



Project Erebus Environmental Statement Chapter 17: Aviation and Radar

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Acronyms

Term	Definition
ACC	Area Control Centre
ADR	Air Defence Radar
agl	above ground level
AIP	Aeronautical Information Publication
amsl	above mean sea level
ANO	The Air Navigation Order (ANO) 2016 and Regulations
AOC	Aircraft Operator Certificate
ASACS	Air Surveillance and Control System
ATC	Air Traffic Control
ATS	Air Traffic Service
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CAS	Controlled Airspace
CNS	Communications, Navigation or Surveillance
DCO	Development Consent Order
DGC	Defence Geographic Centre
DIO	Defence Infrastructure Organisation
DVOF	Digital Vertical Obstruction File
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
ERCoP	Emergency Response Co-operation Plan
FIR	Flight Information Region
FL	Flight Level
ft	Feet
GAAC	General Aviation Awareness Council
HMR	Helicopter Main Route
ICAO	International Civil Aviation Organisation

Term	Definition
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
IPC	Infrastructure Planning Commission
km	Kilometres
LARS	Lower Airspace Radar Service
LAT	Lowest Astronomical Tide
LOS	Line of Sight
m	Metres
MCA	Maritime Coastguard Agency
MDS	Maximum Design Scenario
Mil AIP	Military Aeronautical Information Publication
MOD	Ministry of Defence
MSA	Minimum Safe Altitude
MW	Megawatt
NATS	NATS Holdings (formerly National Air Traffic Services)
NERL	NATS En Route Limited
nm	Nautical Miles
NOTAM	Notice to Airmen
NPS	National Policy Statement
O&M	Operation and Maintenance
PAR	Precision Approach Radar
PDE	Project Design Envelope
PEIR	Preliminary Environmental Information Report
PEXA	Practice and Exercise Area
PEDW	Planning and Environment Decisions Wales
PINS	Planning Inspectorate
PSR	Primary Surveillance Radar
RAP	Recognised Air Picture
RoA	Rules of the Air

Term	Definition
RRH	Remote Radar Head
SAR	Search and Rescue
SSR	Secondary Surveillance Radar
TOPA	Technical and Operational Assessment
UKIAIP	United Kingdom Integrated Aeronautical Information Publication; CAA CAP 032
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
WTG	Wind Turbine Generator

Glossary

Term	Definition
Controlled Airspace (CAS)	Airspace in which Air Traffic Control exercises authority. In the UK, Class A, C, D and E airspace is controlled. Class G is uncontrolled airspace.
Flight Level (FL)	A standard nominal altitude of an aircraft, in hundreds of feet, based upon a standardized air pressure at sea-level.
Helicopter Main Route (HMR)	Helicopter Main Routes are routes typically and routinely flown by helicopters, operating to and from offshore destinations and are promulgated for the purpose of signposting concentrations of helicopter traffic to other airspace users. HMR promulgation does not predicate the flow of helicopter traffic. Whilst HMRs have no airspace status and assume the background airspace classification within which they lie they are used by the air navigation service provider and helicopter operators for flight planning and management purposes.
Instrument Flight Rules (IFR)	The rules governing procedures for flights conducted with the crew, referring to aircraft cockpit instruments for situation awareness and navigation.
Instrument Meteorological Conditions (IMC)	Weather conditions which would preclude flight by the Visual Flight Rules; conditions where the aircraft is in or close to cloud or flying in visibility less than a specified minimum.
Minimum Safe Altitude (MSA)	Under aviation flight rules, the altitude below which it is unsafe to fly in IMC, owing to presence of terrain or obstacles within a specified area.
Uncontrolled Airspace	Airspace in which Air Traffic Control does not exercise any executive authority but may provide flight information services to aircraft in radio contact. In the UK, Class G airspace is uncontrolled.
Visual Flight Rules (VFR)	The rules governing flight conducted visually i.e. with the crew maintaining separation from obstacles, terrain, and other aircraft visually.
Visual Metrological Conditions (VMC)	A flight category which allows flight to be conducted under VFR defined by in flight visibility and clearance from cloud.

