

# **Pentland floating offshore wind farm**

## Volume 2: Offshore EIAR

Chapter 18: Other Users of the Marine  
Environment

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## GLOSSARY OF PROJECT TERMS

Key Terms	Definition
Dounreay Tri Floating Wind Demonstration Project (the 'Dounreay Tri Project')	The 2017 consented project that was previously owned by Dounreay Tri Limited (in administration) and acquired by Highland Wind Limited (HWL) in 2020. The Dounreay Tri Project consent was for two demonstrator floating Wind Turbine Generators (WTGs) with a marine licence that overlaps with the Offshore Development, as defined. The offshore components of the Dounreay Tri Project consent are no longer being implemented.
Highland Wind Limited	The Developer of the Project (defined below) and the Applicant for the associated consents and licences.
Landfall	The point where the Offshore Export Cable(s) from the PFOWF Array Area, as defined, will be brought ashore.
Offshore Export Cable(s)	The cable(s) that transmits electricity produced by the WTGs to landfall.
Offshore Export Cable Corridor (OECC)	The area within which the Offshore Export Cable(s) will be located.
Offshore Site	The area encompassing the PFOWF Array Area and OECC, as defined.
Onshore Site	The area encompassing the PFOWF Onshore Transmission Infrastructure, as defined.
Pentland Floating Offshore Wind Farm (PFOWF) Array and Offshore Export Cable(s) (the 'Offshore Development')	All offshore components of the Project (WTGs, inter-array and Offshore Export Cable(s), floating substructures, and all other associated offshore infrastructure) required during operation of the Project, for which HWL are seeking consent. The Offshore Development is the focus of this Environmental Impact Assessment Report.
PFOWF Array	All WTGs, inter-array cables, mooring lines, floating sub-structures and supporting subsea infrastructure within the PFOWF Array Area, as defined, excluding the Offshore Export Cable(s).
PFOWF Array Area	The area where the WTGs will be located within the Offshore Site, as defined.
PFOWF Onshore Transmission Infrastructure (the 'Onshore Development')	All onshore components of the Project, including horizontal directional drilling, onshore cables (i.e. those above mean low water springs), transition joint bay, cable joint bays, substation, construction compound, and access (and all other associated infrastructure) across all project phases from development to decommissioning, for which HWL are seeking consent from The Highland Council.
PFOWF Project (the 'Project')	The combined Offshore Development and Onshore Development, as defined.

## ACRONYMS AND ABBREVIATIONS

AIAA	Area of Intense Aerial Activity
BT	British Telecoms
CCS	Carbon Capture and Storage
CEMP	Construction Environmental Management Plan
COLREGs	International Regulations for the Prevention of Collision at Sea
DSRL	Dounreay Site Restoration Ltd
EIAR	Environmental Impact Assessment Report
ft	feet
HDD	Horizontal Directional Drilling
HWL	Highland Wind Limited
JRC	Joint Radio Company
km	kilometres
LMP	Lighting and Marking Plan
m	metres
m <sup>2</sup>	square metre
MoD	Ministry of Defence
MSS	Marine Scotland Science
MW	Megawatt
OECC	Offshore Export Cable Corridor
Offshore EIAR	Offshore Environmental Impact Assessment Report
NRTE	Naval Reactor Test Establishment
NtM	Notice to Mariners
OAA	Option Agreement Area
OCC	Offshore Export Cable Corridor
PEXA	Practice and Exercise Area
PFOWF	Pentland Floating Offshore Wind Farm
PO	Plan Option
ROV	Remotely Operated Vehicle
SHE	Scottish Hydro Electric
SHEP-D	Scottish Hydro Electric Power Distribution
SOLAS	International Regulations for the Safety of Life at Sea
SSE	Scottish and Southern Electricity
THC	The Highland Council
UXO	Unexploded Ordnance
WTG	Wind Turbine Generator

## 18 OTHER USERS OF THE MARINE ENVIRONMENT

### 18.1 Introduction

The potential effects of the Pentland Floating Offshore Wind Farm (PFOWF) Array and Offshore Export Cable(s), hereafter referred to as the 'Offshore Development', during construction, operation and maintenance, and decommissioning on Other Users of the Marine Environment are assessed in this chapter. This chapter also includes a review of the potential cumulative impacts with other relevant projects. Impacts on other human receptors in the marine environment are not assessed within this chapter; these are considered in Chapter 13: Commercial Fisheries, Chapter 14: Shipping and Navigation, Chapter 15: Aviation and Radar, and Chapter 19: Socio-economics, Recreation, and Tourism.

Xodus Group Limited has undertaken this impact assessment. Further details of the Project Team's competency, including the lead authors for each chapter, are provided in Volume 3: Appendix 1.1: Details of the Project Team of this Offshore Environmental Impact Assessment Report (Offshore EIAR).

### 18.2 Legislation, Policy, and Guidance

The following relevant legislation and guidance relating to Other Users of the Marine Environment were consulted in preparing this chapter:

#### 18.2.1 Legislation

- > The Ministry of Defence (MoD) can regulate and restrict the use of sea areas temporarily or in some cases permanently for the purposes of national defence using by-laws under the provisions of the following acts:
  - Military Lands Act 1892 and 1900; and
  - Land Powers Defence Act 1958.

#### 18.2.2 Guidance

- > Scotland's National Marine Plan (Scottish Government, 2015). General Policies relevant to Other Users of the Marine Environment include GEN 1 – General Planning Principle and GEN 4 – Co-existence. The plan was reviewed in 2018 and 2021. In both instances, it was concluded that the plan remains effective whilst acknowledging that there have been significant changes for marine planning since the plan was adopted (e.g. the United Kingdom leaving the European Union and the COVID-19 pandemic). This document provides sector-specific guidance relevant for the other sea user receptor groups and the potential interactions between them. The relevant Other Users of the Marine Environment included in Scotland's National Marine Plan that are considered within this chapter are:
  - Aquaculture;
  - Oil and gas;
  - Carbon capture and storage (CCS);
  - Offshore wind and marine renewable energy;
  - Submarine cables; and
  - Defence.
- > Scottish Government (2020). Sectoral Marine Plan: Regional Location Guidance;
- > Marine Scotland (2015). Regional Locational Guidance - Consultation Draft. Marine Renewable Energy in the Pentland Firth and Orkney Waters;
- > Scottish Government (2016). Pilot Pentland Firth and Orkney Waters Marine Spatial Plan;
- > SgurrEnergy Ltd (2014). RenewableUK Offshore wind and marine energy health and safety guidelines. 2014 (Issue 2);

- > ESCA (2016). Guideline No 6, The Proximity of Offshore Renewable Energy Installations and Submarine Cable Infrastructure in UK Waters (ESCA, 2016) (currently being updated);
- > ICPC (2021). International Cable Protection Committee recommendations; and
- > The Highland Council (THC) (2016). Aquaculture Planning guidance.

### 18.3 Scoping and Consultation

Scoping and consultation have been ongoing throughout the Environmental Impact Assessment (EIA) process and have played an important role in ensuring the scope of the baseline characterisation and impact assessment are appropriate with respect to the Offshore Development given the requirements of the regulators and their advisors.

Relevant comments from the EIA Scoping Opinion, the Scoping Opinion Addendum, and other consultations specific to Other Sea Users provided by Marine Scotland Science (MSS), British Telecoms (BT) (Radio Network Protection Team), Joint Radio Company (JRC), MoD, THC, Scottish and Southern Electricity (SSE), Scottish Sea Farms, and SIMEC Atlantis are summarised in Table 18.1 below, which provides a high-level response on how these comments have been addressed within this Offshore EIAR.

Highland Wind Limited (HWL) have also been in regular contact with SSE and Dounreay Site Restoration Ltd (DSRL). This engagement will continue to occur throughout the construction, operation and maintenance, and decommissioning phases of the Offshore Development.

Table 18.1 Summary of consultation responses specific to Other Users of the Marine Environment

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
<b>Scoping Opinion</b>		
MS-LOT on behalf of Scottish Ministers	<i>The Developer considers potential impacts upon other users of the marine environment during the different phases of the Offshore Proposed Development within Table 9.15 of the Scoping Report. The Scottish Ministers agree with the impacts proposed to be scoped in and out of the assessment in the EIA Report and provide no further comments. The Scottish Ministers acknowledge that other human receptors in the marine environment such as commercial fisheries, shipping and navigation and socio-economics, recreation and tourism are addressed in other specific chapters.</i>	Noted that Scottish Ministers agree with the following impacts being scoped in and out of the assessment within the Scoping Report.
MSS	<i>There is no fundamental difference to the comments provided in 2016 regarding aquaculture for the Section 36 and marine licence applications for Dounreay Tri Floating Demonstration Project, as no new fish farm sites have been developed or proposed in the vicinity of the proposed development - Pentland Floating Offshore Wind Farm, Dounreay, Caithness by Highland Wind Limited.</i>	Aquaculture sites are discussed in Section 18.4.4. Aquaculture sites were scoped out of the impact assessment during Scoping.  Given the distance between the Offshore Site and the closest aquaculture site (approximately 30 kilometres [km]), there will be no direct impacts on aquaculture sites and there is also a general restriction on new aquaculture sites in the North of Scotland (THC, 2016). As noted in Chapter 9: Physical and Coastal Processes, sedimentation impacts are not expected to extend beyond 10 km from the Offshore Development. Therefore, no impacts on aquaculture sites from the Offshore Development are anticipated.

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
MSS	<p><i>There are currently no aquaculture sites registered with Marine Scotland Science located in the close vicinity of the Pentland Floating Offshore Wind Farm, Dounreay, Caithness by Highland Wind Limited.</i></p> <p><i>The nearest active marine aquaculture site is situated at Kyle of Tongue, ca. 35 km southwest of the south west corner of the proposed offshore site. It is a seawater trestle site holding Pacific oysters, operated by Kyle of Tongue Oysters Ltd.</i></p> <p><i>In addition to this, there are also a number of marine cage aquaculture sites in Orkney, however these sites are &gt; 40 km north east of the proposed development.</i></p> <p><i>There are several land based freshwater sites displayed on the map but these are not expected to be affected by this development.</i></p>	<p>Aquaculture sites are discussed in Section 18.4.4. Aquaculture sites were scoped out of the impact assessment during Scoping.</p> <p>Given the distance between the Offshore Site and the closest aquaculture site (approximately 30 km), there will be no direct impacts on aquaculture sites and there is also a general restriction on new aquaculture sites in the North of Scotland (THC, 2016). As noted in Chapter 9: Physical and Coastal Processes, sedimentation impacts are not expected to extend beyond 10 km from the Offshore Development. Therefore, no impacts on aquaculture sites from the Offshore Development are anticipated.</p>
BT (Radio Network Protection Team)	<p><i>We have studied this Offshore Windfarm proposal with respect to EMC and related problems to BT point-to-point microwave radio links.</i></p> <p><i>The conclusion is that, the Project indicated should not cause interference to BT's current and presently planned radio network.</i></p>	Noted, no response required.
	<p><i>If there are any new on land at height structures i.e., buildings etc. we will be happy to check those for any interference. In the meantime, the offshore area specified will not have any impact on our network.</i></p>	Noted, no response required.
JRC	<p><i>This proposal is cleared with respect to radio link infrastructure operated by: The Local Utility Company</i></p> <p><i>JRC analyses proposals for wind farms on behalf of the UK Fuel &amp; Power Industry. This is to assess their potential to interfere with radio systems operated by utility companies in support of their regulatory operational requirements.</i></p> <p><i>In the case of this proposed wind energy development, JRC does not foresee any potential problems based on known interference scenarios and the data you have provided.</i></p>	Noted, no response required.
	<p><i>In making this judgement, JRC has used its best endeavours with the available data, although we recognise that there may be effects which are as yet unknown or inadequately predicted. JRC cannot therefore be held liable if subsequently problems arise that we have not predicted.</i></p>	Once the final WTG layout has been confirmed, this will be communicated to all relevant consultees to understand any potential interference.

