility. This capability would be removed with the current proximity of Dudgeon North. Access in poor weather will be significantly reduced.	Noted. An obstacle free 1NM arc around Waveney has been proposed as additional mitigation ( <a href="#">Section 16.6</a> ).
Perenco / Bristow	10/03/22	Approaches are always done into wind and the helideck is on the south-east side of Waveney. Note: Bristow operate to Blythe with significant restrictions as it is effectively in a corner and has a lot of cumulative considerations.	Noted.
Perenco / Bristow	10/03/22	It is unlikely that the Durango well will be opened up again, but Durango still needs to be accessed occasionally for inspections.	Noted. Durango has been included in the impact assessment ( <a href="#">Section 16.6</a> ). Durango is located approximately 5km from SEP, 7km from DEP North array area and 8km from the export cable corridor.
Perenco / Bristow	10/03/22	[500m buffer either side of the pipelines] should be adequate for most operations, the only issue would be if equipment needs to be removed.	In addition to 500m pipeline buffers, there will be a minimum spacing of 1km between turbines. Crossing and proximity agreements will be agreed post-consent with pipeline asset owners.
Sustainable Seaweed	10/03/22	Sustainable Seaweed is nearing the end of its application process. Expected commencement of operations unknown at this stage.	Noted.

## 16.3 Scope

### 16.3.1 Study Area

9. The study area for petroleum industry and other marine users has a wide geographic scope to ensure that all plans, projects and activities that have the potential to be influenced by SEP and DEP are identified and included in the assessment. In the majority of cases, this is the area encompassed by and within 5km of the boundaries of the SEP and DEP wind farm sites and offshore cable corridors.
10. In line with the NRA and to ensure that all relevant routeing is captured, a 10nautical miles (NM) buffer of the wind farm sites was assessed within the Vessel Access Study ([Appendix 16.1](#)).
11. In order to achieve a safe aviation operating environment, a consultation zone of 9NM was utilised in the Helicopter Access Study ([Appendix 16.2](#)) to capture all necessary offshore helicopter operations, as required by the Civil Aviation Authority (CAA). The assessment considers existing as well as planned projects and activities, where information is within the planning system, otherwise publicly available, or has been made available to the Applicant through the consultation process.

### 16.3.2 Realistic Worst-Case Scenario

#### 16.3.2.1 General Approach

12. The final design of SEP and DEP will be confirmed through detailed engineering design studies that will be undertaken post-consent to enable the commencement of construction. In order to provide a precautionary but robust impact assessment at this stage of the development process, realistic worst-case scenarios have been defined in terms of the potential effects that may arise. This approach to EIA, referred to as the Rochdale Envelope, is common practice for developments of this nature, as set out in Planning Inspectorate Advice Note Nine: Rochdale Envelope (v3, 2018). The Rochdale Envelope for a project outlines the realistic worst-case scenario for each individual impact, so that it can be safely assumed that all lesser options will have less impact. Further details are provided in [Chapter 5 EIA Methodology](#).
13. The realistic worst-case scenarios for the petroleum industry and other marine users assessment are summarised in [Table 16-2](#). These are based on the project parameters described in [Chapter 4 Project Description](#), which provides further details regarding specific activities and their durations.
14. In addition to the design parameters set out in [Table 16-2](#), consideration is also given to:
  - How SEP and DEP will be built out as described in [Section 16.3.2.2](#) to [Section 16.3.2.4](#). This accounts for the fact that whilst SEP and DEP are the subject of one DCO application, it is possible that either one or both of the projects will be developed, and if both are developed, that construction may be undertaken either concurrently or sequentially.

- A number of further development options, which either depend on pre-investment or anticipatory investment, or that relate to the final design of the wind farms.
  - Whether one OSP or two OSPs are required.
  - The design option of whether to use all of the DEP North and DEP South array areas, or whether to use the DEP North array area only (relevant only to the offshore assessments).
15. In order to ensure that a robust assessment has been undertaken, all development scenarios and options have been considered to ensure the realistic worst case scenario for each topic has been assessed. Further details are provided in **Chapter 4 Project Description**.

#### 16.3.2.2 Construction Scenarios

16. In the event that both SEP and DEP are built, the following principles set out the framework for how SEP and DEP may be constructed:
- SEP and DEP may be constructed at the same time, or at different times;
  - If built at the same time both SEP and DEP could be constructed in four years;
  - If built at different times, either Project could be built first;
  - If built at different times, each Project would require a four year period of construction;
  - If built at different times, the offset between the start of construction of the first Project, and the start of construction of the second Project may vary from two to four years;
  - Taking the above into account, the total maximum period during which construction could take place is eight years for both Projects; and
  - The earliest construction start date is 2025.
17. The impact assessment for Petroleum Industry and Other Marine Users considers the following development scenarios in determining the worst-case scenario for each topic:
- Build SEP or build DEP in isolation – one OSP only; and
  - Build SEP and DEP concurrently or sequentially – with either two OSPs, one for SEP and one for DEP, or with one OSP only to serve both SEP and DEP.
18. For each of these scenarios it has been considered whether the build out of the DEP North and DEP South array areas, or the build out of the DEP North array area only, represents the worst-case for that topic. Any differences between SEP and DEP, or differences that could result from the manner in which the first and the second projects are built (concurrent or sequential and the length of any gap) are identified and discussed where relevant in the impact assessment section of this chapter (**Section 16.6**). For each potential impact, where necessary, only the worst-case construction scenario for two Projects is presented, i.e. either concurrent or sequential.

### 16.3.2.3 Operation Scenarios

19. Operation scenarios are described in detail in **Chapter 4 Project Description**. The assessment considers the following three scenarios:
- Only SEP in operation;
  - Only DEP in operation; and
  - The two projects operating at the same time, with a gap of up to three years between each project commencing operation.
20. The operational lifetime of each project is expected to be 40 years.

### 16.3.2.4 Decommissioning Scenarios

21. Decommissioning scenarios are described in detail in **Chapter 4 Project Description**. Decommissioning arrangements will be agreed through the submission of a Decommissioning Programme prior to construction, however for the purpose of this assessment it is assumed that decommissioning of SEP and DEP could be conducted separately, or at the same time.



**Table 16-2: Realistic Worst-Case Scenarios**

Impact	SEP in Isolation	DEP in Isolation	SEP and DEP	Notes and Rationale
<b>Construction</b>				
General interference, disruption or damage to the activities or assets of the petroleum industry and other marine users (including other offshore wind farm export cables, oil & gas, and subsea cables)	<p><b>Wind farm site:</b></p> <p>One wind farm site totalling 97km<sup>2</sup></p> <p>Installation of up to <b>23</b> wind turbines (between 13 and 23 ranging from 15 megawatts (MW) to 26MW) and 1 OSP located in the SEP wind farm site</p> <p>Safety zones of <b>500m</b> radius from any construction activity (to be applied for)</p>	<p><b>Wind farm site:</b></p> <p>One wind farm site totalling 114.75km<sup>2</sup></p> <p>Installation of up to <b>30</b> wind turbines (between 17 and 30 ranging from 15MW to 26MW) and 1 OSP in DEP North array area</p> <p>Safety zones of <b>500m</b> radius from any construction activity (to be applied for)</p>	<p><b>Wind farm sites:</b></p> <p>Two wind farm sites totalling 211.75 km<sup>2</sup> (SEP and DEP wind farm sites).</p> <p>Installation of up to <b>53</b> wind turbines (between 30 and 53 ranging from 15MW to 26MW). Maximum 2 OSPs, one in DEP North array area and one in SEP wind farm site (if projects not integrated)</p> <p>Safety zones of <b>500m</b> radius from any construction activity (to be applied for)</p>	<p>The worst-case construction scenario for petroleum industry and other marine users is that which would create the maximum disruption for the longest period. Spatial disruption and proximity is of greater impact than temporal factors.</p> <p>Activities which could adversely affect the activities of the petroleum industry and other marine users, include:</p> <p>overlapping other projects (area covered by the export cable corridor and the wind farm site);</p> <p>disruption to services (e.g. transit routes) affecting safety (navigation and buffer zones around structures);</p>
	<p><b>Offshore cables:</b> Up to <b>130km</b> of cables comprising:</p>	<p><b>Offshore cables:</b></p> <p>Up to <b>263km</b> of cables comprising:</p>	<p><b>Offshore cables (worst-case scenario<sup>1</sup>):</b></p> <p>Up to <b>448km</b> of cables:</p>	

<sup>1</sup> The individual worst-case scenarios presented for export, interlink and infield cables would not represent a developable scenario if taken as a total, therefore a 'realistic' worst-case scenario for all cables is presented for this and for all other activities that vary depending on the development scenario in question. This includes number of OSP and anchoring.

Impact	SEP in Isolation	DEP in Isolation	SEP and DEP	Notes and Rationale
	<p>One High Voltage Alternating Current (HVAC) export cable up to <b>40km</b> in length</p> <p><b>90km</b> of infield cables</p> <p>No interlink cables</p> <p>Burial depth: 0.5 to 1m (excluding burial in sand waves up to 20m; export cable surface lay possible in Cromer Shoal Chalk Beds Marine Conservation Zone (MCZ))</p> <p>Cable installation maximum width of disturbance: 15m.</p>	<p>One HVAC export cable up to <b>62km</b> in length</p> <p><b>135km</b> of infield cables (DEP North array area: 90km; DEP South array area: 45km)</p> <p>Up to 3 parallel interlink cables between DEP South array area and OSP in DEP North array area: up to <b>66km</b> in length (combined)</p> <p>Burial depth: Same as SEP in isolation</p> <p>Cable trench maximum width of disturbance: Same as SEP in isolation</p>	<p>2 HVAC export cables up to <b>102km</b> in length (DEP 62km and SEP 40km)</p> <p>Up to <b>225km</b> of infield cables</p> <p>Up to 7 interlink cables from DEP North array area (up to 5) and DEP South array area (up to 3) to OSP in SEP, up to <b>154km</b> total length.</p> <p>Burial depth: Same as SEP or DEP in isolation</p> <p>Cable trench maximum width of disturbance: Same as SEP or DEP in isolation.</p>	<p>potential adverse impact of structure construction (wind turbines and ancillary structures number and location and foundation type);</p> <p>export and inter-array cable excavation, layout and properties; and cable and pipeline crossings. The realistic worst-case scenario for cables relates to an integrated scenario with one OSP in SEP with both DEP wind farm sites are being developed.</p> <p>Horizontal Directional Drilling (HDD) beneath the intertidal zone with offshore exit point approximately 1,000m offshore.</p>
	<p><b>Maximum temporary disturbance footprint: 1.95km<sup>2</sup></b> (Export cable 0.60km<sup>2</sup>, Infield cables 1.35km<sup>2</sup>)</p>	<p><b>Maximum temporary disturbance footprint: 3.95km<sup>2</sup></b> (Export cable 0.93km<sup>2</sup>, Infield cables 2.025km<sup>2</sup>, Interlink cables 1.05km<sup>2</sup>)</p>	<p><b>Maximum temporary disturbance footprint: 5.90km<sup>2</sup></b></p> <p>(Export cable: 1.53km<sup>2</sup>, infield 3.38km<sup>2</sup>, interlink cables 1.05km<sup>2</sup>)</p>	<p>For SEP and DEP, the initial trench assumes both export cables are within the same initial trench, meaning the area of disturbance is the same as SEP and DEP in isolation scenarios. However, for the transition zone it assumes two trenches, therefore, the area of disturbance is double</p>
	<p><b>HDD Exit Point temporary disturbance</b></p>	<p><b>HDD Exit Point temporary disturbance</b></p>	<p><b>HDD Exit Point temporary disturbance</b></p>	

Impact	SEP in Isolation	DEP in Isolation	SEP and DEP	Notes and Rationale
	Initial trench: <b>600m<sup>2</sup></b> Transition zone: <b>50m<sup>2</sup></b> Jack up footprint: <b>128m<sup>2</sup></b> Deposited material on sea bed: 200m <sup>2</sup> Total = 978m <sup>2</sup>	Initial trench: <b>600m<sup>2</sup></b> Transition zone: <b>50m<sup>2</sup></b> Jack up footprint: <b>128m<sup>2</sup></b> Deposited material on sea bed: <b>200m<sup>2</sup></b> Total = <b>978m<sup>2</sup></b>	Initial trench: <b>600m<sup>2</sup></b> Transition zone: <b>100m<sup>2</sup></b> Jack up footprint: <b>256m<sup>2</sup></b> Deposited material on sea bed: <b>400m<sup>2</sup></b> Total = <b>1,356m<sup>2</sup></b>	the SEP and DEP in isolation scenarios.  Jack up footprint for SEP and DEP includes total jack up legs footprint and jack up movements required.
	<b>Maximum temporal footprint</b> Maximum duration of offshore construction: <b>2 years</b>	<b>Maximum temporal footprint</b> Maximum duration of offshore construction: <b>2 years</b>	<b>Maximum temporal footprint</b> Duration of offshore construction: <b>8 years</b> if built sequentially with a maximum gap of 4 years.	
	<b>Vessel movements:</b> Maximum number of construction vessels on site at any one time: 16 Construction vessel trips to port: <b>603</b> over 2 years	<b>Vessel movements:</b> Maximum number of construction vessels on site at any one time: 16 Construction vessel trips to port: <b>603</b> over 2 years	<b>Vessel movements:</b> Maximum number of construction vessels on site at any one time: 25 in total if both SEP and DEP constructed concurrently) Construction vessel trips to port: <b>1,196</b> over 2 years (concurrent) or 4 years (sequential)	
<b>Operation</b>				
	<b>Maximum spatial footprint:</b>	<b>Maximum spatial footprint:</b>	<b>Maximum spatial footprint:</b>	

Impact	SEP in Isolation	DEP in Isolation	SEP and DEP	Notes and Rationale
<p>General interference, disruption or damage to the activities or assets of the petroleum industry and other marine users (including other renewable energy projects, oil &amp; gas, aggregates and subsea cables)</p>	<p>One wind farm site totalling 97km<sup>2</sup></p> <p>Safety zones of 500m radius for major maintenance only (to be applied for)</p>	<p>One wind farm site totalling 114.75km<sup>2</sup></p> <p>Safety zones of 500m radius for major maintenance only (to be applied for)</p>	<p>Two wind farm sites totalling 211.75km<sup>2</sup> (SEP and DEP wind farm sites).</p> <p>Safety zones of 500m radius for major maintenance only (to be applied for)</p>	<p>The SEP and DEP scenario represents the greatest potential disruption to the petroleum industry and other marine users during operational activities including:</p>
	<p><b>Wind farm site:</b></p> <p>Installation of up to <b>23</b> wind turbines (between 13 and 23 ranging from 15 megawatts (MW) to 26MW) and 1 OSP located in the SEP wind farm site</p> <p>Maximum blade tip height 330m HAT</p> <p>Maximum permanent sea bed footprint associated with 19 18 MW wind turbines on Gravity Base Structure (GBS) foundations including scour protection: <b>0.48km<sup>2</sup></b></p> <p><b>OSP foundations:</b></p> <p>Maximum footprint of OSP foundations including scour</p>	<p><b>Wind farm site:</b></p> <p>Installation of up to <b>30</b> wind turbines (between 17 and 30 ranging from 15MW to 26MW) and 1 OSP in DEP North array area</p> <p>Maximum blade tip height 330m HAT</p> <p>Maximum permanent sea bed footprint associated with 24 18 MW wind turbines on GBS foundations including scour protection: <b>0.61km<sup>2</sup></b></p> <p><b>OSP foundations:</b></p> <p>Maximum footprint of OSP foundations including scour protection (with suction cans): <b>4,761m<sup>2</sup></b></p>	<p><b>Wind farm site:</b></p> <p>Installation of up to <b>53</b> wind turbines (between 30 and 53 ranging from 15MW to 26MW). Maximum 2 OSPs, one in DEP North array area and one in SEP wind farm site (if projects not integrated)</p> <p>Maximum blade tip height 330m HAT</p> <p>Maximum permanent sea bed footprint associated with 43 18 MW wind turbines on GBS foundations including scour protection: <b>1.09km<sup>2</sup></b></p> <p><b>OSP foundations:</b></p>	<p>Permanent footprint of the installed offshore infrastructure from SEP and DEP;</p> <p>Maintenance and repair vessel activity and temporary disturbance from anchoring;</p> <p>Use of port services; and</p> <p>Crossings and proximity of cables and pipelines during operation and maintenance.</p> <p><b>Proximity:</b> Separation distance of at least 500m from existing operational infrastructure and wind turbines is proposed.</p>