Chapter 17 Aviation and Radar

17.1 Introduction

- 17.1.1.1 The proposed Project Erebus (the Project) is a demonstration scale Floating Offshore Wind (FLOW) development in the Celtic Sea region. The Applicant, Blue Gem Wind, is a joint venture between Simply Blue Energy (SBE) and TotalEnergies, set up to create a new low carbon offshore energy sector in the region; that contributes to climate change targets, supply chain diversification and energy security.
- 17.1.1.2 This assessment has been carried out by Osprey Consulting Services Ltd (Osprey), specialist aviation and radar subcontractor. The Chapter has been authored by Richie Hinchcliffe (MBA, BSc (Eng), MRAeS), Principal Consultant at Osprey, who has over 40 years' experience in aviation and flight operations and undertaking Environmental Impact Assessment (EIA) focused on potential effects of projects on aviation and radar receptors.
- 17.1.1.3 The array area is located approximately 35 km southwest of the Pembrokeshire coastline, covering an area of 43.5 km² in water depths of between 65-85 m. The array area is located outside of the 12 nm limit, but all elements of the Project, array area, offshore export cable corridor and landfall, fall within Welsh territorial waters or the Welsh Zone.
- 17.1.1.4 The Project comprises six to ten Wind Turbine Generators (WTG) with a total generating capacity up to 100 MW. Each WTG is housed on a semi-submersible floating platform with a mooring system comprising a maximum of five catenary mooring lines, up to 870 m in length, and a range of foundation options including drag embedment anchors, driven piles, drilled piles and/or suction piles. Up to 10 dynamic array cables are proposed, with a lazy wave configuration from the semi-submersible floating platform to the seabed. The offshore export cable, up to 49 km in length, links the array area to landfall at West Angle Bay, Pembrokeshire.
- 17.1.1.5 The Study Area for this assessment is defined in Section 17.4.2 (also see Volume 2, Figure 17.1). The Study Area encapsulates the array area and, for the purposes of the assessment of cumulative effects, also includes any other offshore wind farms in the northeastern Celtic Sea (littoral Celtic Sea, bounded by North Devon/Cornwall, Pembrokeshire, County Cork and then out to a line between St Ives-Kinsale) that could have potential effects on identified civil, military aviation, airport, and radar stakeholders.
- 17.1.1.6 A wide range of studies was undertaken to inform the site-selection process, as described fully in Chapter 3: Site Selection and Alternatives. This chapter builds on the technical report Volume 3, Technical Appendix 17.1: Aviation, Military and Radar Technical Report and incorporates feedback from key aviation and radar stakeholder engagement detailed in Section 17.3.
- 17.1.1.7 This chapter of the Environmental Statement (ES) characterises aviation and radar activity in the Study Area and presents the assessment of the potential effects of the Project on aviation and radar which may arise during the construction, operation and maintenance (O&M), and decommissioning phases of the Project. The transboundary and cumulative effects of the Project are also considered in regard to:
- The existing environmental baseline (Section 17.5) established from desk studies, and consultation;
 - Potential effects on aviation and radar arising from the array area, based on the information gathered and the analysis and assessments undertaken;

- Assumptions and limitations encountered in compiling the environmental information; and
 - Necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible effects identified in the EIA process.
- 17.1.1.8 This chapter utilises and builds upon the information presented in the Project Erebus EIA Scoping Report (MarineSpace, 2019). Comments were made with respect to aviation and radar in Natural Resource Wales' (NRW) formal EIA Scoping Opinion (NRW, 2020), which have been considered in this chapter. Copies of the Scoping Opinion Request (the Scoping Report) and NRW's Scoping Opinion are provided in Volume 3, Technical Appendices 2.1 and 2.2, respectively.
- 17.1.1.9 The potential impacts on aviation and radar have been assessed conservatively using realistic worst case scenarios for the Project, summarised in Table 17.7. The Project Design Envelope (PDE) is provided in full in Chapter 4: Proposed Development Description.
- 17.1.1.10 Further details on aviation and radar activity in the Study Area are provided in Volume 3, Technical Appendix 17.1: Aviation, Military and Radar Technical Report. This chapter should also be read in conjunction with the following ES chapter:
- Chapter 16: Shipping and Navigation.
- 17.1.1.11 The effects of WTG on aviation interests have been widely publicised but the primary concern is one of safety. There are innumerable subtleties in the actual effects but there are two dominant scenarios that lead to objection from aviation stakeholders:
- Physical: WTG can present a physical obstruction to aircraft in transit at low altitudes; and
 - Radar/Air Traffic Services (ATS): WTG derived clutter appearing on radar displays can affect the safe provision of ATS, as it can mask unidentified aircraft from the air traffic controller and/or prevent the controller from accurately identifying aircraft under control. In some cases, radar reflections from the WTG can affect the performance of the radar system itself.