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
	<i>It should be noted that this clearance pertains only to the date of its issue. As the use of the spectrum is dynamic, the use of the band is changing on an ongoing basis and consequently, developers are advised to seek re-coordination prior to considering any design changes.</i>	
MoD	<i>The applicant has prepared a Scoping Report of the proposed development. This recognises the principal defence issues that will be of relevance to the progression of the proposed development.</i>	All defence issues are in relation to aviation and radar impacts; these are assessed in detail within Chapter 15: Aviation and Radar.
	<i>The use of airspace for defence purposes in the vicinity of the proposed development have been appropriately identified and considered.</i>  <i>Potential interference with military air traffic control and air defence radars during both construction and operational phases has been scoped out. We agree with this, the proposed offshore will not affect military radar systems.</i>	Noted. Potential interference with radar is assessed in detail within Chapter 15: Aviation and Radar.
	<i>One of the potential options is to use a sea water inlet. Please note this is under the control of MoD and not Downreay Site Restoration Ltd (DSRL) as stated, this may not be available due to site decommissioning.</i>	The water inlet option has been removed as an option from the Design Envelope. Horizontal directional drilling is the solution proposed for the landfall location.
	<i>MoD has concerns with the proposed wind turbines in relation to the proximity to Vulcan Naval Reactor Test Establishment (NRTE) and its surrounding sea approaches in terms of security.</i>	It is recognised that the Vulcan NRTE will be entering into decommissioning in forthcoming years. There are limited details available on these decommissioning activities.  Any impacts relating to the safe navigation of vessels are addressed in Chapter 14: Shipping and Navigation.  HWL will continue to engage with Vulcan NRTE to further understand any upcoming decommissioning activities and to agree on procedures to reduce any disruption.  HWL will also continue to engage with the MoD regarding any security concerns.
THC	<i>The EIAR needs to recognise community assets that are currently in operation for example TV, radio, tele-communication links, aviation interests including radar, MOD safeguards, etc. In this regard the applicant, when submitting a future application, will need to demonstrate what interests they have identified and the outcomes of any consultations with relevant authorities such as Ofcom, NATS, BAA, CAA, MOD, Highlands and Islands Airports Ltd, etc. through the provision of written evidence of concluded discussions / agreed outcomes.</i>	All relevant consultees in regard to existing infrastructure have been contacted.  BT and JRC have confirmed that the Offshore Development is unlikely to affect their services. Once the final layout has been confirmed, this will be communicated to all relevant consultees to understand any potential unexpected interference.  All aviation and radar consultations are set out and discussed in Chapter 15: Aviation and Radar.

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
	<i>We consider the results of these surveys should be contained within the EIAR to determine whether any suspensive conditions are required in relation to such issues.</i>	
	<i>If there are no predicted effects on communication links as a result of the development, the EIAR should still address this matter by explaining how this conclusion was reached.</i>	Impacts on telecommunication links are assessed in Section 18.6.2.3.
<b>Scoping Opinion Addendum</b>		
MoD	<i>In addition, the impact of marine and road traffic associated with the construction phase and once works are completed and also, offshore construction works may impact upon the MoD. The applicant will need to assess this within their Environmental Statement to ensure Vulcan Naval Reactor Test Establishment (NRTE) operations are not affected.</i>	It is recognised that the Vulcan NRTE will be entering into decommissioning in forthcoming years. There are limited details available on these decommissioning activities. However, as the Vulcan NRTE is onshore, the interaction with the offshore elements of the Offshore Development is expected to be low. HWL will continue to engage with Vulcan NRTE to further understand any upcoming decommissioning activities and to agree on procedures to reduce any disruption. HWL will also continue to engage with the MoD regarding any security concerns.
Marine Scotland Licensing Operations Team (on behalf of Scottish Ministers) / SSE	<b>Marine Scotland Licensing Operations Team:</b> <i>The Scottish Ministers however highlight the response from SSE requesting the inclusion of a chart showing all proposed developments in the area and, if possible, proposed vessel management and delivery routes in order to mitigate impacts on Orkney to Dounreay high voltage alternating current ("HVAC") cable. The Scottish Ministers advise that this should be included in the EIA Report.</i> <b>SSE:</b> <i>We would like to request the additional inclusion of a chart showing all proposed developments in the area such that spatial relationships can be understood, the inclusion of proposed vessel management and delivery routes would be beneficial such that any additional threat to our asset can be understood, and appropriate comment made.</i>	A figure of offshore developments in the vicinity of the Offshore Development is included in Section 18.4. Details on vessel management and routes are not available at this stage. However, a Vessel Management Plan will be prepared post-consent which will detail the number, type and specification of vessels utilised during construction and operation. This will also detail the ports and transit corridors proposed.
Scottish Sea Farms	<i>Scottish Sea Farms have no comments to make on this proposal or the scoping addendum.</i>	Noted, no response required.
SIMEC Atlantis	Nil return.	Noted, no response required.
BT	<i>We have studied this offshore wind farm proposal with respect to EMC and related problems to BT point-to-point microwave</i>	Noted, no response required.

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
	<i>radio links. The conclusion is that, the Project indicated using the coordinates provided should not cause interference to BT's current and presently planned radio network.</i>	
THC	<i>It is our understanding that the turbines may be in proximity to the launch zone and projected route of the launch vehicles utilising the Sutherland Spaceport. As this is the case, it is considered appropriate that this should be scoped into the EIAR.</i>	Noted, this has been considered in Sections 18.6.1.3, 18.6.2.4, and 18.6.3.3.
MSS	<i>With regard to aquaculture animal health, we have no further comments to provide on the proposed changes to the Pentland Floating Offshore Wind Farm project. Please refer to comments provided in January 2021.</i>	Noted, no response required.
Cumulative Projects List		
THC	<p><i>Having reviewed the submitted document, I would suggest the following projects are also included in the cumulative assessment:</i></p> <p>&gt; <i>Space Hub Sutherland (in all chapters of the EIAR not just the SLVIA section).</i></p>	As described in Section 18.4.4, the launch vehicles for the Space Hub Sutherland project will be between 7 degrees east of due north and 8 degrees west of due north; therefore, the overflight launch exclusion zone that will be activated prior to and during launches is not expected to interact with the receptors under consideration within this chapter. Therefore, no cumulative impact is anticipated.

## 18.4 Baseline Characterisation

This chapter discusses the Other Users of the Marine Environment that are relevant to and have the potential to be affected by the Offshore Development. This includes:

- > Other offshore wind and marine renewable developments;
- > Military activity and Unexploded Ordnance (UXO);
- > Subsea cables and utilities;
- > Dredge disposal sites and aggregate extraction sites;
- > Aquaculture;
- > Telecommunications;
- > Dounreay Nuclear Facility and the Vulcan Naval Reactor Test Establishment (NRTE);
- > Space Hub Sutherland; and
- > Oil and gas activity and CCS.

The relevant Other Users of the Marine Environment were identified through desk-based studies using publicly available data sources and literature. Consultation responses on the Scoping Report and Scoping Report Addendum also highlighted relevant Other Users of the Marine Environment that have the potential to be affected by the Offshore Development.

### 18.4.1 Study Area

The following areas are referred to in this impact assessment:

- > Offshore Site: The area encompassing the PFOWF Array Area and Offshore Export Cable Corridor (OECC), as defined;
- > PFOWF Array Area: The area where the Wind Turbine Generators (WTGs) will be located within the Offshore Site, as defined;
- > OECC: The area within which the Offshore Export Cable(s) will be located;
- > Offshore Development: All offshore components of the PFOWF Array Area and OECC (WTGs, inter-array and offshore export cables, floating substructures, and all other associated offshore infrastructure) required during operation of the Offshore Development, for which HWL are seeking consent; and
- > Other Users of the Marine Environment Study Area (the 'Offshore Study Area'): The Offshore Study Area covers the Offshore Site plus a 50-kilometre (km) buffer along the north coast of Scotland to identify any users that may directly interact with the Offshore Development and its components or interact with project vessels transiting to the Offshore Development during construction, operation and maintenance, and decommissioning activities. The 50-km buffer is considered to capture any Other Users of the Marine Environment that may potentially be significantly affected by the Offshore Development. The Offshore Study Area is sufficient to cover any potential impacts to developments that overlap with the Offshore Site, as well as any indirect impacts that may extend beyond this distance. This Offshore Study Area is shown in Figure 18.1 below.

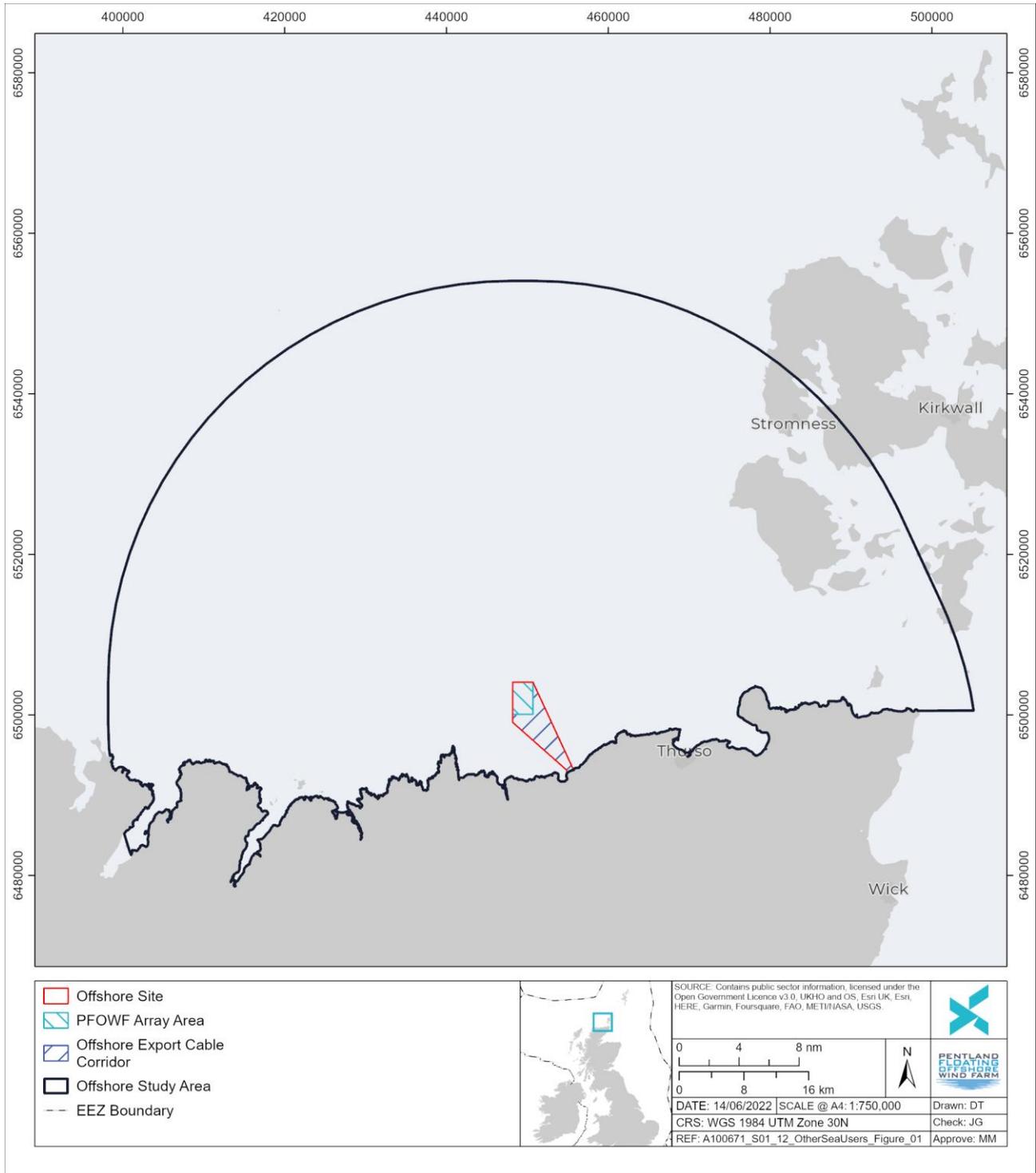


Figure 18.1 Offshore Study Area

## 18.4.2 Sources of Information

A review was undertaken of the literature and data relevant to this assessment relating to Other Users of the Marine Environment and was used to give an overview of the existing environment. The primary data sources used in the preparation of this chapter are listed below in Table 18.2.