Impact	SEP in Isolation	DEP in Isolation	SEP and DEP	Notes and Rationale
	<p>protection (with suction cans): <b>4,761m<sup>2</sup></b></p> <p><b>Offshore cables and crossings:</b> As for construction</p>	<p><b>Offshore cables and crossings:</b> As for construction</p>	<p>Maximum footprint of OSP foundations including scour protection (with suction cans) (2 OSPs): <b>9,522m<sup>2</sup></b></p> <p><b>Offshore cables and crossings:</b> As for construction</p>	
	<p><b>Subsea cable surface protection and pipeline crossings:</b></p> <p><b>Total:</b> 0.015km<sup>2</sup></p> <p>Up to <b>1.5km of surface protection</b> (0.5km export cables, 1.0km infield cables)</p> <p>Up to four crossings (overtrawlable) assuming unbundled installation</p> <p>Infield cables, no crossings</p> <p>Export cable, up to 4 crossings (2 for Dudgeon Offshore Wind Farm (DOW) export cables, 2 for Hornsea Three export cables). One disused subsea cable crosses the export cable.</p>	<p><b>Subsea cable surface protection and pipeline crossings:</b></p> <p><b>Total:</b> 0.051km<sup>2</sup></p> <p>Up to <b>3.0km of surface protection</b> (0.5km export cables, 1.5km interlink cables, 1.0km infield cables)</p> <p>Up to <b>17 crossings</b> (overtrawlable) assuming unbundled installation</p> <p>Infield cables, up to 7 crossings (3 in DEP North array area at Durango-Waveney pipeline, up to 4 in DEP South array area)</p>	<p><b>Subsea cable surface protection and pipeline crossings:</b></p> <p><b>Total:</b> 0.06km<sup>2</sup></p> <p>Up to <b>3.0km of surface protection</b> (0.5km export cables, 1.5km interlink cables, 1.0km infield cables)</p> <p>Up to <b>21 crossings</b> (overtrawlable) assuming unbundled installation</p> <p>Infield cables, up to 5 crossings (3 in DEP North array area at Durango-Waveney pipeline, up to 4 in DEP South array area)</p>	

Impact	SEP in Isolation	DEP in Isolation	SEP and DEP	Notes and Rationale
		<p>Interlink cables, up to 6 crossings (3 cables crossing 2 DOW export cables).</p> <p>Export cable, up to 4 crossings (2 DOW export cables, 2 for Hornsea Three export cables). One disused subsea cable crosses the export cable.</p>	<p>Interlink cables, up to 6 crossings (3 cables crossing 2 DOW export cables)</p> <p>Export cables, up to 8 crossings (4 DOW export cables, 4 for Hornsea Three export cables). One disused subsea cable crosses the export cable but no crossing required.</p>	
	<p><b>HDD exit cable protection</b></p> <p>100m of HDD exit point cable protection: <b>300m<sup>2</sup></b></p>	<p><b>HDD exit cable protection</b></p> <p>100m of HDD exit point cable protection: <b>300m<sup>2</sup></b></p>	<p><b>HDD exit cable protection</b></p> <p>200m of HDD exit point cable protection: <b>600m<sup>2</sup></b></p>	
	<p><b>Maximum temporal footprint:</b> The operational lifetime is expected to be 40 years.</p>	<p><b>Maximum temporal footprint:</b> The operational lifetime is expected to be 40 years.</p>	<p><b>Maximum temporal footprint:</b> The operational lifetime is expected to be 40 years.</p>	
	<p><b>Vessel movements:</b></p> <p>Maximum number of vessels on site at any one time: 6</p> <p>Operation and maintenance vessel trips to port per year: approximately 604 per year (although majority (600) will be small O&amp;M vessel (Crew Transfer Vessel (CTV))</p>	<p><b>Vessel movements:</b></p> <p>Maximum number of vessels on site at any one time: 6</p> <p>Operation and maintenance vessel trips to port per year: approximately 604 per year (although majority (600) will be small O&amp;M vessel (CTV))</p>	<p><b>Vessel movements:</b></p> <p>Maximum number of vessels on site at any one time: 7</p> <p>Operation and maintenance vessel trips to port per year: approximately 1,206 per year (although majority (1,200) will be small O&amp;M vessel (CTV))</p>	

Impact	SEP in Isolation	DEP in Isolation	SEP and DEP	Notes and Rationale
	<p><b>O&amp;M vessel temporary disturbance</b></p> <p>Up to 10 jack-up deployments per year. Legs footprint up to 12,000m<sup>2</sup> per year</p> <p>Cable repair, replacement and reburial footprint: <b>1,170m<sup>2</sup></b> per year</p> <p><b>Total Disturbance</b></p> <p>Worst-case scenario total temporary disturbance footprint for SEP in isolation per year = <b>13,170m<sup>2</sup></b></p> <p>Approximate total temporary disturbance footprint for operational lifetime (40 years) = <b>0.53km<sup>2</sup></b></p>	<p><b>O&amp;M vessel temporary disturbance</b></p> <p>Up to 10 jack-up deployments per year. Legs footprint up to 12,000m<sup>2</sup> per year</p> <p>Cable repair, replacement and reburial footprint: <b>1,743m<sup>2</sup></b> per year</p> <p><b>Total Disturbance</b></p> <p>Worst-case scenario total temporary disturbance footprint for DEP in isolation per year = <b>13,743m<sup>2</sup></b></p> <p>Approximate total temporary disturbance footprint for operational lifetime (40 years) = <b>0.55km<sup>2</sup></b></p>	<p><b>O&amp;M vessel temporary disturbance</b></p> <p>Up to 20 jack-up deployments per year. Legs footprint up to 24,000m<sup>2</sup> per year</p> <p>Cable repair, replacement and reburial footprint: <b>4,704m<sup>2</sup></b> per year.</p> <p><b>Total Disturbance</b></p> <p>Realistic worst-case scenario total temporary disturbance footprint for SEP and DEP per year = <b>28,704m<sup>2</sup></b>.</p> <p>Approximate total temporary disturbance footprint for operational lifetime (40 years) = <b>1.148km<sup>2</sup></b></p>	
<b>Decommissioning</b>				
<p>General interference, disruption or damage to the activities or assets of the petroleum industry and other marine users (including other renewable energy projects, oil &amp; gas,</p>	<p>No final decision has yet been made regarding the final decommissioning policy for the offshore project infrastructure. It is also recognised that legislation and industry best practice change over time. However, the following infrastructure is likely be removed, reused or recycled where practicable:</p> <p>Turbines including monopile, steel jacket and GBS foundations;</p>			<p>Decommissioning arrangements will be detailed in a Decommissioning Programme, which will be drawn up and agreed with the Department for Business, Energy and</p>

Impact	SEP in Isolation	DEP in Isolation	SEP and DEP	Notes and Rationale
<p>aggregates and subsea cables)</p>	<p>OSPs including topsides and steel jacket foundations; and</p> <p>Offshore cables may be removed or left <i>in situ</i> depending on available information at the time of decommissioning.</p> <p>The following infrastructure is likely to be decommissioned <i>in situ</i> depending on available information at the time of decommissioning:</p> <p>Scour protection;</p> <p>Offshore cables may be removed or left <i>in situ</i>; and</p> <p>Crossings and cable protection.</p> <p>The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that, for the purposes of the worst-case scenario, it is anticipated that the impacts will be no greater than those identified for the construction phase.</p>			<p>Industrial Strategy (BEIS) prior to construction.</p>



### 16.3.3 Summary of Mitigation Embedded in the Design

22. This section outlines the embedded mitigation relevant to petroleum industry and other marine users assessment which has been incorporated in to the design of SEP and DEP (**Table 16-3**).
23. The location of the wind farm sites and the offshore export cable corridor has been selected to minimise potential interactions with neighbouring infrastructure. This is the key embedded mitigation with regard to the petroleum industry and other marine users. **Chapter 3 Site Selection and Assessment of Alternatives** describes the process of development of the wind farm sites and the offshore export cable corridor. Site selection considerations of significance to petroleum industry and other marine users include:
- Located away from existing and proposed offshore wind farm sites (excluding the parent Sheringham Shoal Offshore Wind Farm (SOW) and Dudgeon Offshore Windfarm (DOW). The SEP wind farm site boundary was selected to be 5km from the proposed Race Bank extension;
  - Located a minimum of 500m away from all subsea pipelines;
  - Located a minimum of 500m away from O&G platforms and subsea wellheads;
  - Turbines and OSPs located a minimum of 500m away from O&G pipelines;
  - Located away from telecommunication and transmission cables;
  - Located outside any areas licensed for dredging and aggregate extraction;
  - Located outside of major shipping lanes and areas of high-density shipping (considered further in **Chapter 13 Shipping and Navigation**);
  - Located outside any Ministry of Defence (MoD) danger areas; and
  - Located outside any MoD practice and exercise areas.
24. Where other additional mitigation measures are proposed, these are detailed in the impact assessment (**Section 16.6**).

**Table 16-3: Embedded Mitigation Measures**

Parameter	Mitigation Measures Embedded into the Project Design
Stakeholder engagement	Owners and operators of infrastructure (including O&G operators, other wind farm developers, dredging companies and cable operators) have been and will continue to be, consulted by the Applicant, and commercial and technical agreements will be put in place where required ahead of construction.
Promulgation of information	Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated safety zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins and other appropriate media. This will be secured through the DCO / Deemed Marine Licence (DML) conditions. Relevant shipping and navigation mitigations are described in <b>Chapter 13 Shipping and Navigation</b> .
Crossing and proximity agreements	Crossing and proximity agreements will be agreed post-consent with the relevant asset owners with consideration of OIL AND GAS UK – Pipelines

Parameter	Mitigation Measures Embedded into the Project Design
	Crossing Agreement and Proximity Agreement Pack (OIL AND GAS UK, 2015).
Cooperation and liaison agreements	Cooperation and liaison agreements between SEP and DEP and relevant operators to ensure any access issues are minimised, this should include the sharing of information between parties to ensure both the Applicant and the relevant O&G operators are aware of each other's operations in advance.
Marking and lighting	Consultation with Trinity House to determine appropriate lighting and marking with consideration of existing O&G assets.
Unimpeded SAR access	Alignment of turbines as required under Marine Guidance Note (MGN) 654 to provide obstruction free SAR access.

## 16.4 Impact Assessment Methodology

### 16.4.1 Policy, Legislation and Guidance

#### 16.4.1.1 National Policy Statements

25. The assessment of potential impacts upon the petroleum industry and other marine users has been made with specific reference to the relevant NPS. These are the principal decision making documents for Nationally Significant Infrastructure Projects (NSIP). Those relevant to SEP and DEP are:
- Overarching NPS for Energy (EN-1) (Department of Energy and Climate Change (DECC) 2011a);
  - NPS for Renewable Energy Infrastructure (EN-3) (DECC 2011b); and
  - NPS for Electricity Networks Infrastructure (EN-5) (DECC 2011c).
26. The NPS for Renewable Energy Infrastructure (EN-3) (DECC 2011) is the NPS of most relevance to the petroleum industry and other marine users. The specific assessment requirements for petroleum industry and other marine users, as detailed in the NPS, are summarised in **Table 16-4** together with an indication of the section of the ES chapter where each is addressed.
27. It is noted that the NPS for Renewable Energy Infrastructure (EN-3) is in the process of being revised. Draft versions were published for consultation in September 2021 by Department for Business Energy and Industrial Strategy (BEIS, 2021). A review of the draft versions has been undertaken in the context of this ES chapter. No new requirements applicable to petroleum industry and other marine users were found within the draft EN-3 document.

**Table 16-4: NPS Assessment Requirements**

NPS Requirement	NPS Reference	Section Reference
<b>NPS for Renewable Energy Infrastructure (EN-3)</b>		
There may be constraints imposed on the siting or design of offshore wind farms because of restrictions	Section 2.6, paragraph 2.6.35	<b>Chapter 3 Site Selection and Assessment of Alternatives</b> provides the rationale for the

NPS Requirement	NPS Reference	Section Reference
<p>resulting from the presence of other offshore infrastructure and activities.</p>		<p>location of the SEP and DEP offshore sites, array cables and proposed offshore export cable corridor, which includes consideration of constraints associated with other offshore infrastructure.</p>
<p>Where a potential offshore wind farm is proposed close to existing operational offshore infrastructure, or has the potential to affect activities for which a license has been issued by government, the applicant should undertake an assessment of the potential effect of the proposed development on such existing or permitted infrastructure or activities. The assessment should be undertaken for all stages of the lifespan of the proposed wind farm in accordance with the appropriate policy for offshore wind farm EIAs.</p>	<p>Section 2.6, paragraph 2.6.179</p>	<p>The potential impacts are assessed in <a href="#">Section 16.6</a>.</p>
<p>Applicants should engage with interested parties in the potentially affected offshore sectors early in the development phase of the proposed offshore wind farm, with an aim to resolve as many issues as possible prior to the submission of an application.</p>	<p>Section 2.6, paragraph 2.6.180</p>	<p>Consultation with owners and operators of offshore infrastructure is being undertaken by Equinor, consultation responses received to date are shown in <a href="#">Table 16-1</a>.</p>
<p>Such stakeholder engagement should continue throughout the life of the proposed development including construction, operation and decommissioning phases where necessary. As many of these offshore industries are regulated by Government, the relevant Secretary of State should also be a consultee where necessary. Such engagement should be taken to ensure that solutions are sought that allow offshore wind farms and other uses of the sea to successfully co-exist.</p>	<p>Section 2.6, paragraph 2.6.181</p>	<p>Consultation with the secretary of state has been undertaken as part of the scoping phase. The scoping opinion from the Secretary of State in relation to the petroleum industry and other marine users are shown in <a href="#">Table 16-1</a>.</p>

### 16.4.1.2 Other

28. In addition to the NPS, there is various guidance applicable to the assessment of petroleum industry and other marine users. These include:

- European Subsea Cable UK Association (ESCA) Guideline No. 6 – The Proximity of Offshore Renewable Energy Installations and Submarine Cable Infrastructure in UK Waters (ESCA, 2016);
- The International Cable Protection Committee (ICPC) has issued a series of recommendations for marine cables, specifically:
  - Recommendations No. 2 – Recommended Routing and Reporting Criteria for Cables in Proximity to Others (ICPC, 2015);
  - Recommendations No. 3 – Criteria to be Applied to Proposed Crossings Submarine Cables and/or Pipelines (ICPC, 2014);
  - Recommendations No. 13 – The Proximity of Offshore Renewable Wind Energy Installations and Submarine Cable Infrastructure in National Waters (ICPC, 2013).
- OIL AND GAS UK – Pipelines Crossing Agreement and Proximity Agreement Pack (OIL AND GAS UK, 2015);
- O&G licencing rounds information (OGA, 2018); and
- HM Government (2014) East Inshore and East Offshore Marine Plans.