Table 18.2 Summary of key sources of information pertaining to Other Users of the Marine Environment

Title	Source	Year	Author
Spatial data on other users of the marine environment on National Marine Plan Interactive	<a href="https://marinescotland.atkinsgeospatial.com/nmpi/">https://marinescotland.atkinsgeospatial.com/nmpi/</a>	2022	National Marine Plan Interactive
Energy and Infrastructure Spatial Data	<a href="https://www.crownstatescotland.com/resources/documents">https://www.crownstatescotland.com/resources/documents</a>	2022	Crown Estate Scotland
Oil and Gas Infrastructure Feature Data	<a href="https://www.nstauthority.co.uk/data-centre/nsta-open-data/">https://www.nstauthority.co.uk/data-centre/nsta-open-data/</a>	2022	North Sea Transition Authority
Sectoral marine plan: regional locational guidance	<a href="https://www.gov.scot/publications/sectoral-marine-plan-regional-locational-guidance/">https://www.gov.scot/publications/sectoral-marine-plan-regional-locational-guidance/</a>	2020	Scottish Government
Information on Joint Warrior exercise	<a href="https://mc.nato.int/media-centre/news/2021/nato-ships-train-in-exercise-joint-warrior-211-with-uk-queen-elizabeth-carrier-strike-group">https://mc.nato.int/media-centre/news/2021/nato-ships-train-in-exercise-joint-warrior-211-with-uk-queen-elizabeth-carrier-strike-group</a>	2021	Allied Maritime Command
Tidal Stream Projects MeyGen	<a href="https://simecatlantis.com/projects/meygen/">https://simecatlantis.com/projects/meygen/</a>	2020a	SIMEC Atlantis
Dounreay Organisation Website	<a href="https://www.gov.uk/government/organisations/dounreay">https://www.gov.uk/government/organisations/dounreay</a>	2022	DSRL
Marine Scotland Marine Projects	<a href="https://marine.gov.scot/marine-projects">https://marine.gov.scot/marine-projects</a>	2022	MS
The Orkney Connection Project	<a href="https://www.ssen-transmission.co.uk/projects/orkney/">https://www.ssen-transmission.co.uk/projects/orkney/</a>	2019	SSE
Royal Navy operations information	<a href="https://www.royalnavy.mod.uk/news-and-latest-activity/operations">https://www.royalnavy.mod.uk/news-and-latest-activity/operations</a>	2021	Royal Navy
Chart of United Kingdom Airspace Restrictions and Hazardous Areas	<a href="https://nats-uk.ead-it.com/cms-nats/export/sites/default/en/Publications/AIP/Current-AIRAC/graphics/289426.pdf">https://nats-uk.ead-it.com/cms-nats/export/sites/default/en/Publications/AIP/Current-AIRAC/graphics/289426.pdf</a>	2018	National Air Traffic Services

## 18.4.3 Site-specific Surveys

No site-specific surveys with regards to Other Users of the Marine Environment were required as the information obtained through consultation on the Scoping Report and Scoping Report Addendum along with desktop studies and publicly available data sources was sufficient to enable a robust impact assessment.

## 18.4.4 Baseline Description

The following sections describe Other Users of the Marine Environment that are relevant to and have the potential to be affected by the Offshore Development. Other Users of the Marine Environment relevant to the assessment are depicted in Figure 18.2.

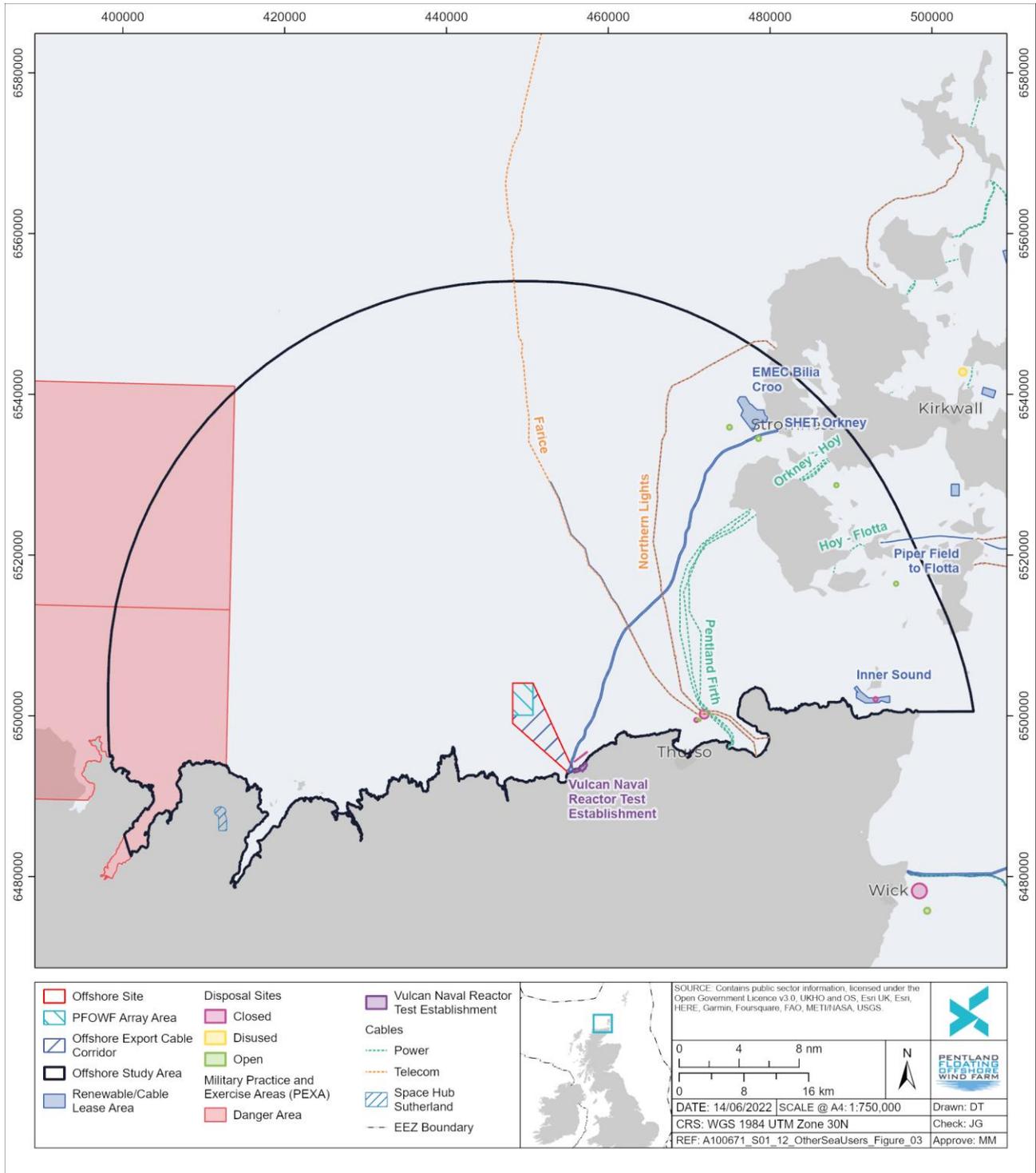


Figure 18.2 Location of Other Users of the Marine Environment in the vicinity of the Offshore Site

#### *18.4.4.1 Other marine renewable energy developments*

The closest operational marine renewable energy development to the Offshore Site is the MeyGen Phase 1A (6 megawatts [MW]) development located approximately 36 km from the Offshore Site at its closest point. Project Stroma (formally known as MeyGen Phase 1B) was installed in September 2020 and included the installation of a single power export cable for the WTGs within MeyGen Phase 1A. Additionally, MeyGen Phase 1C has full consent. This will include building an additional 49 WTGs (73.5 MW). Phase 2 and 3 are proposed to follow Phase 1C to reach the full 398 MW capacity for the offshore lease (Simec Atlantis, 2020a; Tethys, 2021a). However, limited information is currently available for the development of these subsequent phases.

The EMEC Billia Croo site is approximately 39 km north-east of the Offshore Site. The test site has six berths, five of which are cabled in up to 70 metres (m) water depth, and one which is located in shallower water closer to shore. The current purpose of the site is for the deployment of wave energy technologies to be tested under working conditions (Tethys, 2021b).

Several other tidal, wave, and wind energy sites had previously been proposed along the north coast of Scotland within a 50 km radius of the Offshore Site, including the Ness of Duncansby tidal energy development, the Brims Tidal Array, Farr Point Wave Farm, the Dounreay Demonstration Centre, and Katanes Floating Energy Park (Simec Atlantis, 2020b; Tethys, 2021c). However, these developments are either dormant, postponed indefinitely, or have been cancelled.

Following the announcement of the ScotWind offshore wind leasing round in January 2022, additional offshore wind developments may soon be entering the consenting phase. Several recently awarded ScotWind Option Agreement Areas (OAAs) are located off the north coast of Scotland within, for example, the N1 (the West of Orkney Windfarm) (see Figure 18.3). The N1 OAA is approximately 20 km north-west of the Offshore Site.

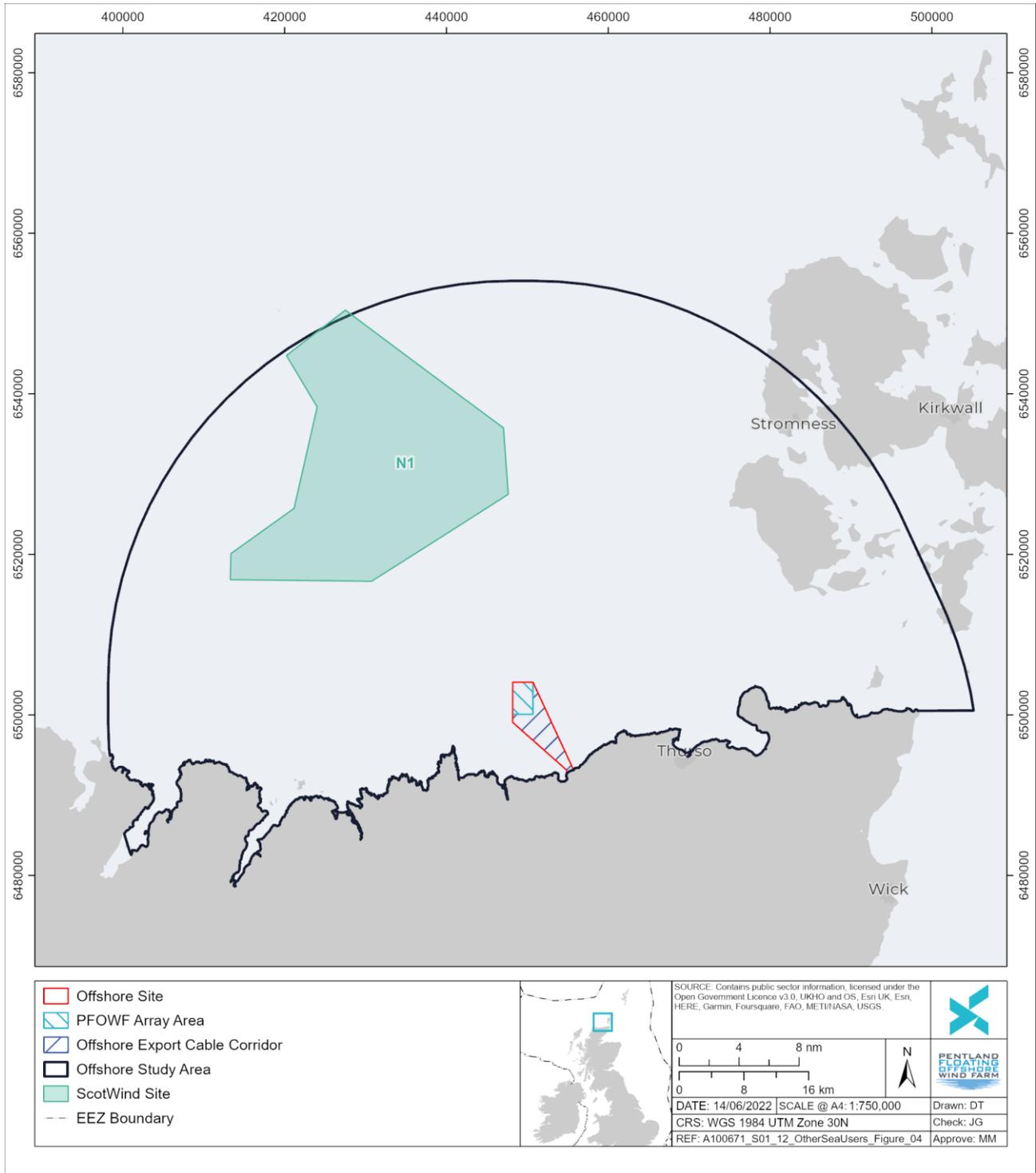


Figure 18.3 ScotWind awarded sites

#### 18.4.4.2 *Military activity and Unexploded Ordnance*

The MoD utilises Scotland's coastal areas and adjacent seas to carry out maritime and aerial training activities and surveillance of potential threats to the country's offshore interests. Defence activities include the operation of naval vessel aircraft, navigational interests, underwater acoustic ranges, maritime exercise areas, amphibious exercises, coastal training ranges, and coastal test and evaluation ranges.

The Offshore Site lies within a military Practice and Exercise Area (PEXA), D712C, which is an Area of Intense Aerial Activity (AIAA) and is part of the Northern Managed Danger Area complex. An AIAA is defined as 'airspace within which military or civil aircraft, singly or in combination with others, regularly participate in unusual manoeuvres' (CAA, 2008). Danger area D712C is an AIAA that is only used when notified (NATS, 2018). This AIAA is located at approximately 7,468 m to 20,117 m (24,500 feet [ft] to 66,000 ft); therefore, no interactions with the Offshore Development are anticipated. The Offshore Site is approximately 37 km east of the military danger area complex D801, D802, and D803, which encompasses activities from surface level up to 16,764 m (55,000 ft) for air-to-ground bombing.

Additionally, the Offshore Site is approximately 35 km west of the Cape Wrath Firing Range military exercise area and its Firing Danger Area. The firing range is not always in use and access to this area for appropriate activities is permitted where compatible with operational requirements. Temporal and spatial restrictions may be in place in these areas and where other military exercises are carried out.

Twice a year, Europe's largest military exercise, Joint Warrior is undertaken off the north, north-east, and north-west coasts of Scotland. Joint Warrior involves the three-Armed Forces and aircraft, navy vessels, submarines, and army personnel and occurs in March/April and October each year for 10 to 15 days (Allied Maritime Command, 2021). In 2019, Joint Warrior took place in PEXAs between the Clyde and Cape Wrath (Royal Navy, 2019).

There are no current or historical military munitions disposal sites within the vicinity of the Offshore Site, and the potential for UXO is considered to be low. Prior to construction, a UXO survey will be undertaken by HWL to ensure that any UXO is identified and, if necessary, appropriately disposed of. The UXO survey and disposal will be subject to separate permits and licences.

Aerial military activity is discussed in detail in Chapter 15: Aviation and Radar.

#### 18.4.4.3 *Subsea cables and utilities*

No active cables or pipelines that intersect with the Offshore Site. However, the proposed landfall area for the Scottish Hydro Electric (SHE) Transmission Orkney-Caithness Project is located within the OECC, which creates the potential for interaction during construction at the landfall location or OECC cable installation offshore (see Figure 18.2). This new transmission infrastructure is required between Orkney and Caithness to enable the export of electricity from renewable energy generation in Orkney into the national grid. SHE Transmission is planning to develop the 70 km 220 kV subsea electricity transmission connection from the existing connection site at Dounreay to the Bay of Skail on the west coast of Orkney (SSE, 2019). This project is consented but is currently on hold subject to the approval of a needs case by Ofgem concerning the viability of new generation projects on Orkney (Ofgem, 2019).

Four additional subsea power cables are located to the east of the Offshore Site, including two telecommunications cables, Farice and BT Northern Lights, approximately 12 and 15 km from the Offshore Site, respectively. Both cables reach landfall at Dunnet Bay in Caithness, and Farice continues onto the Faroe Islands, whereas BT Northern Lights reaches landfall at Skail Bay, on the Orkney Mainland. Two Scottish Hydro Electric Power Distribution (SHEP-D) power cables, Pentland Firth East and Pentland Firth West, lie approximately 18 km east of the Offshore Site. These cables reach landfall at Murkle Bay, near Thurso and at Rackwick Bay on the west coast of Hoy, Orkney (see Figure 18.2). There are also several SHEP-D power distribution cables connecting Hoy to Mainland Orkney and Hoy to Flotta and South Wells, located approximately 40 km to 50 km north-east of the Offshore Site (see Figure 18.2).

#### **18.4.4.4 Dredge disposal sites and aggregate extraction**

The closest active dredge disposal site is Scrabster extension, approximately 16 km east of the Offshore Site. Other active dredge disposal sites within the Offshore Study Area include Stromness A, B, and C, approximately 38 to 42 km north-east of the Offshore Site, and Scapa, approximately 43 km north-east of the Offshore Site within Scapa Flow. A construction aggregate site for fine (coarse sands) is located 15 km east of the Offshore Site (Scottish Government, 2016).

#### **18.4.4.5 Aquaculture**

There are no active finfish or shellfish marine aquaculture sites within the vicinity of the Offshore Site. The closest marine aquaculture site is located 30 km south-west of the Offshore Site in the Kyle of Tongue. This site is holding Pacific oysters and is operated by Kyle of Tongue Oysters Ltd. In addition, there are a number of aquaculture sites in Orkney, the closest being 50 km north-east in Orkney waters.

The north of Scotland coastline has also been identified as an area where the development of new aquaculture sites is restricted. Only existing aquaculture sites can be extended. Given the proximity of the existing aquaculture sites, it is unlikely there will be any overlap with this activity (THC, 2016).

#### **18.4.4.6 Telecommunications**

Due to the production of low levels of electromagnetic radiation, WTGs can affect communication systems that utilise electromagnetic waves as their means of transmission. The rotating blades of WTGs can also cause interference through reflection and shadowing of electromagnetically propagated radio signals, such as terrestrial fixed microwave links, terrestrial radio telemetry links, and television broadcasts. Therefore, it is necessary to ensure a suitable separation distance between telecommunications links and WTGs.

Telecommunications considered include:

- > Microwave communications;
- > Television reception;
- > Radio reception; and
- > Cellular telephone service.

Maritime communications devices within the scope of this assessment include cellular telephones, satellite communications, VHF radio, television, and offshore microwave fixed links. Cellular telephone service providers are unlikely to provide coverage for users located in the vicinity of the Offshore Site, which means that interference to services is unlikely. Satellite communications users include surface vessels or rigs/platforms, the latter of which are not located within the Offshore Study Area.

The Ofcom Tall Structures guidance indicates that the principal impact of new structures, such as WTGs, upon satellite television is potentially blocking the signal between the receiver and the satellite (Ofcom, 2009). Satellite signals are generally received from a high elevation; this means that disruption to satellite reception is usually limited only to cases where a receiver is very close to a tall structure (e.g. a ship passing in close proximity to a WTG).

Responses to the Scoping Report and the Scoping Report Addendum were received from BT and JRC. BT stated that the Offshore Site will not affect their network. Similarly, JRC stated that they did not foresee any potential problems based on the Scoping Report parameters for the Offshore Development. As described in Section 18.6.2.3, HWL will consult with relevant parties once the Offshore Development design is refined to understand potential impacts on telecommunications services and to discuss and agree to appropriate mitigation measures, if required.

#### **18.4.4.7 Dounreay Nuclear Facility and the Vulcan Naval Reactor Test Establishment**

DSRL is the licencing company responsible for the decommissioning of the Dounreay Nuclear Facility, specifically, the Nuclear Power Development Establishment, which is located approximately 1 km east of the landfall location within the OECC. As a result of operational standards in reprocessing during the 1960s and 1970s, some radioactive particles were released into the sea via an active discharge pipeline in a subsea tunnel that extends approximately 600 m offshore. A number of radioactive particles have been discovered on

the seabed close to the old discharge point. An extensive remediation programme was undertaken by DSRL to detect and retrieve hazardous particles from a 600,000 square meter (m<sup>2</sup>) (60-hectare) area of seabed near the outfall using Remotely Operated Vehicles (ROVs), clean-up vehicles, and divers. The seabed remedial works commenced in 2008 and continued each summer until 2012 (DSRL, 2022a). The beaches at Sandside Bay, adjacent to the western boundary of the landfall location, and Dounreay Foreshore, to the east of the landfall location continue to be regularly monitored for particles and other contamination (DSRL, 2022b).

DSRL are looking to decommission the Dounreay Nuclear Facility between 2022 and 2033. Additionally, the Vulcan NRTE (previously known as HMS Vulcan) is adjacent to the eastern boundary of the landfall location of the OECC. The Vulcan NRTE is managed by the MoD and is expected to be decommissioned within a timeline consistent with the Dounreay Nuclear Facility, although exact details remain unknown. The Vulcan NRTE site consists of a short test facility that was shut down in 2015, and it is now within a 'post-operational phase' until the site is decommissioned (MoD, 2015).

#### **18.4.4.8 Space Hub Sutherland**

In August 2020 permission was granted for the construction of a vertical launch space port with launch operations control centre, site integration facility, launch pad complex, antenna park, access road, fencing, services, and associated infrastructure at Talmine, Tongue, approximately 38 km from the Offshore Site. In the planning permission, a condition is applied to limit the number of launches to 12 per year. The first satellite launches are planned for the early 2020s.

The Environmental Impact Assessment Report (EIAR) for the Space Hub Sutherland project was published in February 2020 (Ramboll, 2020). It details that the trajectories for the launch vehicles will be between 7 degrees east of due north and 8 degrees west of due north and that there will be an overflight launch exclusion zone that will be activated prior to and during launches for approximately six hours. Limited details are currently available on the geographical extent of the launch exclusion zone. However, it will extend from the launch site into the Pentland Firth; therefore, marine users will be prohibited from the area whilst the launch exclusion zone is in operation (Ramboll, 2020). Considering the planned trajectory for the launch vehicles and the fact that the Space Hub Sutherland launch site is approximately 38 km west of the Offshore Site, the Offshore Site is not expected to overlap with the launch exclusion zone.

#### **18.4.4.9 Oil and gas activity and carbon capture and storage**

The oil and gas activity and CCS (the nearest pipeline, well, or licence block) is at least 50 km from the Offshore Site.

There are no United Kingdom Continental Shelf licensed blocks for oil and gas activities within the Offshore Study Area (North Sea Transition Authority, 2022). The majority of oil and gas activities are undertaken offshore beyond territorial waters and are particularly concentrated further north and along eastern offshore waters. The nearest oil and gas infrastructure is the oil pipeline 'P/C Tee to Flotta', which terminates at the Flotta Oil Terminal and is approximately 43 km north-east of the Offshore Site.

The nearest potential CCS sites are located in the Moray Firth and North Sea east of the Scottish mainland and, therefore, are not likely to interact with the Offshore Development.

### **18.4.5 Future Baseline**

The future baseline for subsea cables, other offshore renewable energy developments, the Dounreay Nuclear Facility and Vulcan NRTE, and Space Hub Sutherland is subject to change, as projects associated with these industries in the vicinity of the Offshore Development are either proposed to be constructed or, in the case of the Dounreay Nuclear Facility and Vulcan NRTE, are proposed to be decommissioned. These users have been considered within this impact assessment; therefore, the future baseline scenario is unlikely to change substantially from that presented in Section 18.4.4. Nevertheless, it is acknowledged that with regards to Other Users of the Marine Environment, the future baseline is subject to gradual change as new projects / plans are proposed and progressed, and the baseline will evolve with or without the Offshore Development being in place.

### 18.4.6 Summary of Baseline Environment

The following Other Users of the Marine Environment are identified as present in the Offshore Study Area:

- > MeyGen Development, and EMEC Billia Croo, approximately 36 km and 39km, respectively from the Offshore Site;
- > N1 ScotWind awarded site, approximately 20 km from the Offshore Site;
- > Military PEXAs overlapping and in proximity to the Offshore Site, including an AIAA and the Cape Wrath Firing Range (35 km east of the Offshore Site);
- > The proposed SHE Transmission Orkney-Caithness Project, which shares a landfall location with the OECC;
- > Five active dredge disposal sites, the closest of which is located approximately 16 km east of the Offshore Site;
- > The Dounreay Nuclear Facility and the Vulcan NRTE, including the Dounreay monitoring and remedial works at Sandside Bay and Dounreay Foreshore, directly adjacent to the west and east of the landfall location for the OECC, respectively; and
- > Space Hub Sutherland, located approximately 38 km west of the Offshore Site. The planned trajectory for the launch vehicles is not expected to overlap with the Offshore Site, as the launch trajectory will be between 7 degrees east of due north and 8 degrees west of due north.

The following Other Users of the Marine Environment have been scoped out of the EIA as no impacts have been identified:

- > Aquaculture: The closest active aquaculture site is located approximately 35 km from the Offshore Site. Impacts from suspended sediments arising from the Offshore Development are not expected to occur out to this distance (see Chapter 9: Physical and Coastal Processes), and access to the aquaculture site is not expected to be obstructed by the Offshore Development given the distance between the Offshore Site and the nearest aquaculture site; and
- > Military activities and Unexploded Ordnance: The impacts on aerial military activity, including within an AIAA, are assessed in Chapter 15: Aviation and Radar. Impacts on the military activities at Cape Wrath and Loch Eriboll firing ranges are not anticipated to occur as the firing ranges are over 35 km from the Offshore Site. The probability for UXO in the Offshore Site is low and any UXO will be identified during pre-construction surveys and appropriately disposed of.

Additional receptors were scoped out within the Scoping Report, including marine renewable energy developments, oil and gas, CCS, dredge disposal sites, and aggregate extraction; the justifications for this are provided in Section 18.5.2.

Potential receptors and impacts scoped into the assessment and impacts scoped out are also provided in Section 18.5.2 along with justifications.

### 18.4.7 Data Gaps and Uncertainties

The information sources outlined and reviewed in Section 18.4.2 are deemed sufficient to inform a robust impact assessment. Where there is uncertainty about the location, timing, and activity of particular receptors, a precautionary approach has been adopted either in their assessment of sensitivity or the potential magnitude of the impact associated with the Offshore Development.

## 18.5 Impact Assessment Methodology

### 18.5.1 Impacts Requiring Assessment

This assessment covers all potential impacts identified through the scoping process, as well as any further potential impacts that have been highlighted as the EIA has progressed. It should be noted that impacts are not necessarily relevant to all stages of the Offshore Development.

Table 18.3 below indicates the direct and indirect impacts assessed with regards to Other Users of the Marine Environment and indicates the Offshore Development stages to which they relate. Cumulative impacts are discussed in Section 18.7.