29. Further detail is provided in **Chapter 2 Policy and Legislative Context**.

#### 16.4.2 Data and Information Sources

30. The data sources that have been used to inform the assessment are listed in **Table 16-5**.

*Table 16-5: Other Available Data and Information Sources.*

Dataset	Spatial coverage	Notes
Petroleum industry	UK	Oil and Gas Authority: <div style="background-color: black; width: 100%; height: 1.2em; margin-bottom: 0.5em;"></div> O&G surface and subsurface infrastructure, wells, pipelines and licensing information.
Offshore wind farms	UK	The Crown Estate: <div style="background-color: black; width: 100%; height: 1.2em; margin-bottom: 0.5em;"></div> Planned, consented, under construction wind farm areas and export cable corridors. Proposed offshore wind extension projects.
Offshore cables	UK	Offshore Renewables and Cable Awareness (KIS-ORCA), publicly available data: <div style="background-color: black; width: 100%; height: 1.2em; display: inline-block;"></div>
Aggregate sites	UK	The Crown Estate: <div style="background-color: black; width: 100%; height: 1.2em; margin-bottom: 0.5em;"></div> Marine aggregates production and exploration options areas.

Dataset	Spatial coverage	Notes
Dredger transit routes	UK	British Marine Aggregate Producers Association (BMAPA): [REDACTED] Aggregate dredger transit routes (all passage plans).
Disposal sites	UK	Centre for Environment Fisheries and Aquaculture Science (Cefas): [REDACTED]
Automatic Identification System (AIS)	Study Area	Collected as part of the Navigation Risk Assessments (NRA) ( <a href="#">Appendix 13.1</a> ). Utilised within this assessment to provide long term coverage of routing to/from O&G assets and inform the Vessel Access Study ( <a href="#">Appendix 16.1</a> ).
AIS	Study Area	20 days of data from April 2021 covering drilling activity at the Elgood well (spudded on 9th April 2021) to inform the Vessel Access Study ( <a href="#">Appendix 16.1</a> ).
AIS	Study Area	25 days of data from May-June 2021 covering the installation of the Blythe Normally Unmanned Installation (NUI) Platform to inform the Vessel Access Study ( <a href="#">Appendix 16.1</a> ).
Meteorological Data	West Sole A platform	Supplied by Perenco from the West Sole A platform. Data includes: timestamp, visibility, cloud base, wind direction and speed and air temperature. Data collected to inform the Helicopter Access Study ( <a href="#">Appendix 16.2</a> ).
Vantage Personnel On Board (POB) system flight data	Waveney, Lancelot, Excalibur	Supplied by Perenco covering the same duration as the meteorological data for direct comparison.

### 16.4.3 Impact Assessment Methodology

31. **Chapter 5 EIA Methodology** provides a summary of the general impact assessment methodology applied to SEP and DEP. The following sections confirm the methodology used to assess the potential impacts on petroleum industry and other marine users.
32. The assessment of impacts on petroleum industry and other marine users has focused on establishing potential for overlaps, interactions and the consequential potential for conflict between activities in both a geographical and temporal context. This assessment has been informed by consultation with relevant operators ([Section 16.2](#)) and the Vessel Access Study ([Appendix 16.1](#)) and Helicopter Access Study ([Appendix 16.2](#)). Information has additionally been obtained through statements made in publicly available literature (e.g. information in an EIA or Scoping Report).

### 16.4.3.1 Definitions

33. For each effect, the assessment identifies receptors sensitive to that effect and implements a systematic approach to understanding the impact pathways and the level of impacts on given receptors. The definitions of sensitivity and magnitude for the purpose of the petroleum industry and other marine users assessment are provided in **Table 16-6** and **Table 16-7**.

*Table 16-6: Definition of Sensitivity.*

Sensitivity	Definition
High	High value activity/activity fundamental to the operator or infrastructure that is of international or national economic importance. No redundancy available in the event of impact. Asset very sensitive to the impact. For example, gas pipeline, electrical infrastructure or telecommunication cable supporting UK or European activity or nationally important aggregates area where extraction company has no access to areas of equal quality aggregates.
Medium	Medium value activity. Impact to asset would significantly reduce operators' activities but not result in complete failure to continue operations. Limited redundancy available. Asset regionally important. Asset has <u>limited</u> tolerance of impact. For example, gas pipeline, electrical infrastructure or telecommunication cable, where asset owners have some potential for redundancy planning. Aggregates areas where extraction company has some, but limited access to equal quality aggregate.
Low	Low value activity. Impact to asset would have limited implications on operator/public either due to the availability of redundancy or limited pathway for impact. Asset has some tolerance of impact. For example, electrical or telecommunication cable with ability to undertake redundancy planning to limit impact. Aggregates area where extraction company has access to large area of equal quality aggregate.
Negligible	Low value activity, operators' activities would not be significantly reduced by impact. Asset generally tolerant of impact. Limited impact to asset owners or local community in case of damage or failure.

*Table 16-7: Definition of Magnitude.*

Magnitude	Definition
High	Loss of resource and / or quality and integrity of receptor; severe damage to key characteristics, features or elements. For example, accidental damage to asset resulting in permanent or long term inoperability or complete loss of access to economically important asset.
Medium	Loss of resource, but not adversely affecting integrity of resource; partial loss of / damage to key characteristics, features or elements. For example, damage to an asset that results in either short term, complete inoperability or long term reduced functionality. Partial loss of access to economically important asset, or short term complete loss of access.
Low	Some measurable change in attributes, quality or vulnerability, minor loss or, alteration to, one (maybe more) key characteristics, features or elements. For example, accidental damage to asset resulting in short term reduction of functionality but not complete loss of function. Short term disruption to access of asset.
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements, and / or slight alteration to activity.

### 16.4.3.2 Impact Significance

34. In basic terms, the potential significance of an impact is a function of the sensitivity of the receptor and the magnitude of the effect (see **Chapter 5 EIA Methodology** for further details). The determination of significance is guided by the use of an impact significance matrix, as shown in **Table 16-8**. Definitions of each level of significance are provided in **Table 16-9**.
35. It is noted that the Vessel Access Study (**Appendix 16.1**) was undertaken using the International Maritime Organisation (IMO) Formal Safety Assessment (FSA) criteria detailed within **Chapter 13 Shipping and Navigation** and **Appendix 13.1**. Definitions of each level of significance in EIA terms are provided in **Table 16-9**.
36. Potential impacts identified within the assessment as major are regarded as significant in terms of the EIA regulations. Impacts identified within the assessment as moderate are regarded as significant in terms of EIA regulations unless assessed to be tolerable with mitigation within the FSA (where applicable). Appropriate mitigation has been identified, where possible, in consultation with the regulatory authorities and relevant stakeholders. The aim of mitigation measures is to avoid or reduce the overall impact in order to determine a residual impact upon a given receptor and reduce impact significance.

**Table 16-8: Impact Significance Matrix.**

		Adverse Magnitude				Beneficial Magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

**Table 16-9: Definition of Impact Significance.**

FSA Definition	EIA Significance	EIA Definition
<p>Unacceptable</p> <p>Safety risks are unacceptable (high risk) and cannot be managed with mitigation. Unacceptable risks are not considered As Low as Reasonably Practicable (ALARP).</p>	Major	<p>Very large or large change in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or could result in exceedance of statutory objectives and / or breaches of legislation.</p>
<p>Tolerable (with mitigation)</p> <p>Safety risk is tolerable (intermediate risk) and ALARP if</p>	Moderate	<p>Intermediate change in receptor condition, which are likely to be important considerations at a local level.</p>



FSA Definition	EIA Significance	EIA Definition
appropriate mitigation is put in place to control or monitor risk.		Impact can be Significant or not Significant ( <b>Chapter 5 EIA Methodology</b> ).
Broadly Acceptable  Safety risks are broadly acceptable (low risk) and ALARP.	Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision-making process.
N/A	Negligible	No discernible change in receptor condition.
No discernible change in receptor condition. Safety risks are acceptable and ALARP without additional mitigation.	No impact	No impact, therefore, no change in receptor condition.

#### 16.4.4 Cumulative Impact Assessment Methodology

37. The CIA considers other plans, projects and activities that may impact cumulatively with SEP and DEP. As part of this process, the assessment considers which of the residual impacts assessed for SEP and/or DEP on their own have the potential to contribute to a cumulative impact, the data and information available to inform the cumulative assessment and the resulting confidence in any assessment that is undertaken. **Chapter 5 EIA Methodology** provides further details of the general framework and approach to the CIA.
38. For petroleum industry and other marine users, these include other OWF projects, shore-based maintenance works, O&G development activities, pipelines and cables, and active restricted areas.
39. Further detail on potential cumulative impacts is provided in **Section 16.7**.

#### 16.4.5 Transboundary Impact Assessment Methodology

40. The transboundary assessment considers the potential for transboundary effects to occur on petroleum industry and other marine user receptors as a result of SEP and DEP; either those that may arise within the Exclusive Economic Zone (EEZ) of European Economic Area (EEA) states or arising on the interests of EEA states e.g. a non-UK fishing vessel. **Chapter 5 EIA Methodology** provides further details of the general framework and approach to the assessment of transboundary effects.
41. For the petroleum industry and other marine users, the potential for transboundary effects has been scoped out in line with the recommendation of the Planning Inspectorate in the Scoping Opinion (Planning Inspectorate, 2019) (**Table 16-1**).



## 16.4.6 Assumptions and Limitations

42. Characterisation of the existing environment and the resulting impact assessment is based on publicly available information, purchased data or information gained directly from the relevant operators / organisations during consultation. There may be elements of uncertainty associated with the locations of some existing infrastructure and where this is the case, this will be discussed with the owners / operators and / or established during pre-construction surveys as necessary.
43. The Vessel Access Study ([Appendix 16.1](#)) has assessed direct marine access impacts considering known mitigations assumed to be in place. Operator's own Safety Cases were not available to the assessment and as such tolerability comparisons were not possible.

## 16.5 Existing Environment

### 16.5.1 Petroleum Industry Infrastructure

44. The southern North Sea is a mature area of O&G development with wells and production platforms producing from primarily gas reservoirs and exporting via pipelines to onshore terminals, such as the Bacton Gas Terminal, for further processing and transmission to the downstream gas distribution network. Some of this infrastructure is now undergoing decommissioning as hydrocarbon fields reach the end of their economic life.
45. The SEP and DEP project boundaries were chosen with the aim of avoiding direct interaction with O&G infrastructure as much as possible. The nearest O&G infrastructure is associated with the Blythe, Elgood, Lancelot and Waveney gas fields. There is no surface O&G infrastructure within the SEP or DEP wind farm sites or the proposed offshore export cable corridor. However, the normally unmanned Perenco-operated Waveney gas platform is located close to the northern boundary of the DEP North array area such that the DEP North array area boundary has been routed around the Waveney 500m marine safety zone. The Lancelot A platform, also operated by Perenco and normally unmanned, is located to the north within 5km of the DEP North array area.
46. The Blythe normally unmanned production platform was successfully installed in June 2021, and the Noble Hans Deul jack up rig was on location at the Elgood gas field in June 2021. Flow testing was successfully undertaken in Q3 2021. The Blythe Hub surface and Elgood subsurface infrastructure are located in close proximity to DEP, and a connecting pipeline will route directly North of DEP South array area, stopping south of DEP North array area. The Blythe Hub project includes the development of two gas fields (Blythe and Elgood) located in blocks 48/23 and 48/22. Both fields are 100% owned and operated by IOG A single subsea well has also been developed in the Elgood field to the north west of the Blythe platform which is tied back to Blythe via a 6" subsea flowline and controlled from Blythe by an umbilical.
47. A list of all surface and subsurface infrastructure within 5km of SEP and DEP is provided in [Table 16-10](#) and shown in [Figure 16.1](#).

48. Further, in order to help achieve a safe operating environment, a consultation zone of 9NM radius (CAA, 2016) is utilised to capture necessary offshore helicopter installations. This consultation zone is not considered a prohibition on wind turbine development within a 9NM radius of offshore operations, but is a trigger for consultation between platform operators, helicopter operators, and wind developers to maintain a safe coexistence between wind turbines and offshore helicopter operations. **Figure 16.2** shows the platforms within 9MN.

**Table 16-10: Oil or Gas Infrastructure within 5km of SEP and DEP Offshore Wind Farm Area**

Name	Status	Operator	Distance from DEP (excluding temporary works area) km	Distance from SEP (excluding temporary works area) km
<b>Surface infrastructure</b>				
Waveney	Active	Perenco	0.6	20
Lancelot A	Active	Perenco	5.3	25
Blythe platform	Pre-commission	IOG North Sea Ltd. and IOG U.K. Ltd.	1.3	17
<b>Subsurface infrastructure</b>				
Elgood wellhead	Pre-commission	IOG North Sea Ltd. and IOG U.K. Ltd.	0.5	19
Durango wellhead	Pre-commission	Perenco	7.2	5.1
<b>Wells</b>				
Elgood well	Pre-commission	IOG North Sea Ltd. and IOG U.K. Ltd.	0.5	19
48/17c-12Z	Completed - operating	Perenco UK Ltd	0.6	19
48/17c-W1	Completed - operating	Perenco UK Ltd	0.6	19
48/17c-12	Completed - operating	Perenco UK Ltd	0.6	19
48/17c-W2	Completed - operating	Perenco UK Ltd	0.6	19
48/16b-2	Decommissioned	Conoco Philips UK Ltd	3.4	12
48/16b-3	Decommissioned	Serica Energy UK Ltd	1.5	12
48/17-1	Decommissioned	Apache Beryl Ltd	1.8	16
48/17a-6	Decommissioned	Perenco	3.8	26
48/18c-8	Decommissioned	Unknown	2.7	23
48/21-1	Decommissioned	Unknown	6.7	4.7

Name	Status	Operator	Distance from DEP (excluding temporary works area) km	Distance from SEP (excluding temporary works area) km
48/21a- 3	Decommissioned	Unknown	6.3	5.2
48/22-1	Decommissioned	Unknown	3.7	14
48/22-2	Decommissioned	Unknown	4.2	14
48/22-3	Decommissioned	Unknown	2.5	12
48/22-4	Decommissioned	Unknown	0.8	17
48/22b-5	Decommissioned	Century Exploration UK Ltd	6.2	8.4
48/22b-6	Decommissioned	Perenco UK Ltd	0	15
48/23-2	Decommissioned	Unknown	4.8	22
48/23-1	Decommissioned	Unknown	3.9	20
48/23a-4	Decommissioned	Unknown	0	16
48/23-3	Decommissioned	Unknown	0.2	15
48/27a-1	Decommissioned	Fina Petroleum Development Limited	8.5	2.3

### 16.5.2 Petroleum Industry Pipelines

49. There is a concentration of pipelines to the east of SEP and DEP linking southern North Sea gas fields to the Bacton Gas Terminal on the Norfolk Coast. The most easterly of these traverses the DEP South array area wind farm site. They are the Perenco operated Lancelot to Bacton gas export pipeline (PL876), the Bacton to Lancelot chemical pipeline (PL877), and the Shell operated Shearwater to Bacton gas pipeline (PL1570), all of which run parallel to each other (**Figure 16.1**). The Durango to Waveney gas production pipeline, operated by Perenco, also traverses the DEP North array area. Gas pipeline PL27 routes parallel to, and approximately 500m north of the northern boundary of DEP North array area, however, is no longer in use.
50. The Elgood to Blythe production pipeline will route close to the southern boundary of the DEP North array area and the planned Blythe to Thames export pipeline to export gas from the Blythe platform will route close to the north-eastern boundary of DEP South array area (**Figure 16.1**). There are no pipelines within or in close proximity to the SEP wind farm site.