Table 18.3 Potential impacts requiring assessment

Potential Impact	Description
<b>Construction</b>	
Disturbance of subsea cables	There are no anticipated impacts in relation to existing cables, however, the proposed landfall area for the SHE Transmission Orkney-Caithness Project overlaps with the OECC landfall location; therefore, the potential for interaction exists.
Disruption to DSRL remedial and monitoring activities	DSRL remedial activities are potentially undertaken within the OECC; therefore, there is potential for disruption.
Interference to the operations of Space Hub Sutherland	Potential interference to Space Hub Sutherland launches due to the presence of construction vessels and project infrastructure.
<b>Operation and maintenance</b>	
Disturbance of subsea cables	There are no anticipated impacts in relation to existing cables, however, the proposed landfall area for the SHE Transmission Orkney-Caithness Project overlaps with the OECC landfall location; therefore, there is potential for interaction.
Obstruction of DSRL remedial and monitoring activities	DSRL remedial activities are undertaken within the OECC; therefore, there is potential for disruption.
Adverse impacts on telecommunication systems	Potential impact on telecommunication system services through reflection or shadowing of telecommunication signals by WTGs.
Interference to the operations of Space Hub Sutherland	Potential interference to Space Hub Sutherland launches due to the presence of vessels and project infrastructure.
<b>Decommissioning</b>	
As per construction	Potential impacts arising during the decommissioning phase are expected to be similar to, and not exceeding, those arising during the construction phase.

The assessment of impacts on Other Users of the Marine Environment was a desk-based exercise, and assessments were informed by publicly available data sources, augmented by consultation through Scoping, and based on expert judgment.

As set out above, potential impacts on military activities from the construction, operation and maintenance, and decommissioning of the Offshore Development are addressed in detail within Chapter 15: Aviation and Radar; potential impacts to socio-economics from the construction, operation and maintenance, and decommissioning of the Offshore Development are addressed in detail within Chapter 19: Socio-economics, Recreation, and Tourism; potential impacts to Commercial Fisheries activities are addressed in detail in

Chapter 13: Commercial Fisheries; potential impacts relating to the safe navigation of vessels are addressed in Chapter 14: Shipping and Navigation; and potential impacts relating to sediment disturbance and resuspension (e.g. in relation to disturbance of contaminated sediment associated with the Dounreay Nuclear Facility Site) are assessed in Chapter 7: Marine Physical Processes and Chapter 8: Water and Sediment Quality. These impacts are not discussed further in this chapter.

### 18.5.2 Impacts Scoped Out

The following impacts were scoped out of the assessment during EIA scoping:

- > **Obstruction of marine renewable energy activities due to the presence of safety zones and construction vessels during installation activities / maintenance activities:** Existing and proposed marine renewable energy sites are at least 20 km from the Offshore Site. Ports utilised for construction or as operation and maintenance bases of proposed marine renewable energy sites could be located within proximity to the Offshore Site. Any impacts on capacity at ports are addressed in Chapter 19: Socio-economics, Recreation, and Tourism. Impacts to safe navigation of vessels associated with these developments are addressed in Offshore EIA (Volume 3): Technical Appendix 14.1: Navigation Risk Assessment and Chapter 14: Shipping and Navigation. It is acknowledged that the West of Orkney Windfarm (within the N1 PO) may interact with the Offshore Development. The West of Orkney Windfarm Scoping Report was submitted beyond the cut-off date for consideration within the cumulative assessments within the EIA. It is expected that the West of Orkney Windfarm would be constructed after the Offshore Development and, therefore, would be required to undertake a more detailed assessment of potential impacts to the Offshore Development to support its development consent applications. HWL will also be open to engagement from the West of Orkney Windfarm to facilitate the co-existence with the Offshore Development once further details are known. For these reasons, an assessment of potential impacts upon the West of Orkney Windfarm has not been included in this assessment. Therefore, all marine renewable energy projects are scoped out as potential receptors to impacts from the Offshore Development.
- > **Obstruction of spoil disposal activities or aggregate extraction due to the presence of safety zones and construction vessels during installation activities / maintenance activities:** No potential impacts are anticipated as the closest dredge disposal site is approximately 16 km from the Offshore Site and the closest construction aggregate extraction area is approximately 15 km from the Offshore Site. Considering these distances, no obstruction to the access of these sites is anticipated and any impacts relating to the safe navigation of vessels carrying material to and from these sites are addressed in Chapter 14: Shipping and Navigation. No impacts associated with increased suspended sediment concentrations are expected as the zone of influence over which impacts from increased suspended sediment concentrations is expected to occur is 10 km, as described in Chapter 7: Marine Physical Processes.
- > **Obstruction of oil and gas and CCS activities due to the presence of safety zones and construction vessels during installation activities / maintenance activities:** There are no CCS activities within the Offshore Study Area. The closest oil and gas infrastructure to the Offshore Site is the P/C Tee to Flotta pipeline, approximately 43 km to the north-east. Given this distance from the Offshore Site, no obstruction of access is anticipated to occur. Any impacts relating to the safe navigation of operational vessels associated with oil and gas activities are addressed in Chapter 14: Shipping and Navigation.
- > **Disruption to telecommunications during the construction phase:** The only tall structures envisaged to be used during construction are construction cranes. As these structures will not be static for prolonged periods and will only cover a small spatial area, any disruption to telecommunications is considered to be highly unlikely and would be temporary.

### 18.5.3 Assessment Methodology

The EIA process and methodology are described in detail in Chapter 6: EIA Methodology.

Project-specific criteria have been developed for the sensitivity and vulnerability of the receptor and the likelihood and magnitude of impact, as detailed below.

#### 18.5.3.1 Defining impact magnitude

Defining impact magnitude requires consideration of how the following factors will affect the baseline conditions:

- > Spatial Extent: The area over which the impact will occur;
- > Duration: The period of time over which the impact will occur;
- > Frequency: The number of times the impact will occur over the Offshore Development's life-cycle;
- > Intensity: The severity of the impact;
- > Likelihood: The probability that the impact will occur and the probability that the receptor will be present; and
- > Reversibility: The ability for the receiving environment / exposed receptor to return to baseline conditions.

Based on these parameters, and expert judgement, a summarised description on the assignment of magnitude criteria is provided in Table 18.4.

Table 18.4 Impact magnitude criteria

Magnitude	Criteria
High	The impact occurs over a large spatial extent resulting in widespread, long-term, or permanent changes in baseline conditions or affects a large proportion of a receptor population. The impact is very likely to occur and/or will occur at a high frequency or intensity.
Moderate	The impact occurs over a local to medium extent with a short- to medium-term change to baseline conditions or affects a moderate proportion of a receptor population. The impact is likely to occur and/or will occur at a moderate frequency or intensity.
Low	The impact is localised and temporary or short-term, leading to a detectable change in baseline conditions or a noticeable effect on a small proportion of a receptor population. The impact is unlikely to occur or may occur but at low frequency or intensity.
Negligible	The impact is highly localised and short-term, with full rapid recovery expected to result in very slight or imperceptible changes to baseline conditions or a receptor population. The impact is very unlikely to occur; if it does, it will occur at a very low frequency or intensity.
No Change	No change from baseline conditions.
<p>Note: The magnitude of an impact is based on a variety of parameters. The definitions provided above are for guidance only and may not be appropriate for all impacts. For example, an impact may occur in a very localised area but at a very high frequency / intensity for a long period of time. In such cases, expert judgement is used to determine the most appropriate magnitude ranking as explained through the narrative of the assessment.</p>	

#### 18.5.3.2 Receptor sensitivity

Determining receptor sensitivity is part of the significance of effects assessment. Receptor sensitivity is defined as 'the degree to which a receptor is affected by an impact'.

Overall receptor sensitivity is determined by considering a combination of value, adaptability, tolerance, and recoverability. This is achieved by applying known research and information on the status and sensitivity of the feature under consideration coupled with professional judgement and past experience.

The key to assessing a receptor's vulnerability is determining the ability of a receptor to adapt to change, tolerate, and/or recover (along with the timing for recovery) from potential impacts. Table 18.5 details the criteria used to define sensitivity in terms of adaptability and recoverability.

Table 18.5 Sensitivity of receptor (in the context of ability to recover and adaptability)

Receptor sensitivity	Definition
Very high	The receptor has no capacity to accommodate a particular effect and no ability to recover or adapt.
High	The receptor has a very low capacity to accommodate a particular effect with a low ability to recover or adapt.
Moderate	The receptor has a low capacity to accommodate a particular effect with a low ability to recover or adapt.
Low	The receptor has some tolerance to accommodate a particular effect or will be able to recover or adapt.
Negligible	The receptor is generally tolerant and can accommodate a particular effect without the need to recover or adapt.

Receptor value considers whether, for example, a receptor is rare, has protected or threatened status, and/or has importance on a local, regional, national, or international scale. Based on this, receptor value has been defined for Other Users of the Marine Environment in Table 18.6 below to aid the overall assessment of receptor sensitivity.

Table 18.6 Criteria for the value of Other Users of the Marine Environment receptors

Sensitivity of receptor	Definition
Very high	Activity or receptor (infrastructure / asset) is of international importance.
High	Activity or receptor (infrastructure / asset) is of national importance.
Moderate	Activity or receptor (infrastructure / asset) is of regional importance.
Low	Activity or receptor (infrastructure / asset) is of local importance.
Negligible	Activity or receptor (infrastructure / asset) is not considered to be of any importance.

The overall sensitivity for Other Users of the Marine Environment receptors is thus defined based on professional judgement in line with the above criteria.

### 18.5.3.3 Evaluation to determine significance of effect

Significance of an effect is determined by correlating the magnitude of the impact and the sensitivity of receptor whilst utilising professional judgement and industry best practice guidance, science, and accepted approaches.

To ensure transparency and consistency throughout this Offshore EIAR, a matrix approach has been adopted to guide the significance of effects assessment (see Table 18.7). Importantly, latitude for professional judgement in the application of this matrix is permitted where deemed appropriate.

Table 18.7 Significance of effects matrix

Significance of Effects Matrix					
Sensitivity of Receptor	Magnitude of Impact				
	No Change	Negligible	Low	Moderate	High
Negligible	Negligible	Negligible	Negligible	Negligible	Minor
Low	Negligible	Negligible	Minor	Minor	Moderate
Moderate	Negligible	Minor	Minor	Moderate	Major
High	Negligible	Minor	Moderate	Major	Major
Very High	Negligible	Minor	Major	Major	Major

Definitions of significance of effect are provided in Table 18.8. For this Offshore EIAR, any effect with a significance of moderate or greater is generally considered 'significant' in EIA terms and additional mitigations may be required. Effects identified as minor or negligible are generally considered to be 'not significant' in EIA terms.

Table 18.8 Assessment of consequence

Assessment Consequence	Description (consideration of receptor sensitivity and value and impact magnitude)	Significance of Effect
Major Effects	Effects (beneficial or adverse) are likely to be highly noticeable and long-term, or permanently alter the character of the baseline and are likely to disrupt the function and/or status / value of the receptor population. Effects may have broader systemic consequences (e.g. to the wider ecosystem). Such adverse effects are a priority for mitigation in order to avoid or reduce the anticipated significance of the effect.	Significant
Moderate Effects	Effects (beneficial or adverse) are likely to be noticeable and result in lasting changes to the character of the baseline and may cause hardship to, or degradation of, the receptor population, although the overall function and value of the baseline / receptor population are not disrupted. Such adverse effects are a priority for mitigation in order to avoid or reduce the anticipated significance of the effects.	Significant
Minor Effects	Effects (beneficial or adverse) are expected to comprise noticeable changes to baseline conditions, beyond natural variation, but are not expected to cause long-term degradation, hardship, or impair the function and value of the receptor. Such adverse effects are typically not contentious and generally will not require additional mitigation but may be of interest to stakeholders.	Not Significant
Negligible	Effects are expected to be either indistinguishable from the baseline or within the natural level of variation. Such effects do not require mitigation and are not anticipated to be a stakeholder concern and/or a potentially contentious issue in the decision-making process.	Not Significant

#### 18.5.4 Design Envelope Parameters

As detailed in Chapter 5: Project Description, this assessment considers the Offshore Development parameters which are predicted to result in the greatest environmental impact, known as the 'realistic worst case scenario'. The realistic worst case scenario represents, for any given receptor and potential impact on that receptor, various options in the Design Envelope that would result in the greatest potential for change to the receptor in question.

Given that the realistic worst case scenario is based on the design option (or combination of options) that represents the greatest potential for change, confidence can be held that the development of any alternative options within the design parameters will give rise to no effects greater or worse than those assessed in this impact assessment. Table 18.9 presents the realistic worst case scenario for potential impacts on Other Users of the Marine Environment during the construction, operation and maintenance, and decommissioning phases of the Offshore Development.

For Other Users of the Marine Environment, the realistic worst case scenario has been derived by ensuring that the maximum parameters of components for the Offshore Development with the potential to interact with Other Users of the Marine Environment are assessed (e.g. the maximum area and duration for construction activities which would result in the greatest potential for disturbance / disruption).

For the disruption / disturbance to subsea cables and DSRL remedial and monitoring activities, the parameters which represent the greatest amount of infrastructure over the largest area have been assumed. For example, it is assumed that two offshore export cables will be installed and that all seven WTGs will be built out across the maximum extent of the PFOWF Array Area.

The realistic worst case scenario also assumes the maximum construction duration, which will last approximately two years with the commencement of the HDD works at the landfall location in 2024 and the installation of the offshore components across two construction stages, Each construction stage, Stage 1 and Stage 2, will span approximately seven months per year, and a pause during the winter months between the two stages is assumed. Refer to Chapter 5: Project Description for further details on the construction programme.

Impacts on telecommunications are influenced by the number, height, and location of the WTGs. The WTG layout has not been finalised, however, the realistic worst case scenario for this impact assumes that the maximum number of WTGs are spread out across the maximum PFOWF Array Area, as this is expected to have the greatest potential for disruption/interference to other marine activities. The maximum parameters for the components of the WTG have also been assumed (e.g. rotor diameter and hub height), as this could influence the reflection and shadowing of telecommunication signals.

Table 18.9 Worst case scenario design parameters specific to Other Users of the Marine Environment receptor impact assessment

Potential Impact	Design Envelope Scenario Assessed
<b>Construction Phase</b>	
Disturbance of subsea cables	<ul style="list-style-type: none"> <li>&gt; A maximum of seven WTGs built-out to the maximum extent of the PFOWF Array Area;</li> <li>&gt; A maximum of nine mooring lines and anchors per WTG with a mooring radius of 1,500 m and a maximum seabed footprint per anchor of 625 m<sup>2</sup>;</li> <li>&gt; A maximum number of two offshore export cables to the landfall location with a maximum seabed footprint (including area required for seabed preparation and installation equipment) of 12.5 km x 15 m per offshore export cable;</li> <li>&gt; HDD of up to two drilled holes (that may require up to five bore attempts) at the landfall location (between the boundary of Vulcan NRTE and White Geos [adjacent to Sandside Bay]) with a maximum HDD length of 700 m;</li> <li>&gt; 500-m construction safety zones around each renewable energy installation, implemented on a rolling basis; advisory safety zones of 500 m around installation vessels; and 50-m statutory safety zones once each WTG is installed prior to commissioning;</li> <li>&gt; Planned commencement of HDD works at the landfall location in 2024 followed by the installation of the offshore components across two stages, each comprising seven months per year (Stage 1 and Stage 2), and pausing over the winter months between the two stages; and</li> <li>&gt; Approximately 660 vessel trips with a maximum of 10 vessels at the Offshore Site at any one time.</li> </ul>
Disruption to DSRL remedial and monitoring activities	<ul style="list-style-type: none"> <li>&gt; A maximum number of two offshore export cables to the landfall location with a maximum seabed footprint (including area required for seabed preparation and installation equipment) of 12.5 km x 15 m per offshore export cable;</li> <li>&gt; Advisory safety zones of 500 m around installation vessels;</li> <li>&gt; Approximately 660 vessel trips with a maximum of 10 vessels at the Offshore Site at any one time;</li> <li>&gt; HDD of up to two drilled holes (that may require up to five bore attempts) at the landfall location (between the boundary of Vulcan NRTE and White Geos [adjacent to Sandside Bay]), with a maximum HDD length of 700 m; and</li> </ul>

Potential Impact	Design Envelope Scenario Assessed
	<ul style="list-style-type: none"> <li>&gt; Planned commencement of HDD works at the landfall location in 2024 followed by the installation of the offshore components across two stages, each comprising seven months (Stage 1 and Stage 2), and pausing over the winter months between the two stages.</li> </ul>
Interference to the operations of Space Hub Sutherland	<ul style="list-style-type: none"> <li>&gt; A maximum of seven WTGs built-out to the maximum extent of the PFOWF Array Area;</li> <li>&gt; A maximum number of two offshore export cables to the landfall location with a maximum seabed footprint (including area required for seabed preparation and installation equipment) of 12.5 km x 15 m per cable;</li> <li>&gt; Planned commencement of HDD works at landfall in 2024 followed by the installation of the offshore components across two stages, each comprising seven months (Stage 1 and Stage 2), and pausing over winter between the two stages; and</li> <li>&gt; Approximately 660 vessel trips with a maximum of 10 vessels at the Offshore Site at any one time.</li> </ul>
<b>Operation and Maintenance Phase</b>	
Disturbance of subsea cables	<ul style="list-style-type: none"> <li>&gt; A maximum of seven WTGs built-out to the maximum extent of the PFOWF Array Area;</li> <li>&gt; Advisory safety zones of 500 m during times of major maintenance; and</li> <li>&gt; Approximately 210 annual vessel trips to the site required during operation and maintenance (up to 30 years) and a maximum of 10 vessels at the Offshore Development at any one time.</li> </ul>
Disruption to DSRL remedial and monitoring activities	<ul style="list-style-type: none"> <li>&gt; Advisory safety zones of 500 m during times of major maintenance; and</li> <li>&gt; Approximately 210 annual vessel trips to the site required during operation and maintenance (up to 30 years) and a maximum of 10 vessels at the Offshore Development at any one time.</li> </ul>
Adverse impact on telecommunication systems	<ul style="list-style-type: none"> <li>&gt; A maximum of seven WTGs in the PFOWF Array Area;</li> <li>&gt; A rotor diameter of up to 260 m;</li> <li>&gt; A rotor tip height of up to 300 m;</li> </ul>

Potential Impact	Design Envelope Scenario Assessed
	<ul style="list-style-type: none"> <li>&gt; A hub height up to 190 m; and</li> <li>&gt; A minimum blade clearance of 35 m.</li> </ul>
Interference to the operations of Space Hub Sutherland	<ul style="list-style-type: none"> <li>&gt; A maximum of seven WTGs built-out to the maximum extent of the PFOWF Array Area; and</li> <li>&gt; Approximately 210 annual vessel trips to the site required during operation and maintenance (up to 30 years) and a maximum of 10 vessels at the Offshore Development at any one time.</li> </ul>
Decommissioning	
As per construction	<p>In the absence of detailed information regarding decommissioning works, the implications for Other Users of the Marine Environment are considered analogous with or likely less than those of the construction phase. Therefore, the worst case parameters defined for the construction phase also apply to decommissioning.</p> <p>The decommissioning approach is set out in Section 5.11. The starting position for offshore components is complete removal to shore for re-use, recycling, and disposal during decommissioning unless there is compelling evidence to leave the buried sections <i>in situ</i>. A potential exception is scour protection, which may not be practical to recover. Anchor piles may also be cut to a depth of 1 m below the seabed and left <i>in situ</i>. Relevant stakeholders and regulators will be consulted to establish the approach. The seabed will be restored, as far as reasonably practicable, to the condition it was prior to the construction of the Offshore Development.</p>

### 18.5.5 Embedded Mitigation and Management Plans

As part of the Offshore Development design process, a number of designed-in measures and management plans have been proposed to reduce the potential for impacts on Other Users of the Marine Environment receptors (see Table 18.10). As there is a commitment to implementing these measures which will likely be secured through Section 36 Consent and Marine Licence conditions, they are considered inherently part of the design of the Offshore Development and have therefore been considered in the assessment presented below (i.e. the determination of the magnitude of impact and therefore the significance of effects assumes implementation of these measures). These measures are considered standard industry practice for this type of development.

Table 18.10 Embedded mitigation and management plans specific to Other Users of the Marine Environment for the Offshore Development

Embedded Mitigation Measures and Management Plans	Justification
<b>Management Plans</b>	
Construction Environmental Management Plan (CEMP)	The CEMP will set out procedures to ensure all activities with the potential to affect the environment are appropriately managed and will include: a description of works and construction processes, roles and responsibilities, description of vessel routes and safety procedures, pollution control and spillage response plans, incident reporting, chemical usage requirements, waste management plans, plant service procedures, communication and reporting structures, and timeline of work. It will detail the final design selected and take into account Marine Licence Conditions and commitments.
Offshore Construction Method Statement	An Offshore Construction Method Statement will be developed in accordance with the CEMP and detail how project activities and plans identified within the CEMP will be carried out whilst also highlighting any possible dangers / risks associated with specific Offshore Development activities.
Design Statement	A Design Statement will be submitted for the Offshore Development which details the final design of the PFOWF Array and associated infrastructure. This will include visualisations of how the final design for the PFOWF Array will look from selected viewpoints in agreement with Scottish Ministers and key consultees.
Development Specification and Layout Plan	A Development Specification and Layout Plan will allow stakeholders to see the specifics of the Offshore Development (e.g. WTG layout and mooring arrangement positions). This will be agreed upon with Scottish Ministers and key consultees.
Cable Plan	A Cable Plan will be prepared for the Offshore Development and will detail the location / route and cable laying techniques of the inter-array and offshore export cables and the methods for cable surveys during the operational life of the cables for the Offshore Development. This will be supported by survey results from the geotechnical, geophysical, and benthic surveys. The Cable Plan will also detail the electromagnetic fields of the cables deployed. A Cable Burial Risk Assessment will also be undertaken and included within the Cable Plan which will detail cable specifications, cable installation, cable protection, target burial depths / depth of lowering, and any hazards the cable will present during the life-cycle of the cable.
Vessel Management Plan	A Vessel Management Plan will be prepared for the Offshore Development which will detail the number, type, and specification of vessels utilised during construction and operation. This will also detail the ports and transit corridors proposed.
Navigational Safety Plan	A Navigational Safety Plan will be developed for the Offshore Development which will detail all navigational safety measures, construction exclusion zones if required, Notices to Mariners (NtM) and radio navigation warnings, anchoring areas, lighting and marking requirements, and emergency response procedures during all phases of the Project.

Embedded Mitigation Measures and Management Plans	Justification
Lighting and Marking Plan (LMP)	An LMP will be prepared for the Offshore Development. It will provide that the Offshore Development be lit and marked in accordance with the current Civil Aviation Authority and MoD aviation lighting policy and guidance. The LMP will also detail the navigational lighting requirements detailed in IALA R139 and G1162.
<b>Embedded Mitigation</b>	
Charting Requirements	Prior to construction, the final WTG positions and height will be provided to the United Kingdom Hydrographic Office, MoD, and Defence Geographic Centre for aviation and nautical charting purposes. Structures greater than 91.4 m in height will be charted on aeronautical charts and reported to the Defence Geographic Centre, which maintains the UK's database of tall structures (Digital Vertical Obstruction File), at least 10 weeks prior to construction.
Promulgation of information as per consent requirements and standard industry practice.	As per required consent conditions, the details of the Offshore Development will be promulgated in advance of and during construction via channels such as NtM and Kingfisher to ensure shipping and navigation users are informed about ongoing and upcoming works.
MoD and Dounreay Site Notification	Due to the proximity of the Dounreay Nuclear Facility and Vulcan NRTE, prior to construction, HWL will notify the Dounreay Nuclear Facility and MoD of any offshore works being undertaken and the duration of activities for the Offshore Development for compliance with the security measures for these nuclear sites.
Minimum Spacing between WTGs	The minimum spacing between each WTG (from the centre of each WTG structure) will be 800 m.
Marine Guidance Note (MGN) 654 compliance	The Offshore Development will comply with MGN 654 and its annexes to ensure that impacts on navigational safety and emergency responses are considered, assessed, and mitigated. This includes post-consent completion of the Search and Rescue Checklist, which includes the completion of an Emergency Response Cooperation Plan.
Post-consent application for safety zones	<p>Five-hundred-meter safety zones will be applied for during construction, major maintenance, and decommissioning works. These will be centred on the Offshore Renewable Energy Installation being worked on at the time. In addition, a 500-m advisory safety zone will also be requested around project vessels (e.g. during cable-laying).</p> <p>Operational safety zones are under consideration in terms of their status (advisory or statutory) and extent. If statutory operational safety zones are planned, further consultation will be held with stakeholders before making an application, which will be supported by risk-based justification.</p>
International Regulations for the Prevention of Collision at Sea (COLREGs) and the International Regulations for the Safety of Life at Sea (SOLAS).	All vessels will comply with the relevant COLREGs and SOLAS provisions, including the display of appropriate lights and shapes such as when vessels are restricted in their ability to manoeuvre.
Crossing and Proximity agreements	Crossing and proximity agreements will be sought, if required, with SHE Transmission. These agreements will include the ability of SHE Transmission to access the SHE Transmission Orkney-Caithness Project during construction if required. If such works are required to occur simultaneously, consultation with SHE Transmission will be undertaken.

## 18.6 Assessment of Potential Effects

### 18.6.1 Effects during Construction

#### 18.6.1.1 Disturbance of subsea cables

The OECC landfall location overlaps with the SHE Transmission Orkney-Caithness Project's proposed landfall area. The latter is fully consented, but details of the construction timeline remain unknown as the project is on hold subject to Ofgem's approval of a needs case, which is dependent on the viability of renewable projects on Orkney (Ofgem, 2019).

Installation activities for the Offshore Development, including the presence of safety zones and construction vessels, may limit the movements of all third-party vessels, including those associated with the installation of the SHE Transmission Orkney-Caithness Project, if the construction periods overlap. Construction activities for the Offshore Development are planned to be conducted in two seven-month stages (Stage 1 and Stage 2).