### 16.5.3 O&G Licence Areas

51. For the purpose of O&G licensing, the UK continental shelf is divided into quadrants. Within each quadrant are licence blocks. Different types of licence<sup>2</sup> for particular blocks, or part blocks, are issued by BEIS through competitive annual Seaward Licensing Rounds under the Petroleum Act 1998 (as amended).
52. The most recent round was the 32<sup>nd</sup> Offshore Licensing Round which closed in November 2019. The OGA confirmed it was taking a temporary pause from annual licence round activity and would not run a licence round in what would have been the 2020/21 period. There is one 32<sup>nd</sup> round provisional award block (48/23d) which partially overlaps both DEP South array area and DEP North array area (**Figure 16.1**). A provisional licence requires survey and data gathering to estimate oil or gas volumes ahead of making a drilling commitment and final award.
53. **Table 16-11** shows current licensed blocks that overlap with DEP North array area and DEP South array area. No licence blocks overlap SEP.

*Table 16-11: Current Licence Blocks Overlapping with DEP.*

Quadrant Block	Operator	Licence type	Licence End	Distance from DEP North array area (excluding temporary works area) km	Distance from DEP South array area (excluding temporary works area) km
48/22c	IOG North Sea Limited	Production	2041	0	4.28
48/23a	IOG North Sea Limited	Production	2030	5.25	0
48/17d	OK Energy (North Sea) Limited	Production	2044	0	11
48/17c	Perenco UK Limited	Production	2027	0	13
48/16	OK Energy (North Sea) Limited	Production	2044	0	20
48/22b	IOG North Sea Limited	Production	2030	4.17	2.25

<sup>2</sup> Such as production licences, exploration licences and innovation licences. More information on the types of licences is available from the Oil and Gas Authority: [REDACTED]

#### 16.5.4 Offshore Wind Infrastructure

54. UK waters, and the southern North Sea area in particular, are a focus of significant offshore wind development activity, having been subject to several phases of offshore wind development under The Crown Estate's various leasing rounds (Round 1, Round 2, Round 1 and 2 extensions and Round 3). In 2017 The Crown Estate launched an opportunity for existing wind farms to apply for project extensions. SEP and DEP are both part of this process.
55. Other nearby operational offshore wind farms in the Greater Wash area include the parent SOW and DOW and also Race Bank, Triton Knoll, Lincs, Inner Dowsing and Lynn offshore wind farms (**Figure 16.4**). A summary of all offshore wind farms in the vicinity of SEP and DEP is provided in **Table 16-12**.
56. The existing SOW and DOW are owned by different partners, however, Equinor has ownership interests in both. The Dudgeon partners also own Dudgeon Extension Limited (DEL – being the named undertaker for DEP) whilst Equinor is the sole owner of Scira Extension Limited (SEL – being the named undertaker for SEP). Equinor acts as the operator of the projects on behalf of both DEL and SEL. Given the commonality of ownership interests, it is in the interests of SEP and DEP that Equinor will ensure that the development of SEP and DEP is undertaken in such a way to limit and, where possible, avoid any potential impacts on the existing SOW and DOW.
57. The next nearest operational wind farm to the projects is Race Bank, located 10.1km to the west of the SEP wind farm site, with export cables making landfall in Lincolnshire. Race Bank has been operational since 2018 (Ørsted, 2018a). Triton Knoll offshore wind farm is 13.2km to the northwest of DEP North array area, with the export cables making landfall in Lincolnshire. Installation of the offshore array (Triton Knoll website, 2021) was completed in September 2021.
58. Export cables for the existing SOW and DOW offshore wind farms make landfall on the North Norfolk coast to the west of Weybourne. The proposed SEP and DEP offshore export cables cross and then route to landfall immediately to the east of the DOW export cables. The DOW export cables will also be crossed further offshore by interlink cables, either those connecting DEP South array area to an OSP in the SEP wind farm site (with an integrated grid option) or interlink cables from DEP South array area to DEP North array area with a separated grid option (**Figure 16.3**).
59. The proposed offshore export cable corridor for the consented Hornsea Three offshore wind farm will cross the SEP and DEP offshore export cable corridor approximately 14km from the coast and make landfall at Weybourne to the west of the SEP and DEP offshore export cable corridor landfall.
60. Export cables for the existing DOW also make landfall at Weybourne. The proposed SEP and DEP offshore export cables cross and then route to landfall to the east of these cables.
61. The DOW export cables will also be crossed further offshore by interlink cables, either those connecting the DEP South array area to an OSP in the SEP wind farm site (in a SEP and DEP scenario), or interlink cables from the DEP South array area to the DEP North array area.

**Table 16-12: Offshore Wind Farm Projects within 50km and Their Approximate Distance from SEP and DEP**

Offshore Wind Farm	Status	Developer/ Owner	Generating Capacity (MW)	Distance from DEP offshore site (km)	Distance from SEP offshore site(km)
DOW	Operational	Dudgeon Offshore Wind Ltd	402	0	18
Inner Dowsing	Operational	Execo	97.2	50	38.2
Lincs	Operational	Ørsted	270	46.0	34.4
Lynn	Operational	Execo	97.2	51	37
Race Bank	Operational	Ørsted	573	19.2	10.0
SOW	Operational	SCIRA Offshore Energy Ltd	317	13	0
Triton Knoll	Under construction	RWE	857	13.2	19.2

### 16.5.5 Telecommunication Cables and Interconnectors

62. The southern North Sea is crossed by a large number of cables. The majority of those not related to offshore wind (as described in [Section 16.5.](#)) are telecommunication cables between the UK and mainland Europe ([Figure 16.3](#)). Several electrical interconnector cables also connect the power grids of the UK and mainland Europe. The majority in the North Sea connect to the UK on the coast of Kent to the south. However, the planned Viking Link interconnector, being developed by Norwegian Geotechnical Institute (NGI) and Energinet.dk, will connect Denmark to the UK making landfall on the Lincolnshire coast. The Viking interconnector is planned to be delivered by 2022 and is located approximately 40m to the north of DEP North array area at its nearest point ([Figure 16.3](#)). The disused Stratos telecommunications cable makes landfall near Weybourne and crosses the offshore export cable corridor as it approaches the coast. From here the cable routes in a north easterly direction, passing to the southeast of the onshore scoping area (KIS-ORCA, 2019) ([Figure 16.3](#)). There are no other telecommunications cables or interconnectors in the vicinity of SEP or DEP.

### 16.5.6 Marine Aggregate Extraction

63. There are no aggregate dredging licences or application areas within 5km of SEP or DEP. The nearest licensed areas for aggregate production are areas 515/1 and 515/2, licensed to Westminster Gravels Ltd and located to the north and west of the projects, approximately 8km and 10km away from DEP North array area respectively ([Figure 16.5](#)).

64. SEP and DEP overlap with an area identified as a High Potential Aggregate Resource (AGG3 zone). This area is covered by Policy AGG3 in the East Inshore and East Offshore Marine Plans (2014). The areas defined as high potential aggregate resource are based on mapping undertaken by British Geological Survey on behalf of The Crown Estate and identify the locations with the greatest potential for aggregate resource. The East Inshore and Offshore Marine Plan states that within defined areas of high potential aggregate resource, proposals should demonstrate that they will not prevent aggregate extraction or, if they do, how they will be minimised or mitigated. However, the site is not a licensed aggregate extraction area itself.
65. The East Inshore and Offshore Marine Plan WIND1 policy states licences should not be granted that are in, or could affect, sites held under a lease or an AfL that has been granted by The Crown Estate for development of an offshore wind farm, unless certain criteria are met. Therefore, as the AfLs are already in place for the SEP and DEP wind farm sites, they take precedence over any future potential aggregate extraction that may have occurred within the respective AfLs.
66. Some aggregate dredging vessels transit the SEP and DEP wind farm sites (BMAPA, 2009), although they are outside the main dredger transit routes. Impacts on shipping associated with marine aggregate extraction are assessed in **Chapter 13 Shipping and Navigation**.

#### 16.5.7 Disposal Sites

67. There are no marine disposal sites within 5km of SEP or DEP, the nearest is the historical DOW disposal site (HU145) located approximately 9.5km away, which is now closed. The nearest open disposal site is associated with the Race Bank offshore wind farm export cable corridor (HU126) located 10km northwest of the SEP wind farm site (**Figure 16.5**). Offshore wind farm disposal sites are typically licensed for the disposal of sediment arisings from sea bed levelling works, primarily during wind farm construction and cable installation. HU126 is only to be used to dispose of sediment arising from Race Bank offshore wind farm sea bed levelling and will be closed on completion of the works.
68. There are no identified historical dumps for sewage sludge or radioactive wastes in the vicinity of the projects, activities that have been banned by the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR).

#### 16.5.8 Aquaculture

69. Aquaculture off the North Norfolk coast (mariculture) is currently limited to a small number of shellfish farms which produce oysters in the shallow coastal waters of Blakeney Point and Wells-next-the-Sea. Future aquaculture potential is discussed in **Section 16.5.11**).



## 16.5.9 Unexploded Ordnance

70. The southern North Sea has been a major area of naval and airborne warfare, most notably during World War 1 and World War 2. Consequently, it is possible for unexploded ordnance (UXO) to be found in almost any area of the southern North Sea. There are no identified explosives dumping grounds in the vicinity of SEP and DEP, the nearest being approximately 110km southeast of the export cable corridor (**Figure 16.5**).
71. Pre-construction UXO surveys were completed for SOW and DOW. The DOW UXO survey identified 20 UXOs and three UXO related/shaped debris for removal (MMT, 2015). The UXO and UXO debris identified included air dropped and projectile ordnance with charges ranging from 45kg to 1000lb, a MK 17 mine and mine sinkers. The SOW UXO survey identified 10 potential UXOs (Gardline, 2010), however, all the potential UXOs identified were nonexplosive ordnance except for one confirmed 250lb German air drop bomb.
72. Magnetometer surveys were completed across the offshore export cable corridor in 2019, and the wind farm sites and interlink cable corridors in 2020. Detailed UXO surveys and if required a detonation programme will be carried out prior to construction of SEP and/or DEP. UXO is considered further in **Chapter 28 Health**.

## 16.5.10 Marine Recreation

73. This section provides an overview of marine recreational activity which has the potential to interact with SEP and DEP. Recreational activity includes recreational fishing, recreational vessel activity and SCUBA diving. It should be noted that impacts on recreational vessels from a navigation perspective are assessed in **Chapter 13 Shipping and Navigation**.

### 16.5.10.1 Recreational fishing

74. Sea angling is the capture of fish for leisure or personal consumption, by line only, and is the most common method of marine recreational fishing in the UK. There are no complete lists of marine recreational fishers nor licensing schemes in the UK, so an independent study would be required to accurately estimate participation, effort and catches (CEFAS, 2020). However, the 2012 Sea Angling survey estimated that there are 884,000 sea anglers in England. Shore fishing was the most common type of sea angling (almost 3 million angler-days) compared with private/rented boats (1 million angler-days) and charter boats (0.1 million angler-days) (Defra, 2013). It is generally considered that the most important area to anglers is within 1NM of the coast (Offshore Energy Strategic Environmental Assessment, 2009). Since the Sea Angling 2012 survey in England, a revised monitoring programme with new methods was tested in 2015 and expanded in 2016 and 2017 to estimate numbers of UK sea anglers, how often they fish, what they catch (Defra, 2020). The latest data showed that an estimated 874,000 people in the UK went sea angling in 2016, and 902,000 in 2017, an increase from the 2012 survey.



75. The east coast, including the EIFCA district incorporating the counties of Lincolnshire, Norfolk and Suffolk, is popular with recreational sea anglers, who practice the sport both at sea and from the beach. The recreational sector is increasingly recognised for its importance to the local economy, as well as for the amenity value of the activity itself (EIFCA, 2020). Shore fishing is undertaken from the Weybourne area. There are charter fishing trips from Well-next-the-Sea to the west of landfall, and Brancaster Staithe further west, but no established charter fishing from Weybourne.

#### 16.5.10.2 Recreational vessels

76. Recreational vessel usage is described in **Chapter 13 Shipping and Navigation** and the Navigational Risk Assessment (NRA) completed for the projects (**Appendix 13.1**), including the results of two 14-day summer (July-August 2020) and winter (Jan-Feb 2021) shipping surveys in the navigation study area. Recreational vessels, including yachts and motor cruisers, predominantly transit along the coast inshore of the SEP wind farm site in the summer months. Some transit in a north-westerly and south-easterly direction between the SEP and DEP wind farm sites, with a small number traversing along north-eastern boundary of the SEP wind farm site (**Figure 16.7**).

77. The summer shipping survey recorded less than one recreational vessel per day on average in the study area (within 10NM of SEP and DEP). The survey observations align with the Royal Yachting Association (RYA) Coastal Atlas, the majority of recreational vessels transiting close to the coastline inshore of SEP and DEP wind farm sites and a small proportion routing between the SEP and DEP wind farm sites.

78. Additionally, there is an RYA identified boating area along the coast inshore of the SEP and DEP wind farm sites and across the export cable corridor (**Annex 13.1 NRA, Figure 14.18**).

#### 16.5.10.3 Diving

79. There are a number of coastal dive sites along the North Norfolk coast inshore of SEP and DEP. **Figure 16.7** shows the locations of recreational dive sites identified by the Finstrokes website (Finstrokes, 2020). Several dive sites off the coast are associated with shipwrecks, the nearest being the wreck of the SS Rosalie which is dived from the shore, located close to the western boundary of the offshore export corridor close to landfall. To the east of the offshore export corridor is an area of chalk gullies between Weybourne and Sheringham, and continuing east to Overstrand chalk cliffs (North Norfolk Divers website, 2020). This area is dived to enjoy the chalk reef and associated marine life, with shore dive locations identified as Sheringham Gullies and Overstrand to the east of the export cable corridor (Finstrokes, 2020; **Figure 16.7**).

### 16.5.11 Future Trends

80. The deployment of offshore wind in the UK is set to continue with an existing pipeline of projects in planning and further expansion expected to achieve a target of 40 gigawatt (GW) offshore wind capacity by 2030. Therefore, offshore wind deployment in the southern North Sea and wider North Sea is likely to increase over the next 10–20 years.
81. There are plans to further integrate the UK electrical network and the European networks through the installation of interconnector cables. This is likely to lead to an increase in electricity transmission cables across the southern North Sea, such as the Viking Link interconnector.
82. The O&G industry, especially in the southern North Sea, is in a period of slow decline with existing gas fields reaching the end of their economic lives and the rate of new field development declining. It is likely that the baseline of steady decline in the O&G industry in the southern North Sea will continue. However, it is acknowledged that the OGA continues to award new licences.
83. The MMO document “Spatial trends in aquaculture potential in the South and East inshore and offshore marine plan areas” (2013) identifies locations with potential for future aquaculture activity. In vicinity of SEP and DEP, these include; lobster restocking (Figure 5), rope grown bivalve shellfish culture (Figure 21), macro-algae culture production (Figure 23) and marine finfish cage culture (Figure 27). A 2019 MMO study into aquaculture potential determined that sea trout and oyster show high suitability; Atlantic salmon, rainbow trout, European lobster and mussels show moderate suitability; and Atlantic cod, Manila clam and King scallop show low suitability for growth in vicinity of the study area.
84. The 2019 study additionally identifies an increasing interest, at both the global and national level, in seaweed (or macroalgae) production (MMO,2019). The Analysis determined that the study area is of moderate suitability to seaweed species growth. The most suitable region was identified to be the east coast from the Humber to the Scottish border and off Dover and Folkstone. It is noted that, a seaweed farm is proposed to the west of SOW and a further seaweed farm application has been submitted 17.8km from the Project (**Table 16-14**). However, it is assumed that the highest density of future developments would be preferentially located in high suitability regions.
85. The East Anglia coast (i.e. Norfolk and Suffolk) has been highlighted in the East Marine Plan (HM Government, 2014) as being an important area for aggregates for the UK, with a view to facilitating growth of the aggregates industry in this area of the UK sea bed. It is expected that aggregate extraction activity will increase over the next 10–20 years (HM Government, 2014) as a strategic industry for this area. It is noted that an AfL has been granted by The Crown Estate for SEP and DEP which takes precedence over any future potential aggregate extraction that may have occurred within the AfL areas.

## 16.6 Potential Impacts

### 16.6.1 Potential Impacts during Construction

86. The baseline presented in **Section 16.5** shows that there are no interactions between SEP and DEP and other offshore wind farms, aggregates or disposal sites or existing aquaculture and, therefore, there is no pathway for impact. Following the scoping response from the Planning Inspectorate (**Table 16-1**), impacts on these receptors have been scoped out of the EIA and are not considered further in this chapter. Potential impacts to offshore wind farm export cables are considered in **Section 16.6.1.2**.
87. Following the scoping response from the Planning Inspectorate (**Table 16-1**) impacts to human health from UXO are considered in **Chapter 28 Health**. UXO is not considered further in this chapter.

#### 16.6.1.1 Impact 1: Potential interference with O&G operations

##### 16.6.1.1.1 DEP in Isolation

88. As discussed in **Section 16.5** and presented in **Table 16-10** and **Figure 16.1**, there is O&G infrastructure within and in close proximity to DEP. Construction activities such as sea bed preparation, installation of turbines, trenching and installation of cables, vessel anchoring, debris clearing and the enforcement of safety zones restricting access have the potential to interfere with existing operations. The areas being considered for the siting of wind turbines are a minimum of 500m from existing platforms, pipelines, active wells and other infrastructure. Access impacts are identified for the nearest platforms and infrastructure, including Waveney, Blythe and Elgood, where there is the potential for access restrictions as a result of SEP and DEP. It is noted that impacts associated with O&G platform access (both marine and helicopter) are detailed and assessed in the operational assessment in **Section 16.6.2.1** whereby the operational phase, representing the maximum build out of SEP and DEP, is assumed to represent the worst-case. Any impacts on the transit of O&G vessels are assessed in **Chapter 13 Shipping and Navigation** and potential impacts on pipelines are assessed in **Section 16.6.1.3**.
89. The 200m temporary works area (TWA) (**Figure 16.1**) overlaps the Elgood safety zone. Agreement, via an appropriate proximity agreement, will be established prior to works execution (as embedded in **Table 16-3**). If an appropriate proximity agreement cannot be reached, the TWA could be omitted in proximity to Elgood, where the enforcement of such would otherwise impede the established 500m safety zone.
90. The O&G industry as a receptor is an industry of national importance. Damage to platforms or subsurface infrastructure, including active wells, caused by the construction of DEP has the potential to cause major disruption to O&G operations with associated environmental impacts; therefore, the sensitivity of the receptor is high.

91. As detailed in **Section 16.6.2.1** the magnitude of effect is low given the platforms are unmanned, access for construction activities is only required infrequently and will be temporary and of limited duration. Impacts associated with the maximum build out of DEP are assessed within the operational phase assessment (**Section 16.6.2.1**). Therefore, the impact on O&G operations during the construction phase is considered to be of **moderate adverse** significance driven by high receptor sensitivity which is significant in EIA terms.
92. Crossing and proximity agreements will determine how close construction activities can be to the existing infrastructure. With these in place, along with additional embedded mitigation such as site selection to avoid O&G infrastructure (excluding pipelines) and promulgation of information, significant impacts are anticipated to be avoidable.

#### 16.6.1.1.2 SEP in Isolation

93. There is no active O&G infrastructure inside or within 5km of the SEP wind farm site or offshore export cable corridor. Therefore, there would be no pathway and **no impact** associated with the construction of SEP in isolation.

#### 16.6.1.1.3 SEP and DEP

94. Should both SEP and DEP be constructed, either concurrently or sequentially, the potential impacts to O&G operations would be the same as for DEP in isolation (**moderate adverse**) (**Section 16.6.1.1.1** and **Section 16.6.1.1.12**).

#### 16.6.1.1.4 Mitigation

95. Additional mitigation options include:
- 1NM buffer free of turbines or other permanent infrastructure around Waveney to ensure approaches and take off under Visual Meteorology Conditions (VMC) could be conducted safely (**Appendix 16.2**);
  - Positioning of turbines within the DEP North array area and DEP South array area to minimise any reduction in searoom (for example, to accommodate anchor spreads);
  - Ongoing consultation with relevant O&G stakeholders in addition to Maritime and Coastguard Agency (MCA) and Trinity House ensuring maintenance of appropriate access. Liaison and agreement of appropriate protocols during periods of construction; and
  - Commercial agreements with key stakeholders where necessary.
96. Further targeted mitigations pertaining specifically to vessel and helicopter access are detailed in **Section 16.6.2.1**.

### 16.6.1.1.5 Residual Impact

97. Experience at other offshore wind farms that have been constructed within close proximity to O&G assets show that large rig operations can occur within areas where there is limited sea room. Blythe, for example, was installed less than 200m from the consented boundary of DOW and 0.6NM (approximately 1,100m) from the nearest wind turbine. Given that the platforms most impacted are NUI's, and with the implementation of the additional mitigation described in [Section 16.6.1.1.4](#), the magnitude of impact, while reduced, is still considered to be low. The sensitivity remains high, however, it is considered that the impacts associated with O&G operations can be managed to acceptable levels with the mitigation proposed. The residual impact, remains **moderate adverse** driven by the high sensitivity, however, the impact is not considered to be significant in EIA terms with the proposed additional mitigation and given its assessment to be tolerable with mitigation within the access studies ([Appendix 16.1](#) and [Appendix 16.2](#)). It is noted that the key mitigations driving the reduction in impact are a 1NM turbine free buffer around Waveney and commercial agreements, where necessary. Should these mitigations not be implemented, the residual impact would remain as significant.

### 16.6.1.2 Impact 2: Potential impacts on O&G exploration and development

#### 16.6.1.2.1 DEP in Isolation

98. The DEP wind farm site overlaps six licensed blocks ([Section 16.5.1](#)). It is not known whether these production licenses include commitments to further development or exploration, however, there is the potential that during construction of DEP, seismic surveys within these licensed blocks would be restricted (due to the size of the seismic equipment), and any potential drilling or installation of new infrastructure within the wind farm site would be limited by DEP offshore infrastructure or construction activities.
99. The O&G industry as a receptor is an industry of national importance. It is difficult to predict the level of impact that DEP would have on future O&G activity and there is no guarantee of future exploration or development activity. Given the prevalence of decommissioning activities over exploration and development in the North Sea ([Section 16.5.11](#) and [16.6.2.2](#)) and the limited duration of construction activities, the sensitivity is considered to be medium.
100. The magnitude of the impact depends on the level of O&G development that occurs within the vicinity of DEP. The O&G production licences that overlap spatially and could overlap temporally with the DEP construction phase (which would begin in 2025 at the earliest) are listed in [Table 16-11](#). If future O&G exploration or development were planned in the DEP wind farm site during the construction phase, the magnitude of the impact could be medium due to short term loss of access, however, if no further development occurs, there would be no impact.

101. Consultation with the operators of the licensed blocks has aimed to address any potential issues and establish a line of communication to ensure that coexistence between both activities can be achieved with minimal disruption. Consultation feedback was primarily concerned with access to existing infrastructure rather than loss of future exploration and development potential. Perenco noted that no exploration activities are planned in the area and IOG successfully completed drilling at Elgood and Blythe in 2021 and noted no further planned exploration and development activities. Where development interests of oil or gas developers and offshore renewables developers come into conflict as they seek to develop the same or adjoining areas of the sea bed, the Secretary of State expects that the parties will be able to come to a private, commercial agreement which will allow the parties to accommodate their respective development aims (Department of Energy and Climate Change (DECC), 2014). Therefore, the worst-case magnitude of the impact is considered to be low.
102. As a worst-case the sensitivity of the licence operators is considered to be medium given the unknown likelihood of exploration or development activity in the DEP wind farm site during with the construction phase, with a low magnitude of impact following consultation and agreements. Therefore, the impact on potential O&G exploration and development is considered to be of **minor adverse** significance.

#### 16.6.1.2.2 SEP in Isolation

103. The SEP wind farm site and offshore export cable corridor do not overlap with any O&G licences. Therefore, there would be **no impact** associated with the construction of SEP in isolation.

#### 16.6.1.2.3 SEP and DEP

104. Should SEP and DEP be constructed, either concurrently or sequentially the potential impacts to O&G exploration and development would be the same (**minor adverse**) as for DEP in isolation. This is because there would still be no impact associated with SEP, due to the lack of overlapping licensed blocks.

#### 16.6.1.2.4 Mitigation

105. No additional mitigation above that embedded is proposed.

### 16.6.1.3 Impact 3: Potential impacts on subsea cables and pipelines

#### 16.6.1.3.1 DEP in Isolation

106. Construction activities, such as cable and foundation installation, vessel anchoring and debris clearing operations in proximity to existing cables and pipelines (including at crossings) have the potential to damage existing assets.
107. If constructed in isolation, the DEP offshore cable corridors will cross the DOW export cables twice and the Hornsea Three export cable corridor once. (**Figure 16.3**). This would require up to four cable crossings assuming unbundled installation (**Table 16-2**). The offshore export cable corridor would also cross the disused Stratos telecommunications cable.



108. The DEP North array area intersects one pipeline (Durango to Waveney) requiring up to three infield cable crossings, and the DEP South array area intersects three pipelines (PL876, PL877 and PL1570) requiring up to four infield cable crossings. Wind turbines and OSPs will be located a minimum of 500m away from these pipelines.
109. Therefore, DEP in isolation will cross up to 17 subsea cables and pipelines. The sensitivity of the receptors is high. Damage to cables would be expensive to repair and has the potential to cause disruption to power distribution and, as a worst-case, total loss of function with limited or no ability to use redundancy (although DOW has two export cables and therefore has redundancy should one be damaged). Damage to pipelines could cause major disruption to O&G operations and associated potential environmental impacts. Therefore, the potential magnitude of such an impact on cables and pipelines is high.
110. In order to prevent impacts, the Applicant will enter into proximity and crossing agreements with the affected cable and pipeline owners and operators as part of embedded mitigation (see **Section 16.3.3**). Proximity agreements will determine how close construction activities, including within the TWA, can be to the existing infrastructure, and crossing agreements will determine how any crossings are made. Crossings are likely to require the installation of protective material (for example rock armouring or concrete mattresses) over the cables or pipelines, then laying the DEP cables over the protective material. Protective material would then be laid over the DEP cables. The resultant locations, design and construction methodologies will avoid physical impact upon cables and pipelines which may affect their operation.
111. Consequently, the magnitude of the impact would be reduced to negligible, meaning that the impact of the construction of DEP in isolation on subsea cables and pipelines would be of **minor adverse** significance.

#### 16.6.1.3.2 SEP in Isolation

112. If constructed in isolation, the SEP offshore export cable corridor will cross the DOW export cables once and the Hornsea Three export cable corridor once (**Figure 16.3**). This would require up to four crossings assuming unbundled installation (**Table 16-2**). The offshore export cable corridor would also cross the Stratos telecommunications cable, however, as it is disused, there will be no operational impact on this receptor.
113. As stated above for DEP in isolation, the Applicant will enter into proximity and crossing agreements with the affected cable owners and operators to minimise the magnitude of impact. Given the high receptor sensitivity but negligible magnitude, the impact of the construction of SEP in isolation on subsea cables would be of **minor adverse** significance.

#### 16.6.1.3.3 SEP and DEP

114. Should SEP and DEP both be constructed, concurrently or sequentially, up to 21 cable and pipeline crossings could be required. Although this is more than either SEP or DEP in isolation, the potential impacts would be at the same general locations on the same receptors, and with adherence to proximity and crossing agreements, the impacts would be the same (**minor adverse**).

#### 16.6.1.3.4 Mitigation

115. No additional mitigation above that embedded is proposed.

#### 16.6.1.4 Impact 4: Potential impacts on marine recreation

##### 16.6.1.4.1 DEP in Isolation

116. During the construction phase of DEP there will be temporary 500m safety zones in operation around construction vessels and partially constructed turbines as well as an incremental increase in the presence of wind farm infrastructure. This could result in the temporary displacement of recreational activities during the construction phase. Impacts associated with displacement and navigational impacts as a result of construction activities at SEP and DEP are addressed in **Chapter 13 Shipping and Navigation**.

117. The marine recreational vessels are able to temporarily alter their course when necessary and recreational angling and divers are considered able to temporarily divert to alternative areas during the construction phase. Notices to Mariners will be provided when necessary throughout construction works. Therefore, the sensitivity of marine recreational activities during the construction phase is considered to be low.

118. Displacement of recreational activities will be associated primarily with installation of the inshore part of the offshore export cable corridor with the nearshore route flagged by the RYA during consultation as the route of primary concern. Following completion of offshore export cable installation, including HDD exit pits, the impact of displacement will cease. The impact on recreational vessels during the construction phase is, therefore, considered temporary in nature and the magnitude of the impact is considered to be low.

119. Overall the impact on recreational activities due to the construction of DEP in isolation is considered to be of **minor adverse** significance.

##### 16.6.1.4.2 SEP in Isolation

120. While recreational transits are higher in the vicinity of SEP than DEP owing to its position closer to shore, the sensitivity of recreational activities to displacement during construction, and the potential magnitude of impact for SEP in isolation is considered the same as for DEP, given SEP's position behind SOW and away from the primary nearshore recreational route. The nearshore route was flagged by the RYA during consultation as the route of primary concern. The overall significance of the impact on recreational activities due to the construction of SEP in isolation is considered to be of **minor adverse** significance.

##### 16.6.1.4.3 SEP and DEP

121. Should SEP and DEP both be constructed concurrently, peak displacement effects would be greater, however, concentrated within a shorter (2 year) period. If constructed sequentially, peak effects would be lower but the duration of impacts would be spread over up to 4 years. For both scenarios the potential impacts would be considered the same as DEP in isolation (**minor adverse**).