Construction activities associated with the landfall works and the Offshore Export Cable(s) are expected to be the most likely source of disruption to the SHE Transmission Orkney-Caithness Project installation. These works are expected to take place in 2024.

It is acknowledged that disruption from the remaining offshore components within the PFOWF Array Area being installed in Stage 2 may also occur. However, the PFOWF Array Area is approximately 7.5 km from the SHE Transmission Orkney-Caithness Project; therefore, no major obstruction of access for vessels associated with the SHE Transmission Orkney-Caithness Project is expected to occur.

Embedded mitigation measures, such as the distribution of Notices to Mariners (NtMs) will make other users aware of the construction works for the Offshore Development. Furthermore, prior to construction, HWL will consult with SHE Transmission to understand the planned activities and to agree on procedures to reduce any adverse impact on both the SHE Transmission Orkney-Caithness Project and the Offshore Development.

If the SHE Transmission Orkney-Caithness Project has been installed by the time the Offshore Development is constructed, the Offshore Export Cable(s) may have to cross this asset, which could potentially damage the integrity of the cable and result in disruption to power transmission. The crossing will be installed in line with industry best practices to reduce any potential damage and will be in accordance with a crossing agreement sought between SHE Transmission and HWL. Proximity agreements will also be developed if required, and these will seek agreement on how close construction activities can occur to existing infrastructure. HWL has been in regular contact with SHE Transmission and this engagement will continue to occur throughout the construction, operation and maintenance, and decommissioning phases of the Offshore Development.

There are potential safety issues regarding disruption during installation works and high costs associated with cable repair. Therefore, the SHE Transmission Orkney-Caithness Project is considered to be of **high sensitivity** to disturbance. The SHE Transmission Orkney-Caithness Project is also judged to be of **high value**, given the potential for this project to enable the transmission of renewable energy from / to Orkney and the Scottish Mainland. Any disruption will be temporary and any damage to cable integrity repairable.

When considering the embedded mitigation measures listed in Section 18.5.5, the impact is defined as being of **negligible magnitude**. Therefore, the overall effect to the SHE Transmission Orkney-Caithness Project is considered to be **minor** and **not significant**.

#### 18.6.1.2 Disruption to DSRL remedial and monitoring activities

Seabed surveys at Dounreay began in 1997 out to a distance of 600 m offshore and were originally conducted by divers and ROVs (PRAG(D), 2012). It is understood that remedial works at the seabed ceased in 2012, with the monitoring activities now being conducted at the nearby beaches at Sandside Bay and Dounreay Foreshore (Dounreay, 2022a). The beaches are monitored on a fortnightly or monthly basis and the monitoring programme is agreed upon with the Scottish Environment Protection Agency (DSRL, 2022; PRAG(D), 2012).

DSRL routinely monitor beaches on either side of Dounreay, including at Dounreay Foreshore and Sandside Bay. The landfall and offshore export cable installation works are not expected to disrupt the monitoring works, as these are conducted onshore at the beaches, rather than on the seabed; therefore, there is a limited potential for interaction between the activities of the Offshore Development and the DSRL monitoring works.

If further seabed surveys are conducted, it is not expected that these would be on a regular basis, as the seabed monitoring and remedial works ceased in 2012. Embedded mitigation, including NtMs, in addition to direct consultation with DSRL ahead of the installation works commencing, will seek to reduce any potential disruption to the remedial and monitoring activities.

No impacts from the PFOWF Array Area on the DSRL monitoring and remedial works are expected, as the monitoring works are mainly onshore and any potential offshore works would be expected to be close to shore.

The DSRL remedial and monitoring activities are considered to be of **high sensitivity** to potential disruption, as the materials contained and monitored at the site are of a sensitive nature. The remedial and monitoring works are considered to be regionally important and therefore are judged to be of **moderate value**. There is a very limited potential for disruption from the Offshore Development, as the monitoring and remedial works are mainly conducted onshore. If remedial or monitoring works on the seabed are required, the disruption would be temporary and for a short duration only; activities would be able to resume once the landfall and offshore export cable installation works are complete.

Considering this in conjunction with the embedded mitigation measures and direct consultation efforts described above, the impact is defined as being of **negligible magnitude**. Therefore, the overall effect to the DSRL remedial and monitoring activities is considered to be **minor** and **not significant**.

#### *18.6.1.3 Interference to the operations of Space Hub Sutherland*

Space Hub Sutherland is located approximately 38 km west of the Offshore Site. The Space Hub Sutherland launch pad complex, located at Melness in Sutherland, will be used to launch satellites into Earth's orbit approximately 12 times per year. A marine launch exclusion zone will be in place for approximately six hours per launch, during which marine users will be restricted from entering the exclusion zone (Highlands and Islands Enterprise, 2022).

The Space Hub Sutherland project is considered to be of **moderate sensitivity** to interference, due to the fact that specific conditions are required for launches; therefore, this receptor has a limited ability to accommodate any interference. The Space Hub Sutherland is considered to be of national importance and is judged as being of **high value**.

The EIAR for the Space Hub Sutherland project was published in February 2020 (Ramboll, 2020). It details that the trajectories for the launch vehicles will be between 7 degrees east of due north and 8 degrees west of due north. Considering the planned trajectory for the launch vehicles and the fact that the Space Hub Sutherland launch site is approximately 38 km west of the Offshore Site, no impacts from the Offshore Development on the Space Hub Sutherland project are anticipated. Any transiting construction vessels will adhere to the launch exclusion zone, as required.

Considering this, the impact is defined as being of **no change**. Therefore, the overall effect to the Space Hub Sutherland project is **negligible** and **not significant**.

#### *18.6.1.4 Summary of effects during construction*

A summary of the assessment of effects during construction is provided in Table 18.11.

Table 18.11 Summary of significance of effects from construction impacts

Summary of Effect	Receptor	Sensitivity	Magnitude of Impact	Rationale	Consequence	Significance of Effect	Additional Mitigation Requirements	Residual Effect
Disturbance of subsea cables	SHE Transmission Orkney-Caithness Project	High	Negligible	<ul style="list-style-type: none"> <li>&gt; The cable will enable renewable energy transmission from / to Orkney and the Scottish Mainland, which is considered to be of national importance;</li> <li>&gt; Potential for safety zones and construction vessels to disrupt the SHE Transmission Orkney-Caithness Project installation works or damage the asset, if it is crossed by the Offshore Export Cable(s) for the Offshore Development;</li> <li>&gt; Embedded mitigation measures, including issuance of NtMs and early consultation with SHE Transmission will be carried out to understand construction timelines and reduce disruption as far as practicable; and</li> <li>&gt; Any crossing (if required) will be in accordance with a crossing agreement.</li> </ul>	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant
Disruption to DSRL remedial and monitoring activities	DSRL remedial and monitoring activities	High	Negligible	<ul style="list-style-type: none"> <li>&gt; Very limited potential for construction activities in the nearshore area to disrupt the remedial and monitoring activities at Sandside Bay and Dounreay Foreshore;</li> <li>&gt; Any disruption will be temporary and for a short duration only; and</li> <li>&gt; Embedded mitigation measures, including issuance of NtMs and early consultation with DSRL, are expected to reduce any disruption to the activities.</li> </ul>	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant
Interference to the operations of Space Hub Sutherland	Space Hub Sutherland	High	No Change	<ul style="list-style-type: none"> <li>&gt; The available information at the time of writing indicates that the launch exclusion zone for the Space Hub Sutherland will not overlap with the Offshore Site. Therefore, no interference to the operations of Space Hub Sutherland is expected.</li> </ul>	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant

## 18.6.2 Effects during Operation and Maintenance

### 18.6.2.1 Disturbance of subsea cables

As described for construction effects, the construction timeline for the SHE Transmission Orkney-Caithness Project remains unknown. The cable could therefore be installed during the operational phase of the Offshore Development. In this instance, it would be expected that SHE Transmission would enter into discussions with HWL and that crossing agreements would be sought.

Although the operational life of the Offshore Development is assumed to be 30 years, any disturbance to the SHE Transmission Orkney-Caithness Project from maintenance activities will be infrequent, temporary, and of short duration. Therefore, any disruption from maintenance activities associated with any repair or remedial works of the Offshore Export Cable(s) would be expected to result in similar or reduced disruption to the SHE Transmission Orkney-Caithness Project installation activities as compared to the assessment conducted for the construction phase.

If remedial or repair works are required for the Offshore Export Cable(s) once both the Offshore Development and the SHE Transmission Orkney-Caithness Project are operational, this will be in line with best practice and SHE Transmission will be consulted early to reduce any risk of damage.

There is also the potential that the PFOWF Array Area may result in vessel displacement or re-routing for the SHE Transmission Orkney-Caithness Project installation vessels. However, considering the small spatial extent of the PFOWF Array Area, the distance between the PFOWF Array Area and the SHE Transmission Orkney-Caithness Project, as well as the embedded mitigation measures including adequate charting, lighting and ongoing liaison between SHE Transmission and HWL, any interference is expected to be minimal.

As described for construction, the SHE Transmission Orkney-Caithness Project is considered to be of **high sensitivity** to disruption or damage and is judged to be of **high value**. Any obstruction will be temporary and considering the embedded mitigation measures described in Section 18.5.5 and ongoing consultation between HWL and SHE Transmission, the impact is defined as being of **negligible magnitude**. Therefore, the overall effect to the SHE Transmission Orkney-Caithness Project is considered to be **minor** and **not significant**.

### 18.6.2.2 Obstruction of DSRL remedial and monitoring activities

Any obstruction to the DSRL remedial and monitoring activities is expected to be limited to any maintenance or inspection activities associated with the Offshore Export Cable(s) during the operational phase. No impacts would be expected from the PFOWF Array Area, as described for construction.

As for disturbance to subsea cables, any obstruction to the DSRL remedial and monitoring activities is expected to be similar to or less than what was described for construction. Therefore, DSRL remedial and monitoring activities are considered to be of **high sensitivity** to obstruction and judged to be of **moderate value**. The impact is defined as being of **negligible magnitude**. Therefore, the overall effect to the DSRL remedial and monitoring activities is considered to be **minor** and **not significant**.

### 18.6.2.3 Adverse impact on telecommunication systems

WTGs can interfere with telecommunications systems, including microwave communications, television reception radio reception, and cellular telephone service. Scoping responses were provided by BT and JRC which noted that no interference with their networks was expected. However, HWL will engage with BT and JRC as well as any other interested parties once the final WTG layout has been confirmed to understand the potential interference with telecommunication systems.

No impacts to telecommunication systems are expected from the Offshore Export Cable(s).

Telecommunication systems are considered to be of **low sensitivity** to any adverse impacts from the Offshore Development and are judged to be of **moderate value**. The impact is defined as being of **negligible magnitude** as minimal interference with telecommunication systems is expected. Therefore, the overall effect to telecommunication systems is **negligible** and **not significant**.

#### *18.6.2.4 Interference to the operations of Space Hub Sutherland*

As described for construction, the Space Hub Sutherland project is considered to be of **moderate sensitivity** and **high value**.

For the same reasons described for construction and operation and maintenance of the Offshore Development is not expected to impact the operations of Space Hub Sutherland. Therefore, the impact is defined as being of **no change**. Therefore, the overall effect on the Space Hub Sutherland project is **negligible** and **not significant**.

#### *18.6.2.5 Summary of effects during operation and maintenance*

A summary of the assessment of effects during operation and maintenance is provided in Table 18.12.