#### 16.6.1.4.4 Mitigation

122. No additional mitigation above that embedded is proposed.

### 16.6.2 Potential Impacts during Operation

#### 16.6.2.1 Impact 1: Potential interference with O&G operations

##### 16.6.2.1.1 DEP in Isolation

#### Vessel Impacts

123. There is potential for operation and maintenance activities associated with DEP to interfere with existing O&G operations. With temporary safety zones during major maintenance around wind farm infrastructure and increased vessel traffic (transiting crew, monitoring surveys and maintenance vessels), access to O&G infrastructure such as the Waveney Gas Platform, Blythe Hub infrastructure and existing gas pipelines by vessels may be compromised leading to deviations and restriction of access during certain periods (for example, during certain weather conditions).
124. A vessel access study ([Appendix 16.1](#)) was undertaken to assess the impact of SEP and DEP on access to nearby O&G infrastructure. Access will need to be accommodated for inspections, maintenance, interventions, emergency repairs and decommissioning. Anchor spreads may also need to be accommodated. AIS data (as detailed in [Table 16-5](#)) was analysed to inform the assessment. All assets within 10NM of SEP and DEP were considered including surface platforms and subsea infrastructure. The majority of O&G vessels routing in proximity to DEP were to Excalibur, Lancelot and Waveney, even so, this traffic accounted for only 9% of O&G vessel activity within the study area averaging four visits per month to Excalibur and Lancelot and one to two visits per month to Waveney.
125. Drilling at Elgood (0.5km from the DEP North array area) did not commence until 2021 and therefore, additional AIS data was obtained to capture drilling activities in April 2021 ([Table 16-5](#)). Two vessels were recorded operating at the site, the Emergency Response and Rescue Vessel (ERRV) Esvagt Champion and the offshore supply vessel VOS Paradise. Both vessels were present within the DEP North array area boundary, however, it was noted that the nearest recorded distance to DOW was 650m. Limited searoom caused by DEP may result in restrictions of the periods when Elgood can be practicably accessed (for example, during poor weather). However, it was noted by IOG that following completion of drilling, no further rig or jack up operations are planned at Elgood or Blythe and no further well intervention is expected to be needed until later in the field life. It is anticipated that Blythe and Elgood will be visited twice per month by standard MRV's for 4-5 days total, reducing to one visit per month for 4-5 days total.
126. The 200m TWA ([Figure 16.1](#)) overlaps the Elgood safety zone. Agreement, via an appropriate proximity agreement, will be established prior to required maintenance activities (as embedded in [Table 16-3](#)). If an appropriate proximity agreement cannot be reached, the TWA could be omitted in proximity to Elgood, where the enforcement of such would otherwise impede the established 500m safety zone.

127. Similarly, installation of the Blythe asset located approximately 1.1km north of the DEP South array area did not commence until 2021 and data spanning May and June covering the installation period was obtained. Four vessels associated with the installation were identified, the Heavy Lift Vessel (HLV) *Seaway Strashnov*, the multirole ERRV *Forties Sentinel*, the hydrographic survey vessel *Geo Focus* and the tug *Fairplay-35*. The vessels were largely outside of the DEP South array area and maintained between 150m (*Geo-focus*) and 1,100m (*ERRV Forties Sentinel*) of separation from the DOW boundary.
128. A review of deviation impacts identified that the majority of support vessels making routine visits to the assets originated from Great Yarmouth and Lowestoft and as such approach from the south. Vessels passing to the east of DOW will be required to pass further to the east to avoid DEP. Vessels passing to the west of DEP to access the LAPS field assets will also be required to pass east of DEP or deviate further west passing south of the outer dowsing bank. There is considered to be sufficient sea room to accommodate this as established through consultation with relevant stakeholders (**Table 16-1**). The largest deviation assessed is for routine visits to Waveney for which a 27% additional transit time is estimated. It is noted that routing to Blythe has not yet been established and a deviation in excess of 2NM will likely be required for routine support visits.

#### *Helicopter Impacts*

129. When flying in good visibility / VMC, a helicopter must maintain a minimum 150m (500ft) separation distance from all obstacles, though this may increase under certain conditions, such as turbulence. Access requirements to the platform helidecks in day VMC are not considered to be affected at a distance of greater than 1NM from wind turbines. Within 1NM helicopter access impacts are considered likely when considering other factors such as wind conditions, approach direction and turbulence from platform structures. When flying in low visibility Instrument Meteorological Conditions (IMC), a pilot is required to maintain a 1,000ft vertical clearance from all obstacles and 1NM lateral separation from all onboard radar contacts until the pilot can transfer to Visual Flight Rules (VFR) to make the final approach to the platform.

130. Helicopters which operate to and from offshore platforms are fitted with weather radar which can be used to conduct an instrument approach to the platform in poor visibility. Airborne Radar Approaches (ARA) are used as a low-visibility approach procedure to the platforms and rely upon the on-board weather radar for obstacle detection and navigation. The radar is designed to display weather phenomena, such as rain, as well as obstacles such as the O&G platforms or wind turbines. When flying IMC certain wind conditions dictate the area of approach to the platform. Due to performance and handling requirements, helicopters will normally approach to land and take-off facing into the prevailing wind. Therefore, helicopter access to O&G platforms is restricted under certain weather conditions (in low visibility (IMC) coupled with wind and low cloud base, for example and a standard ARA procedure might not be available due to the proximity of wind turbines. The extent of this effect can be defined spatially; however, the temporal nature of the effect will vary on a case-by-case basis. This is due to the fact that the length of time in which helicopters can operate VFR will vary due to different weather conditions, and the fact there are inherent restrictions on other phases of flight in certain weather conditions not attributed to the presence of wind turbines near the destination platform. Analysis of day and night VMC access to Waveney indicates that VMC access is currently available 85% (2021) to 92.3% (2020) of the time.
131. In order to help achieve a safe operating environment, a consultation zone of 9NM radius (CAA, 2016) exists around offshore helicopter installations. This consultation zone is not considered a prohibition on wind turbine development within a 9NM radius of offshore operations, but is a trigger for consultation between platform operators, helicopter operators, and wind developers to maintain a safe coexistence between wind turbines and offshore helicopter operations. The DEP North array area and DEP South array area are located within the consultation zones of several installations as illustrated in [Figure 16.2](#). Details of consultation undertaken with O&G operators are provided in [Table 16-1](#).
132. A helicopter access study ([Appendix 16.2](#)) was undertaken to assess the impact of SEP and DEP on access to nearby O&G infrastructure. Six locations were assessed, Waveney, Elgood, Blythe, Lancelot, Durango and Excalibur. The NW Hewett and Anglia West wells are assumed to be decommissioned by 2023 prior to construction and, as such, were not assessed. The assessment was undertaken based on 18 months of meteorological and vantage POB System data ([Table 16-5](#)). It is understood that there is also potential for the Waveney platform to cease production in 2025 ([Table 16-1](#)), although it is noted that no formal decommissioning plans currently exist. Waveney is therefore assumed to remain present during both the construction and operational phases for the purposes of assessment.
133. The helicopter access study determined that access impacts to Lancelot, Excalibur and Durango are low with total access available for 93.8% and 94.1% of the assessed period for Lancelot and Excalibur respectively. Access to Durango is unconstrained owing to its distance from DEP.

134. Although infrequent, it is possible that a drilling rig or diving support vessel may require access to the Elgood well, although it was noted in consultation that no further rig or jack up operations are planned and no further well intervention is expected until later in the field life (**Table 16-1**). Should wind turbines be constructed up to the edge of the DEP wind farm site (excluding the temporary works area), the Elgood well would have minimal access, even under VMC and some operators may decline to fly to site owing to the 500m spacing between Elgood and DEP. An alternative means of access may be required such as a walk-to-work vessel, however, due to the infrequency of required visits to Elgood outside of those by standard MRV's the impacts on access to Elgood are considered to be low.
135. Impacts on helicopter access were assessed to be highest at Waveney and Blythe NUI's. As the boundary of DEP extends across more than 180° of Waveney's approach and take-off arcs, VMC access will be available when an approach and take off on an east-west axis can take place. If wind turbines were built up to the wind farm site boundary (excluding the temporary works area), then Commercial Air Transport (CAT) helicopters would be unable to access the Waveney platform for 85.4% of daylight conditions. IMC access to Waveney would not be feasible.
136. Occasional access to Blythe will be required for maintenance. Should wind turbines be constructed up to the edge of the DEP wind farm site (excluding the temporary works area), the Blythe NUI would have minimal access, even under VMC. It is noted, however, that the Blythe NUI likely already has restricted day / night VMC access due to its proximity to DOW. IMC access to Blythe would not be feasible during the operation of DEP, however, it is noted that it is currently impaired owing to proximity of DOW to such an extent that it is already impractical. Given the existing restrictions presented by DOW, DEP is interpreted to present little additional impact.
137. The O&G industry as a receptor is an industry of national importance. Helicopters are the primary method of access for offshore personnel completing maintenance activities and are also important for transporting small items of equipment. The restriction of helicopter and vessel access has the potential to cause major disruption to O&G operations; therefore, the sensitivity of the receptor (in this case the O&G industry) is assessed to be high.
138. Impacts are considered to be greatest to the Perenco operated Waveney platform given its proximity (approximately 500m) to the DEP North array area boundary. The Blythe platform installed in 2021 by Independent Oil and Gas was constructed less than 200m east of the consented boundary of DOW and 0.6NM (approximately 1,000m) from the nearest wind turbine. It is considered that the impacts associated with Waveney can similarly be managed to acceptable levels with mitigation (**Section 16.6.1.2.4**). With respect to the DEP South array area, helicopters approaching Waveney will only be able to approach from the north in low-visibility (ARA) conditions. This situation should occur at a moderate frequency given the level of helicopter activity at Waveney (typically 70 visits per year, or approximately 1 every 5 days (**Appendix 16.2**)). On this basis the magnitude of effect is considered medium.
139. The impact of DEP in isolation is, therefore, considered to be of **major adverse** significance, which is significant in EIA terms.

#### 16.6.2.1.2 *SEP in Isolation*

140. There is no active O&G infrastructure inside or within 5km of the SEP wind farm site or offshore export cable corridor. Therefore, there would be **no impact** associated with the operation of SEP in isolation.

#### 16.6.2.1.3 *SEP and DEP*

141. The impact from the operation of both SEP and DEP will be the same as for DEP in isolation, i.e **major adverse** significance, which is significant in EIA terms.

#### 16.6.2.1.4 *Mitigation*

142. Mitigation options include:

- Positioning of turbines within the DEP North array area and DEP South array area to minimise any reduction in searoom (to accommodate anchor spreads, for example);
- Ongoing consultation with relevant O&G stakeholders in addition to MCA and Trinity House to ensure appropriate access is maintained and to ensure close liaison and agreement of appropriate protocols during periods of major maintenance;
- An obstacle free 1NM arc around Waveney to ensure approaches and take off under VMC conditions could be conducted safely (**Appendix 16.2**) (additional distance would be required for night VMC approaches). Analysis of 2020 and 2021 Vantage POB data (**Appendix 16.2**), in combination with meteorological data, identified flights that would have been lost or delayed to Waveney should a 1NM turbine free buffer exist. In 2020 two flights out of 72 would have experienced restricted operations requiring early extraction of personnel. In 2021 there would have been one flight out of 67 that would have experienced delays. A 1NM buffer would increase access from approximately 14.6% (500m buffer scenario) to 92.3% (1NM buffer scenario);
- Utilisation of an alternative means of access, such as a walk-to-work vessel, where helicopter operators may decline to fly to site, where appropriate;
- Commercial agreements, where justified, to mitigate delays or impeded access that relates specifically to the presence of SEP and DEP. Commercial discussions have commenced with O&G stakeholders.

### 16.6.2.1.5 Residual Impact

143. Experience at other offshore wind farms that have been constructed within close proximity to O&G assets show that large rig operations can still occur within areas where there is limited sea room. Blythe, for example, was installed in close proximity to DOW (0.6NM (approximately 1,100m) from the nearest turbine). Given that the platforms most impacted are NUI's, and with the implementation of the additional mitigation described in [Section 16.6.1.1.4](#), the magnitude of impact is considered low with mitigation ([Appendix 16.1](#) and [Appendix 16.2](#)). While the sensitivity remains high it is considered that the impacts associated with Waveney can be managed to acceptable levels with the mitigation proposed. The residual impact of potential interference with O&G operations is therefore **moderate adverse**, which is not significant in EIA terms given mitigations and its assessment of tolerable with mitigation within the vessel and helicopter access studies ([Appendix 16.1](#) and [Appendix 16.2](#)). The reduction in impact is driven by the obstacle free 1NM arc around increasing CAT helicopter access from approximately 14.6% (500m scenario) to 92.3% (1NM scenario) ([Appendix 16.2](#)) and commercial negotiations, where justified.

### 16.6.2.2 Impact 2: Potential impacts on O&G exploration and development

#### 16.6.2.2.1 DEP in Isolation

144. The DEP wind farm site overlaps six licensed blocks ([Section 16.5.1](#)). It is not known whether these production licences include commitments to further development or exploration, however, there is the potential that during operation of DEP, seismic surveys within these licensed blocks would be restricted (due to the size of the seismic equipment) and any potential future drilling or placement of new O&G infrastructure within the wind farm site would be limited by DEP infrastructure.
145. The O&G industry is of national importance. There is no guarantee that future exploration or development activity will occur in the licensed blocks. The Oil and Gas UK Decommissioning Insight 2020 (Oil and Gas UK, 2020) detailed that in 2020, well decommissioning activities (116 wells) within the North Sea outranked the combined exploration (4 wells), appraisal (3 wells) and development (60 wells) activities. Further, 371 platform wells, 47 subsea wells and 31 suspended exploration and appraisal wells (totalling 449) are planned to be decommissioned across the Southern North Sea and Irish Sea between 2020 and 2029 (Oil and Gas UK, 2020). Given the prevalence of decommissioning activities over exploration and development in the North Sea, the sensitivity is considered to be medium.



146. The magnitude of the impact depends on the level of O&G development that could occur within DEP during the active lifetime of the licences with which DEP overlaps. If no further development were to occur during the operation of DEP, there would be no impact. The O&G production licences that overlap spatially and temporally with the DEP operational phase (which would begin in 2028 at the earliest) are blocks 48/23a and 48/23b (end date 2030), 48/22c (2041), 48/17d (2044) and 48/16 (2044) (**Table 16-11**). It is unlikely that significant exploration and development activity will take place towards the end of a licence period. However, the presence of DEP infrastructure would restrict future O&G exploration and development potential (**Section 16.5.11**).
147. Consultation with the operators of the licensed blocks has aimed to address any future operational issues and establish a line of communication to ensure that coexistence between both activities can be achieved with minimal disruption. Consultation feedback was primarily concerned with access to existing infrastructure rather than loss of future exploration and development potential (**Table 16.2**). Perenco noted that no exploration activities are planned in the area and IOG successfully completed drilling at Elgood and Blythe in 2021 and noted no further planned exploration and development activities. Where development interests of oil or gas developers and offshore renewables developers come into conflict as they seek to develop the same or adjoining areas of the sea bed, the Secretary of State expects that the parties will be able to come to a private, commercial agreement which will allow the parties to accommodate their respective development aims (DECC, 2014). As such the worst-case magnitude of impact is considered to be low.
148. As a worst-case, the sensitivity of the licence holders is considered to be medium given the unknown likelihood of exploration or development activity in the DEP wind farm sites during with the operation phase, with a low magnitude of impact following consultation and agreements. Therefore, the impact on potential O&G exploration and development is considered to be of **minor adverse** significance.

#### 16.6.2.2.2 *SEP in Isolation*

149. The SEP wind farm site and the proposed offshore export cable corridor do not overlap with any O&G licences, therefore, there would be **no impact** associated with the operation of SEP in isolation.

#### 16.6.2.2.3 *SEP and DEP*

150. Should SEP and DEP operate at the same time, the potential impacts to O&G exploration and development would be the same (**minor adverse**) as for DEP in isolation.

#### 16.6.2.2.4 *Mitigation*

151. No additional mitigation above that embedded is proposed.

### 16.6.2.3 Impact 3: Potential impacts on subsea cables and pipelines

152. During the operation phase, there is the potential for maintenance activities to cause damage to subsea cables and pipelines at crossings and where wind farm infrastructure is installed in close proximity to existing assets. Maintenance activities may include cable repair work which could entail the use of jack up vessels, or the deployment of anchors. It is expected that any such activities would be subject to the same principles and agreements as established during the construction phase (see **Section 16.6.1.3**).

#### 16.6.2.3.1 DEP in Isolation

153. If DEP is operated in isolation there will be up to ten cable crossings and seven pipeline crossings assuming unbundled installation (**Table 16-2**). As described in **Section 16.6.1.3** the sensitivity of the receptors is high. Damage to cables would be expensive to repair and has the potential to cause disruption to power distribution and total loss of wind farm asset function. Damage to pipelines could cause major disruption to O&G operations and associated potential environmental impacts. However, the likelihood of damage to existing cables and pipelines is low due to the implementation of crossing and proximity agreements with due regard of OIL AND GAS UK guidelines (Pipelines Crossing Agreement and Proximity Agreement Pack, OIL AND GAS UK, 2015), and the reduced likelihood that intervention will be required during the operational phase (compared to the construction phase). The magnitude of the impact is, therefore, deemed negligible and impacts would be of **minor adverse** significance.

#### 16.6.2.3.2 SEP in Isolation

154. If SEP is operated in isolation there will be up to four cable crossings assuming unbundled installation (**Table 16-2**). The sensitivity of the receptors is high and the magnitude of the impact is deemed negligible. As for DEP in isolation, impacts would be of **minor adverse** significance.

#### 16.6.2.3.3 SEP and DEP

155. Should SEP and DEP be operated at the same time there would be up to 21 cable and pipeline crossings. Although this is more than for either SEP or DEP in isolation, the potential impacts are assessed as being of the same significance (**minor adverse**) because there is no significant change in the magnitude of effect given embedded mitigation.

#### 16.6.2.3.4 Mitigation

156. No additional mitigation above that embedded is proposed.



#### 16.6.2.4 Impact 4: Potential impacts on marine recreation

##### 16.6.2.4.1 DEP in Isolation

157. During the operational phase of DEP, recreational vessels will be excluded from the immediate vicinity of surface infrastructure due to the physical presence of turbines and OSPs in the DEP wind farm site. Furthermore, there will be temporary 500m safety zones in operation around maintenance vessels when repairs are required. These will result in a potential displacement of recreational activities in these areas. Any displacement or navigational safety impacts on recreational vessels traversing the wind farm sites as a result of the presence of surface infrastructure (wind turbines and OSPs) is addressed in **Chapter 13 Shipping and Navigation**.
158. The area from which recreational activities may be displaced during maintenance activities is likely to be smaller than during construction with potential to result in only a slight alteration to recreational activity. For internal transit, the minimum spacing of 1.05km is considered sufficient to facilitate vessel types that have been observed to pass through operational arrays (e.g. fishing and recreation). The frequency of maintenance activities is likely to be low and intermittent over a longer time period, and it is possible that cable repair and maintenance will not be required in the areas where recreational activities are concentrated (primarily around the inshore part of the offshore export cable corridor rather than DEP infrastructure further offshore). The magnitude of the impact is considered to be low. As for construction, the sensitivity of the receptor is assessed as low (**Section 16.6.1.4**).
159. Overall, the impact on recreational activities due to the operation of DEP in isolation is considered to be of **minor adverse** significance.

##### 16.6.2.4.2 SEP in Isolation

160. Concern was raised during NRA consultation by the RYA over the potential for increases in encounters between recreational and commercial vessels within the area between SEP and DEP (**Chapter 13 Shipping and Navigation**). It is noted that there will be no restrictions on passage through the wind farm sites, and such transit can continue through SEP and DEP by smaller recreational vessels during the operational phase, noting that the minimum spacing of 1.05km is considered sufficient for safe internal navigation. Recreational vessels are noted in the RYA coastal atlas transiting between the wind farm sites in small numbers, with the majority of transits occurring outside of SEP.
161. While recreational transits are slightly higher in the vicinity of SEP than DEP owing to its position closer to shore, the sensitivity of recreational activities to displacement during operation, and the potential magnitude of impact for SEP in isolation is considered the same as for DEP given SEP's position behind SOW and away from the primary nearshore recreational route. The overall significance of the impact on recreational activities due to the operation of SEP in isolation is, therefore, considered to be of **minor adverse** significance.

#### 16.6.2.4.3 SEP and DEP

162. Should SEP and DEP be operated at the same time, the potential impacts would still be considered as **minor adverse** significance because, although the potential area of displacement is higher, in the context of the wider area available for marine recreation, the preferred utilisation of the nearshore route and the intermittent nature of maintenance activities, the magnitude of the impact is still considered **minor adverse**.

#### 16.6.2.4.4 Mitigation

163. No additional mitigation above that embedded is proposed.

### 16.6.3 Potential Impacts during Decommissioning

164. Impacts upon the petroleum industry and other marine users during decommissioning are anticipated to be similar to those assessed during the construction phase of SEP and DEP, with an incremental reduction of impact as infrastructure is removed.
165. Decommissioning works would be determined by the relevant legislation and guidance at the time of decommissioning and would most likely involve the accessible installed components. Offshore, this is likely to include removal of all of the wind turbine and OSP components, including the foundations above sea bed level but excluding scour protection. Offshore cables may be left *in situ* or removed depending on available information and technology at the time of decommissioning. The infield cables will be cut at each end towards the foundation structures. Cable protection and crossings would likely be left *in situ*.

#### 16.6.3.1 Impact 1: Potential interference with O&G operations

##### 16.6.3.1.1 SEP or DEP in Isolation

166. To minimise environmental impacts, buried offshore cables may be disconnected and left *in situ* along with associated cable protection measures and crossings. If this is not the case and they are removed, agreements will be reached with owners of existing (and potentially future) infrastructure prior to removal.
167. Wind turbine and OSP foundations will be removed to the level of the sea bed. These structures will have been located to avoid any impact upon existing infrastructure and, therefore, decommissioning impacts are not anticipated.
168. Further, it is likely that decommissioning activities may have been undertaken at nearby O&G infrastructure by the SEP or DEP decommissioning phase, reducing the prevalence of O&G receptors.
169. The impact significance would be **no impact** for both DEP in isolation and SEP in isolation.

### 16.6.3.1.2 SEP and DEP

170. Decommissioning of SEP and DEP, either concurrently or sequentially, would result in the same potential impacts to O&G operations (**no impact**) as for SEP or DEP in isolation (**Section 16.6.3.1.1**).

### 16.6.3.1.3 Mitigation

171. No additional mitigation above that embedded is proposed.

## 16.6.3.2 Impact 2: Potential impacts on O&G exploration and development

### 16.6.3.2.1 SEP or DEP in Isolation

172. The sensitivity and magnitude of effects on O&G exploration and development during decommissioning would be comparable to those identified for the construction phase. Therefore, the impact significance would be **minor adverse** for DEP in isolation and **no impact** for SEP in isolation.

173. It is worth noting that there could be a beneficial impact from the removal of wind farm infrastructure and the freeing up of sea bed for exploration and development. This is assessed as low magnitude given the expected long-term decline of O&G activity in the southern North Sea. With a medium sensitivity, there may be an impact of minor beneficial significance on O&G exploration and development from the decommissioning of DEP.

### 16.6.3.2.2 SEP and DEP

174. Decommissioning of SEP and DEP, either concurrently or sequentially, would result in the same potential impacts to O&G exploration and development (**minor adverse**) as for DEP in isolation. This is because impacts associated with SEP are not anticipated.

### 16.6.3.2.3 Mitigation

175. No additional mitigation above that embedded is proposed.

## 16.6.3.3 Impact 3: Potential impacts on subsea cables and pipelines

### 16.6.3.3.1 SEP or DEP in Isolation

176. To minimise environmental impacts, the offshore cables may be disconnected and left *in situ* along with associated cable protection measures and subsea structures.

177. The sensitivity and magnitude of effects would be comparable to those identified for the construction phase, although it is worth noting that existing cables and pipelines at crossings are likely to be decommissioned before SEP and DEP and, therefore, there may be no impact. However, as a worst-case, as for the construction phase, the impact on subsea cables and pipelines would be of **minor adverse** significance for both SEP or DEP in isolation due to decommissioning.

#### 16.6.3.3.2 *SEP and DEP*

178. Decommissioning of SEP and DEP, either concurrently or sequentially, would result in the same worst-case potential impacts to subsea cables and pipelines (**minor adverse**) as for the construction phase (and potentially lower if existing cables and pipelines at crossings have already been decommissioned).

#### 16.6.3.3.3 *Mitigation*

179. No additional mitigation above that embedded is proposed.

#### 16.6.3.4 **Impact 4: Potential impacts on marine recreation**

##### 16.6.3.4.1 *SEP or DEP in Isolation*

180. To minimise environmental impacts, offshore cables may be disconnected and left *in situ* along with associated cable protection measures and subsea structures. Wind turbines and OSPs will be removed to the level of the sea bed.
181. The sensitivity and magnitude of effects during the period of decommissioning activities would be comparable to those identified for the construction phase. Therefore, the impact significance would be **minor adverse** upon marine recreation for both SEP or DEP in isolation.

##### 16.6.3.4.2 *SEP and DEP*

182. Decommissioning of SEP and DEP, either concurrently or sequentially, would result in comparable potential impacts to marine recreation (**minor adverse**) as for the construction phase (**Section 16.6.1.4.3**). This is because of the wider area available for marine recreation and the duration of the impact, so the magnitude of the impact is still considered low.

##### 16.6.3.4.3 *Mitigation*

183. No additional mitigation above that embedded is proposed.

## 16.7 **Cumulative Impacts**

### 16.7.1 **Identification of Potential Cumulative Impacts**

184. The first step in the cumulative assessment is the identification of which residual impacts assessed for SEP and / or DEP on their own have the potential for a cumulative impact with other plans, projects and activities (described as ‘impact screening’). This information is set out in **Table 16-13**. Only potential impacts assessed in **Section 16.6** as negligible or above are included in the CIA (i.e. those assessed as ‘no impact’ are not taken forward as there is no potential for them to contribute to a cumulative impact).
185. **Table 16-13** concludes that in relation to the petroleum industry and other marine users there are potential cumulative impacts on O&G exploration and development, subsea cables and pipelines and marine recreation.

**Table 16-13: Potential Cumulative Impacts (Impact Screening)**

Impact	Potential for Cumulative Impact	Data Confidence	Rationale
<b>Construction</b>			
Impact 1: Potential interference with O&G operations	No	Medium	Primary impacts have been identified for the Blythe and Waveney platforms. There are no further access restrictions as a result of other plans and projects.
Impact 2: Potential impacts on O&G exploration and development	Yes	Low	Other projects may result in further restricted access to licence areas. Limited available information about future exploration and development.
Impact 3: Potential impacts on subsea cables and pipelines	Yes	High	Cumulative impacts from other projects' cables and pipeline crossings.
Impact 4: Potential impacts on marine recreation	Yes	Medium	Cumulative impacts from other projects restricting / displacing recreational activities.
<b>Operation</b>			
Impact 1: Potential interference with O&G operations	No	Medium	Primary impacts have been identified for the Blythe and Waveney platforms. There are no further access restrictions as a result of other plans and projects.
Impact 2: Potential impacts on O&G exploration and development	Yes	Low	Other projects may result in further restricted access to licence areas. Limited available information about future exploration and development.
Impact 3: Potential impacts on subsea cables and pipelines	Yes	High	Cumulative impacts from other cable and pipeline crossings.
Impact 4: Potential impacts on marine recreation	Yes	Medium	Cumulative impacts from other projects restricting / displacing recreational activities.
<b>Decommissioning</b>			

Impact	Potential for Cumulative Impact	Data Confidence	Rationale
Impact 1: Potential interference with O&G operations	No	Medium	As for construction.
Impact 2: Potential impacts on O&G exploration and development	Yes	Low	As for construction.
Impact 3: Potential impacts on subsea cables and pipelines	Yes	High	As for construction.
Impact 4: Potential impacts on marine recreation	Yes	Medium	As for construction.

### 16.7.2 Other Plans, Projects and Activities

186. The second step in the cumulative assessment is the identification of the other plans, projects and activities that may result in cumulative impacts for inclusion in the CIA (described as ‘project screening’). This information is set out in **Table 16-14**, together with a consideration of the relevant details of each, including current status (e.g. under construction), planned construction period, closest distance to SEP and DEP, status of available data and rationale for including or excluding from the assessment. Projects within 20km of SEP or DEP were screened into the CIA. Any existing operational projects are considered as part of the existing environment and are not included within the CIA.
187. The project screening has been informed by the development of a CIA Project List which forms an exhaustive list of plans, projects and activities in a very large study area relevant to SEP and DEP. The list has been appraised, based on the confidence in being able to undertake an assessment from the information and data available, enabling individual plans, projects and activities to be screened in or out.

**Table 16-14: Summary of Planned Projects within 20km Considered in the CIA in Relation to Petroleum Industry and Other Marine Users**

Project	Status	Construction Period	Closest Distance from the Project (including temporary works area) (km)	Confidence in Data	Included in the CIA (Y/N)	Rationale
Weybourne Beck outfall to Walcott coastal frontage - Maintenance works	Active	Unknown (open licence until 3rd July 2028)	0.0 (Export cable corridor)  15 (array area)	High	N	Maintenance works and SEP or DEP impacts will not interact because the nearest marine components of SEP or DEP are the HDD exit pits located offshore.
Hornsea Project Three Offshore Wind Farm	Consented	2023-2031 (offshore export cable construction 2026-2027, possibly also 2030-2031)	0 (cable corridor) 83 (array area)	High	Y	Hornsea Project Three export cables will also cross Perenco (PL876, PL877) and Shell (PL1570) pipelines; DOW export cables; and potentially impact marine recreation near landfall.  There is potential that this project could be constructed in two phases with offshore export cable construction in years 3 and 4, and possibly also years 8 and 9 in a two-phase development. Temporal overlap with SEP and DEP export cable construction is unlikely but possible.
Sustainable Seaweed Ltd Seaweed Farm	Application submitted	Unknown	1.5 (array area) 8 (cable corridor)	Low	Y	The seaweed farm is located away from O&G developments and dredging areas. Potential impacts on recreational activities owing to location landward of SOW. Impacts are highly localised, and therefore unlikely to interact.



Project	Status	Construction Period	Closest Distance from the Project (including temporary works area) (km)	Confidence in Data	Included in the CIA (Y/N)	Rationale
Sheringham lifeboat station - maintenance works	Active	Unknown (open licence until 31st May 2027)	2.0 (export cable corridor) 15 (array area)	High	N	Maintenance works and project impacts will not interact. The nearest marine components of the projects are the HDD exit pits located offshore.
Norfolk Seaweed Ltd	Application submitted	Unknown	12 (cable corridor) 17 (array area)	High	Y	The operational phase will overlap with that of SEP and DEP. The seaweed farm is located greater than 10km away from any project component and assessed O&G developments. Potential impacts on recreational activities owing to location landward of SOW. Impacts are highly localised, and therefore unlikely to interact.
Outer Dowsing	Pre scoping	Unknown	13 (array area) 16 (cable corridor)	High	Y	Proposed site with the potential for future interactions if agreement for lease awarded. The proposed project is 13km from DEP north array area, therefore, interactions in the context of other marine users are unlikely.

### 16.7.3 Assessment of Cumulative Impacts

188. Having established the residual impacts for SEP and / or DEP with the potential for a cumulative impact, along with the other relevant plans, projects and activities, the following sections provide an assessment of the level of impact that may arise.

#### 16.7.3.1 Cumulative Impact 1: Potential Impacts on O&G Exploration and Development

189. **No cumulative impact** on O&G exploration and development is anticipated as O&G activities are localised and cumulative projects are located away from SEP and DEP and O&G developments impacted by SEP and DEP.