Table 18.12 Summary of significance of effects from operation and maintenance impacts

Summary of Effect	Receptor	Sensitivity	Magnitude of Impact	Rationale	Consequence	Significance of Effect	Additional Mitigation Requirements	Residual Effect
Disturbance of subsea cables	SHE Transmission Orkney-Caithness Project	High	Negligible	<ul style="list-style-type: none"> <li>&gt; The cable will enable renewable energy transmission from / to Orkney and the Scottish Mainland, which is considered to be of national importance;</li> <li>&gt; Potential for the presence of infrastructure in the PFOWF Array Area and safety zones to disrupt or obstruct the SHE Transmission Orkney-Caithness Project installation works;</li> <li>&gt; Disruption from maintenance works is expected to be less than or similar to construction; and</li> <li>&gt; Embedded mitigation measures, including issuance of NtMs and early consultation with SHE Transmission, will be carried out to understand construction timelines and reduce disruption as far as practicable.</li> </ul>	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant
Obstruction of DSRL remedial and monitoring activities	DSRL remedial and monitoring activities	High	Negligible	<ul style="list-style-type: none"> <li>&gt; Potential for the maintenance activities in the nearshore area to disrupt the remedial and monitoring activities at Sandside Bay and Dounreay Foreshore;</li> <li>&gt; Any disruption will be associated with maintenance works that will be temporary and for a short duration only; and</li> <li>&gt; Embedded mitigation measures, including issuance of NtMs and early consultation with DSRL, are expected to reduce any disruption to the activities.</li> </ul>	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant
Adverse impact on telecommunication systems	Telecommunication systems	Low	Negligible	<ul style="list-style-type: none"> <li>&gt; Potential for WTGs to interfere with telecommunication systems;</li> <li>&gt; Scoping responses from BT and JRC indicated that no impacts were expected on their networks;</li> <li>&gt; HWL will consult with BT, JRC, Ofcom, and all other relevant parties once the WTG layout has been finalised to understand potential interference.</li> </ul>	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant
Interference to the operations of Space Hub Sutherland	Space Hub Sutherland	High	No Change	<ul style="list-style-type: none"> <li>&gt; The available information at the time of writing indicates that the launch exclusion zone for the Space Hub Sutherland project will not overlap with the Offshore Site. Therefore, no interference to the operations of Space Hub Sutherland is expected.</li> </ul>	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant

### 18.6.3 Effects during Decommissioning

Decommissioning will involve the dismantling and removal of up to seven WTGs and associated floating substructures and anchoring systems as well as the removal of the dynamic and seabed laid cables (unless there is compelling evidence to leave the buried sections *in situ*). Scour protection may also be left *in situ* as it may not be practical to remove, and anchor piles may also be cut to a depth of 1 m below the seabed and left *in situ*. Details regarding decommissioning Offshore Development infrastructure are limited at this time as this will occur after a 30-year operation and maintenance phase. A Decommissioning Programme will be developed pre-construction to address the principal decommissioning measures for the Offshore Development; this will be drafted in accordance with applicable guidance and detail the management, environmental management and schedule for decommissioning. The Decommissioning Programme will be reviewed and updated throughout the life-cycle of the Offshore Development to account for changing best practices.

#### 18.6.3.1 Disruption of subsea cables

Potential effects during decommissioning are considered to be comparable to those during construction, as decommissioning of the Offshore Development may result in similar damage to the integrity of the SHE Transmission Orkney-Caithness Project. If the cable is decommissioned before the Offshore Development, there would be no impact on the cable.

Embedded mitigation measures, such as the distribution of NtMs, will make other users aware of the decommissioning works for the Offshore Development. Furthermore, prior to construction, HWL will consult with SHE Transmission to understand the planned activities and to agree on procedures to reduce any adverse impact on both the SHE Transmission Orkney-Caithness Project and the Offshore Development.

The SHE Transmission Orkney-Caithness Project is considered to be of **high sensitivity** to disturbance and judged to be of **moderate value**, for the same reasons described for construction. The impact is defined as being of **negligible magnitude**. Therefore, the overall effect to the SHE Transmission Orkney-Caithness Project is considered to be **minor** and **not significant**.

#### 18.6.3.2 Disruption of DSRL remedial and monitoring activities

The impacts during decommissioning are considered to be comparable to those during construction, as the decommissioning of the Offshore Development will involve the presence of safety zones and decommissioning vessels which could disrupt the monitoring and remedial activities to a similar extent as during construction. This assumes that the monitoring and remedial works still occur at the time of decommissioning.

The DSRL remedial and monitoring activities are considered to be of **high sensitivity** and judged to be of **moderate value**. The impact is defined as being of **negligible magnitude**. Therefore, the overall effect to the DSRL remedial and monitoring activities is considered to be **minor** and **not significant**.

#### 18.6.3.3 Interference to the operations of Space Hub Sutherland

As described for construction and operation and maintenance, no interference to the operations of Space Hub Sutherland is expected to result from the Offshore Development. This also remains true for the decommissioning phase, for the same reasons as described in Sections 18.6.1.3 and 18.6.2.4.

The Space Hub Sutherland project is considered to be of **moderate sensitivity** and is judged to be of **high value**. The decommissioning of the Offshore Development is not expected to impact the operations of Space Hub Sutherland. Therefore, the impact is defined as being of **no change**. Therefore, the overall effect to the Space Hub Sutherland project is **negligible** and **not significant**.

#### 18.6.3.4 Summary of effects during decommissioning

A summary of the assessment of effects during decommissioning is provided in Table 18.13.

Table 18.13 Summary of significance of effects from decommissioning impacts

Summary of Effect	Receptor	Sensitivity	Magnitude of Impact	Rationale	Consequence	Significance of Effect	Additional Mitigation Requirements	Residual Effect
Disturbance of subsea cables	SHE Transmission Orkney-Caithness Project	High	Negligible	<ul style="list-style-type: none"> <li>&gt; The cable will enable renewable energy transmission from / to Orkney and the Scottish Mainland, which is considered to be of national importance;</li> <li>&gt; Potential for safety zones and decommissioning vessels to disrupt the SHE Transmission Orkney-Caithness Project maintenance and / or decommissioning works and potential for damage to this asset, if it is crossed by the Offshore Export Cable(s) for the Offshore Development; and</li> <li>&gt; Embedded mitigation measures, including issuance of NtMs and early consultation with SHE Transmission, will be carried out to understand project timelines and reduce disruption as far as practicable.</li> </ul>	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant
Disruption to DSRL remedial and monitoring activities	DSRL remedial and monitoring activities	High	Negligible	<ul style="list-style-type: none"> <li>&gt; Very limited potential for decommissioning activities in the nearshore area to disrupt the remedial and monitoring activities at Sandside Bay and Dounreay Foreshore;</li> <li>&gt; Any disruption will be temporary and for a short duration only; and</li> <li>&gt; Embedded mitigation measures, including issuance of NtMs and early consultation with DSRL, are expected to reduce any disruption to the activities.</li> </ul>	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant
Interference to the operations of Space Hub Sutherland	Space Hub Sutherland	High	No Change	<ul style="list-style-type: none"> <li>&gt; The available information at the time of writing indicates that the launch exclusion zone for the Space Hub Sutherland project will not overlap with the Offshore Site. Therefore, no interference to the operations of Space Hub Sutherland is expected.</li> </ul>	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant

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## 18.7 Assessment of Cumulative Effects

The Section 18.6 assessment has assessed all potential impacts during the construction, operation and maintenance, and decommissioning phases of the Offshore Development with Other Sea Users as not significant. This assessment has considered the embedded mitigation measures and management plans that HWL will implement to reduce impacts, as described in Section 18.5.5. HWL will also consult relevant parties to coordinate activities as far as practicable and reduce any potential disturbance caused to both the Offshore Development and third parties.

The assessment for the Offshore Development in isolation has considered all potential impacts that may arise between the Offshore Development and Other Users of the Marine Environment; no additional cumulative impacts have been identified that could arise. Therefore, a detailed cumulative assessment is not required.

## 18.8 Assessment of Transboundary Effects

In terms of the impacts on Other Users of the Marine Environment receptors, impacts will be localised to the extent of the Offshore Study Area, which is located within UK waters. Given the intervening distance to neighbouring European Economic Area states, there is no potential for transboundary impacts and resultant effects to occur.

## 18.9 Assessment of Impacts Cumulatively with the Onshore Development

The Onshore Development components are summarised in Chapter 5: Project Description. These aspects of the Project have been considered in relation to the impacts assessed within this chapter.

The main components of the Onshore Development will comprise the onshore export cable(s) and the onshore substation as well as joint bays, temporary construction compounds, grid connection works, and access routes. The construction works for the Onshore Development could disturb any onshore activities of the other sea users described within this chapter, due to the construction of permanent infrastructure as well as access routes or temporary construction areas.

As both the SHE Transmission Orkney-Caithness Project and the DSRL remedial and monitoring activities have onshore elements, there is the potential for disruption to these activities from an onshore perspective, such as impacts on access for these two activities.

The disruption from offshore elements of the Project has been assessed as not significant. Any disruption from the Onshore Development to the SHE Transmission Orkney-Caithness Project and the DSRL remedial and monitoring activities will be mitigated in a manner similar to any disruption from the Offshore Development. For example, HWL will consult with all relevant parties ahead of any onshore works commencing to understand any planned activities in the vicinity of the Onshore Site and to agree on procedures to reduce any adverse impacts. Therefore, no significant impacts to the SHE Transmission Orkney-Caithness Project or the DSRL remedial and monitoring activities are expected to arise from the Onshore Development.

Given the localised nature of the impacts assessed within Section 18.6, which are not anticipated to have any interactions with the onshore environment, the Onshore Development is not expected to change the magnitude or the significance of effect of the potential impacts assessed on Other Marine Users of the Environment, set out in Section 18.6.

There is also the potential for disruption to telecommunication systems from tall structures associated with the onshore elements of the Project. Relevant parties will be consulted to understand and mitigate this interference.

## 18.10 Mitigation and Monitoring Requirements

There is no requirement for additional mitigation over and above the embedded mitigation measures described in Section 18.5.5.

## 18.11 Inter-relationships

Interrelated effects describe the potential interaction of multiple project impacts upon one receptor which may interact to create a more significant impact on a receptor than when considered in isolation. Interrelated effects may have a temporal or spatial element and may be short-term, temporary, or longer-term over the life-cycle of the Offshore Development.

In line with the Scoping Opinion and Scoping Opinion Addendum, this chapter has assessed all impacts that are relevant to Other Marine Users of the Environment receptors during the construction, operation and maintenance, and decommissioning phases of the Offshore Development. Therefore, it is considered that the assessment and conclusions presented in Section 18.6 provide a complete and robust assessment of all potential impacts relevant to Other Marine Users of the Environment. The assessment has also considered the potential for interrelated effects in relation to Other Marine Users of the Environment, and no additional interrelated effects beyond those presented in Section 18.6 have been identified.

Where the assessment contained in this chapter is considered within other assessment chapters, a summary of these interrelationships is presented below in Table 18.14.

Table 18.14 Inter-relationships identified with Other Users of the Marine Environment and other receptors in this Offshore EIA

Receptor	Impacts	Description
Physical Processes	Impacts on aquaculture sites from suspended sediments	There is the potential for the suspension of sediments to reduce the water quality at aquaculture sites. The Chapter 7: Marine Physical Processes and Chapter 8: Water and Sediment Quality assessments consider a 10-km study area over which impacts from increased suspended sediment may occur. No aquaculture sites are located within 10 km of the Offshore Site. Therefore, any increases in suspended sediment associated with the Offshore Development are not expected to impact aquaculture sites.
Water and Sediment Quality		
Shipping and navigation	Impacts on third-party vessels associated with other projects / activities from vessels and infrastructure associated with the Offshore Development	There is the potential for vessels transiting to and from nearby assets / activities, such as the SHE Transmission Orkney-Caithness Project, to be impacted by vessels or infrastructure associated with the Offshore Development. These impacts are discussed within Chapter 14: Shipping and Navigation.
	Impacts on recreational boating	Impacts on recreational boating are discussed in Chapter 14: Shipping and Navigation.
Aviation and Radar	Impacts on aerial military activities	The potential for Offshore Development infrastructure to interfere with aerial military activities and these impacts are discussed within Chapter 15: Aviation and Radar.
Socio-economics	Impacts on tourism, recreation and the economy	<p>Impacts on tourism, recreation and access to amenities are discussed in Chapter 19: Socio-economics, Recreation, and Tourism.</p> <p>In addition, socio-economic impacts (either positive or negative) have the potential to affect Other Users of the Marine Environment. These impacts are discussed within Chapter 19: Socio-economics, Recreation, and Tourism.</p>

## 18.12 Summary and Residual Effects

The summary of the residual effects for Other Users of the Marine Environment is provided in Table 18.15.

Table 18.15 Summary of residual effects for Other Users of the Marine Environment

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation identified	Significance of Residual Effect
<b>Construction</b>					
Disturbance of subsea cables	SHE Transmission Orkney-Caithness Project	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
Disruption to DSRL remedial and monitoring activities	DSRL remedial and monitoring activities	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
Interference to the operations of Space Hub Sutherland	Space Hub Sutherland	Negligible Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
<b>Operation and Maintenance</b>					
Disturbance of subsea cables	SHE Transmission Orkney-Caithness Project	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation identified	Significance of Residual Effect
Obstruction of DSRL remedial and monitoring activities	DSRL remedial and monitoring activities	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
Adverse impact on telecommunication systems	Telecommunication systems	Negligible Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
Interference to the operations of Space Hub Sutherland	Space Hub Sutherland	Negligible Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
<b>Decommissioning</b>					
Disturbance of subsea cables	SHE Transmission Orkney-Caithness Project	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant
Disruption to DSRL remedial and monitoring activities	DSRL remedial and monitoring activities	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation identified	Significance of Residual Effect
Interference to the operations of Space Hub Sutherland	Space Hub Sutherland	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Section 18.5.5 as it was concluded that the effect was not significant.	Not Significant
<b>Cumulative</b>					
No cumulative effects on Other Users of the Marine Environment are expected to arise. The effects from the Offshore Development alone are assessed as not significant and other developments would be expected to have measures in place to reduce disruption to Other Users of the Marine Environment.					

## 18.13 References

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