#### 16.7.3.2 Cumulative Impact 2: Potential Impacts on Subsea Cables and Pipelines

190. In addition to the DEP South array area infield cables crossing Perenco (PL876, PL877) and Shell (PL1570) operated pipelines, Hornsea Project Three is also expected to cross these pipelines at different locations, with potential cumulative impacts. The residual impact from SEP and DEP on subsea cables and pipelines is assessed as **minor adverse** for the construction, operation and decommissioning phases assuming proximity agreements will be agreed. As with SEP and DEP, it is expected that Hornsea Project Three will reach agreements with the affected operators (including proximity and crossing agreements) such that cumulative impacts remain **minor adverse** significance during all stages of the projects.

#### 16.7.3.3 Cumulative Impact 3: Potential Impacts on Marine Recreation

191. The residual impact from SEP and DEP on marine recreation is assessed as **minor adverse** as marine recreational activities are primarily concentrated in coastal areas away from SEP and DEP.

192. Installation of the Hornsea Project Three offshore export cables has the potential to have cumulative impacts with SEP and DEP export cable activities on coastal marine recreation receptors. The Hornsea Project Three offshore export cable corridor crosses the SEP and DEP export cable and is present within the temporary works area at landfall (325m to the west of the area within which cables will be installed). Based on a Hornsea Project Three construction start in 2023 and SEP and DEP offshore cable construction commencing as early as 2027, temporal overlap of export cable construction is not expected. Similarly, it is unlikely that cable maintenance or decommissioning activities would take place at the same time. However, it is possible that if Hornsea Project Three construction is delayed then cable construction activities could occur in close succession increasing the localised temporary impact on marine recreation.

193. Even in this worst-case scenario, in the context of the wider area available for marine recreation, the magnitude of any cumulative impact is still considered low. Cumulative impacts are therefore assessed as being of **minor adverse** significance.

### 16.8 Transboundary Impacts

194. Transboundary impacts for the petroleum industry and other marine users have been scoped out of the assessment in line with the recommendation of the Planning Inspectorate in the Scoping Opinion (Planning Inspectorate, 2019) (**Section 16.2**).

## 16.9 Inter-Relationships

195. **Table 16-15** illustrates the inter-relationship between impacts discussed in this chapter and those discussed in other chapters.

*Table 16-15: Petroleum Industry and Other Marine Users Inter-Relationships*

Topic and description	Related chapter	Where addressed in this chapter	Rationale
<b>Construction and Operation</b>			
Shipping traffic associated with the petroleum and other marine industries	<b>Chapter 13 Shipping and Navigation</b>	Direct impacts on O&G operations (including access of vessels to O&G infrastructure) are assessed in <b>Section 16.6.1.1</b> and <b>Section 16.6.2.1</b> .  The impact to subsea cables and pipelines is assessed in <b>Section 16.6.1.3</b> .	The presence of SEP and DEP construction and operation vessels, and the installation of offshore infrastructure has the potential to be a navigation hazard to O&G shipping, requiring diversion of vessels when in transit.
Helicopter traffic associated with the petroleum and other marine industries	<b>Chapter 15 Aviation and Radar</b>	Direct impacts on O&G operations (including access of helicopters to O&G infrastructure) are assessed in <b>Section 16.6.1.1</b> and <b>Section 16.6.2.1</b> .	The presence of SEP and DEP construction and operation vessels and the installation of wind farm site infrastructure (turbines and OSPs) has the potential to be a navigational hazard to O&G helicopter traffic and require diversion.
<b>Decommissioning</b>			
Shipping traffic associated with the petroleum and other marine industries	<b>Chapter 13 Shipping and Navigation</b>	Direct impacts on O&G operations are assessed in <b>Section 16.6.1.1</b> .  The impact on subsea cables and pipelines is assessed in <b>Section 16.6.1.3</b> .	The presence of SEP and DEP decommissioning vessels has the potential to be a navigational hazard to O&G shipping, requiring diversion of vessels when in transit and potential restriction of vessel access to O&G infrastructure.
Helicopter traffic associated with O&G platforms	<b>Chapter 15 Aviation and Radar</b>	Direct impacts on O&G operations are assessed in <b>Section 16.6.1.1</b> .	The presence of SEP and DEP decommissioning vessels has the potential to be a navigational hazard to O&G helicopter traffic, requiring diversion to platforms.

## 16.10 Interactions

196. The impacts identified and assessed within each chapter of the ES may have the potential to interact with each other. However, in this case there are no potential interactions between impacts on the petroleum industry and other marine users described in this chapter as these are all separate, non-related receptors.

## 16.11 Potential Monitoring Requirements

197. Monitoring requirements are described in the **Offshore In Principle Monitoring Plan (IPMP)** (document reference 9.5) submitted alongside this DCO application and will be further developed and agreed with stakeholders prior to construction based on the **Offshore IPMP** and taking account of the final detailed design of the projects.
198. No monitoring specific to petroleum industry and other marine users is anticipated. However, any such requirements will be agreed with stakeholders prior to construction taking account of the final detailed design of SEP and DEP. Relevant monitoring requirements applicable to topics identified in **Table 16-15** are described in **Chapter 13 Shipping and Navigation** and **Chapter 15 Aviation and Radar**.

## 16.12 Assessment Summary

199. This chapter has provided a characterisation of the existing environment for petroleum industry and other marine users based on existing data, which has established that there will be some **minor adverse** and **moderate adverse** (not significant) residual impacts on O&G operations, subsea cables and pipelines, and recreational activities during construction, operation and decommissioning phases of SEP and DEP.
200. Although SEP and DEP may require works to take place in close proximity to existing O&G operations and will require cable crossings of existing cables and pipelines, the potential for any major adverse impacts can be mitigated through proximity and crossing agreements with other operators, ongoing consultation, layout agreement, turbine placement, 1NM buffer around Waveney and commercial agreements (where justified).

**Table 16-16: Summary of Potential Impacts on Petroleum Industry and Other Marine Users**

Potential impact	Receptor	Sensitivity	Magnitude	Pre-mitigation impact	Additional mitigation measures proposed	Residual impact
<b>Construction</b>						
Impact 1: Potential interference with O&G operations	O&G operations	High	Medium (DEP) No impact (SEP) Medium (SEP & DEP)	<b>Moderate adverse</b> (DEP) <b>No impact</b> (SEP) <b>Moderate adverse</b> (SEP & DEP)	1NM buffer free of surface infrastructure around Waveney;  Positioning of turbines within the DEP North array area and DEP South array area to minimise any reduction in searoom;  Ongoing consultation with relevant stakeholders; Liaison and agreement of appropriate protocols during periods of construction; and commercial agreements.	<b>Moderate adverse (not significant)</b> (DEP) <b>No impact</b> (SEP) <b>Moderate adverse (not significant)</b> (SEP & DEP)
Impact 2: Potential impacts on O&G exploration and development	O&G operations	Medium	Low	<b>Minor adverse</b>	N/A	<b>Minor adverse</b>
Impact 3: Potential impacts on subsea cables and pipelines	Subsea cables and pipelines	High	Negligible	<b>Minor adverse</b>	N/A	<b>Minor adverse</b>
Impact 4: Potential impacts on marine recreational activities	Recreational vessels, sea angling and scuba diving	Low	Low	<b>Minor adverse</b>	N/A	<b>Minor adverse</b>

Potential impact	Receptor	Sensitivity	Magnitude	Pre-mitigation impact	Additional mitigation measures proposed	Residual impact
<b>Operation</b>						
Impact 1: Potential interference with O&G operations	O&G operations	High	Medium (DEP) No impact (SEP) Medium (SEP & DEP)	<b>Major adverse</b> (DEP) <b>No impact</b> (SEP) <b>Major adverse</b> (SEP & DEP)	1NM buffer free of surface infrastructure around Waveney;  Positioning of turbines within DEP North array area and DEP South array area to minimise any reduction in searoom;  Ongoing consultation with relevant stakeholders; Liaison and agreement of appropriate protocols during periods of construction; and commercial agreements.	<b>Moderate adverse (not significant)</b> (DEP)  <b>No impact</b> (SEP)  <b>Moderate adverse (not significant)</b> (SEP & DEP)
Impact 2: Potential impacts on O&G exploration and development	O&G operations	Medium	Low	<b>Minor adverse</b>	N/A	<b>Minor adverse</b>
Impact 3: Potential impacts on subsea cables and pipelines	Subsea cables and pipelines	High	Negligible	<b>Minor adverse</b>	N/A	<b>Minor adverse</b>
Impact 4: Potential impacts on marine recreational activities	Recreational vessels, sea angling and scuba diving	Low	Negligible	<b>Minor adverse</b>	N/A	<b>Minor adverse</b>

Potential impact	Receptor	Sensitivity	Magnitude	Pre-mitigation impact	Additional mitigation measures proposed	Residual impact
<b>Decommissioning</b>						
Impact 1: Potential interference with O&G operations	O&G operations	High	No impact	No impact	N/A	No impact
Impact 2: Potential impacts on O&G exploration and development	O&G operations	Medium	Low	Minor adverse	N/A	Minor adverse
Impact 3: Potential impacts on subsea cables and pipelines	Subsea cables and pipelines	High	Negligible	Minor adverse		Minor adverse
Impact 4: Potential impacts on marine recreational activities	Recreational vessels, sea angling and scuba diving	Low	Low	Minor adverse	N/A	Minor adverse
<b>Cumulative</b>						
Cumulative Impact 1: Potential impacts on O&G exploration and development	O&G operations	Negligible	Negligible	No impact	N/A	No impact
Cumulative Impact 2: Potential impacts on subsea cables and pipelines	Subsea cables and pipelines	Medium	Low	Minor adverse	N/A	Minor adverse



Potential impact	Receptor	Sensitivity	Magnitude	Pre-mitigation impact	Additional mitigation measures proposed	Residual impact
Cumulative Impact 3: Potential impacts on marine recreation	Recreational vessels, sea angling and scuba diving	Low (construction and decommissioning phases)	Low (construction and decommissioning phases)	<b>Minor adverse</b> (construction and decommissioning phases)	N/A	<b>Minor adverse</b> (construction and decommissioning phases)
		Low (operation phase)	Low (operation phase)	<b>Minor adverse</b> (operation phase)		<b>Minor adverse</b> (operation phase)

## References

BMAPA (2009). Renewable Energy & Cables. Dredger transit routes [Online] Available at: [REDACTED] Accessed 08/2022.

Centre for Environment, Fisheries and Aquaculture Science (Cefas) (2020). Participation, catches and economic impact of sea anglers resident in the UK in 2016 & 2017. [Online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/896907/UK\\_Sea\\_Angling\\_2016-17\\_report\\_final.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/896907/UK_Sea_Angling_2016-17_report_final.pdf). Accessed 08/2022.

Department of Energy and Climate Change (DECC) (2014). O&G clause in Crown Estate leases. Guidance on procedures for independent valuation where necessary. June 2014. [Online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/318704/Crown\\_Estate\\_Lease\\_Independent\\_Valuer\\_Guidance.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/318704/Crown_Estate_Lease_Independent_Valuer_Guidance.pdf). Accessed 08/2022.

Department for Environment, Food and Rural Affairs (Defra) (2009). UK Offshore Energy Strategic Environmental Assessment. [Online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/194348/OES\\_A3h\\_Other\\_Users.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/194348/OES_A3h_Other_Users.pdf). Accessed 08/2022.

Department of Energy and Climate Change (DECC) (2011). National Policy Statement for Renewable Energy Infrastructure (EN-3). [Online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/37048/1940-nps-renewable-energy-en3.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37048/1940-nps-renewable-energy-en3.pdf). Accessed 08/2022.

Eastern IFCA (2020). Recreational Sea Anglers. [Online] Available at: <https://www.eastern-ifca.gov.uk/recreational-sea-anglers/>. Accessed 08/2022.

European Subsea Cables Association (ESCA) (2016). Guidelines. [Online] Available at: [REDACTED] Accessed 08/2022.

Finstrokes website (2020). Dive map. [Online] Available at: [REDACTED] Accessed 08/2022.

Fishing The Spot (2020). Fishing in Weybourne. [Online] Available at: [REDACTED] Accessed 08/2022.

HM Government (2014). East Inshore and East Offshore Marine Plans. [Online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/312496/east-plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/312496/east-plan.pdf). Accessed 08/2022.

Independent Oil and Gas (IOG) (2020). Blythe Hub Development Environmental Statement - Additional Information. [Online] Available at: [REDACTED] Accessed 08/2022.

International Cable Protection Committee (ICPC) (2013). Recommendation No. 13. The Proximity of Offshore Renewable Wind Energy Installation and Submarine Cable infrastructure in National Waters. Issue 2B, 26 November 2013. Accessed 08/2022.

ICPC (2014). Recommendation No. 3. Criteria to be Applied to Proposed Crossings of Submarine Cables and/or Pipelines. Issue 10B, 12 February 2014. Accessed 08/2022.

ICPC (2015). Recommendation No. 2. Recommended Routing and Reporting Criteria for Cables in Proximity to Others. Issue 11A, 3 November 2015. Accessed 08/2022.

KIS-ORCA (2019). Offshore map. Kingfisher Information Service - Offshore Renewable & Cable Awareness project (KIS-ORCA). [Online] Available from: [REDACTED] Accessed 08/2022.

Marine Management Organisation (MMO) (2013). Sea Angling 2012 – a survey of recreational sea angling activity and economic value in England. [Online] Available at: [REDACTED] Accessed 08/2022.

Marine Management Organisation (MMO) (2015). Identification of areas of aquaculture potential in English waters. [Online] Available at: <https://www.gov.uk/government/publications/identification-of-areas-of-aquaculture-potential-in-english-waters-mmo1184>. Accessed 08/2022.

Oil and Gas Authority (2018). Offshore Licensing Rounds. Available at: [REDACTED] Accessed 08/2022.

OIL AND GAS UK (2015). Pipeline Crossing Agreement and Proximity Agreement Pack. Accessed 08/2022.

OIL AND GAS UK (2020). Decommissioning Insight 2020.

Ørsted (2018a). Race Bank Offshore Wind Farm officially opens. Available at: [REDACTED] Accessed 08/2022.

Ørsted (2018b). Hornsea Project Three Environmental Statement – Chapter 3: Project Description. PINS Document Reference: A6.1.3 APFP Regulation 5(2)(a). May 2018. Available at: [https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-000528-HOW03\\_6.1.3\\_Volume%201%20-%20Ch%203%20-%20Project%20Description.pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-000528-HOW03_6.1.3_Volume%201%20-%20Ch%203%20-%20Project%20Description.pdf) Accessed 19/01/2021. Accessed 08/2022.

North Norfolk Divers website (2020). Chalk gullies. Available at: [REDACTED] Accessed 08/2022.

PINS (2019). Scoping Opinion: Proposed Dudgeon and Sheringham Shoal Offshore Wind Farm Extensions. Planning Inspectorate Reference EN010109. Available at: [https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010109/EN010109-000006-EQNR\\_Scoping%20Opinion%202017%20EIA%20Regs.pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010109/EN010109-000006-EQNR_Scoping%20Opinion%202017%20EIA%20Regs.pdf). Accessed 08/2022.

PINS (2018). Planning Inspectorate Advice Note Nine: Rochdale Envelope. Accessed 08/2022.

RWE (2020). Triton Knoll Latest News and Information. Available at: [REDACTED] Accessed 08/2022.

The Crown Estate (2019). Record of the Habitats Regulations Assessment Undertaken under Regulation 63 of The Conservation of Habitats and Species Regulations 2017 and Regulation 28 of The Conservation of Offshore Marine Habitats and Species Regulations 2017. 2017 Offshore Wind Extensions Plan. Dated 28 August 2019. Accessed 08/2022.