17.2 Legislation, Policy and Guidelines

- 17.2.1.1 A detailed overview of the relevant policy and legislation for the Project is provided in Chapter 5: Policy and Legislation. The Project is seeking a Section 36 consent, with deemed planning permission, under the Electricity Act 1989 from Welsh Ministers, administered by Planning and Environment Decision Wales (PEDW) and a Marine Licence under the Marine and Coastal Access Act (MCAA) 2009 from NRW.

17.2.2 Legislation

- 17.2.2.1 Relevant legislation and guidance documents have been reviewed and taken into account as part of this assessment. Of particular relevance are:
- Overarching National Policy Statement (NPS) for Energy (EN-1) (DECC, 2011a);
 - NPS for Renewable Energy Infrastructure (EN-3), July 2011 (DECC, 2011b);
 - UK Marine Policy Statement (HM Government, 2011); and
 - Wales National Marine Plan (Welsh Government, 2019).
- 17.2.2.2 Other relevant legislation has also been considered during this assessment (see Chapter 5: Policy and Legislation).

17.2.3 Policy

National Policy Statements

17.2.3.1 Although this Project is seeking Section 36 consent under the Electricity Act 1989 and a Marine Licence under the Marine and Coastal Access Act (MCAA) 2009, as opposed to a Development Consent Order (DCO), its size (up to 100 MW) is similar to the minimum threshold (100 MW) for Nationally Significant Infrastructure Projects (NSIPs). As such, guidance relevant to NSIPs is considered relevant to use for this Project. National Policy Statements (NPSs) were developed to provide guidance in the determination of NSIPs. Those relevant for the assessment of impacts on aviation and radar are referenced throughout this ES and in Table 17.1¹:

Table 17.1 – National Policy Statement EN-1 and EN-3 Assessment Provisions Relevant to Aviation and Radar

NPS Requirement	NPS Reference	ES Reference
Where the proposed development may have an effect on civil or military aviation and/or other defence assets an assessment of potential effects should be set out in the ES.	EN-1, Section 5.4.10	Potential impacts and an assessment of the effects to civil and military aviation have been presented in this Chapter of the ES
The applicant should consult the MOD, CAA, NATS and any aerodrome – licensed or otherwise – likely to be affected by the proposed development in preparing an assessment of the proposal on aviation or other defence interests.	EN-1, Section 5.4.11	Consultation with relevant aviation and radar stakeholders has been undertaken for the Project and is summarised in Section 17.3
Any assessment of aviation or other defence interests should include potential impacts of the project upon the operation of CNS infrastructure, flight patterns (both civil and military), other defence assets and aerodrome operational procedures. It should also assess the cumulative effects of the project with other relevant projects in relation to aviation and defence.	EN-1, Section 5.4.12	Potential impacts to aviation and radar operations are presented in Section 17.6 Cumulative effects have been assessed in Section 17.10.
If any relevant changes are made to proposals during the pre-application and determination period, it is the responsibility of the applicant to ensure that the relevant aviation and defence consultees are informed as soon as reasonably possible.	EN-1, Section 5.4.13	Consultation with relevant aviation and radar stakeholders has been undertaken for the Project and is summarised in Section 17.3
If there are conflicts between the Government's energy and transport policies and military interests in relation to	EN-1, Section 5.4.15	Consultation with relevant aviation and radar stakeholders, including the MOD, has been

¹ A period of consultation on a set of revised energy NPS's, managed by the Department of Business, Energy and Industrial Strategy (BEIS), ended on 29th November 2021.

NPS Requirement	NPS Reference	ES Reference
<p>the application, the IPC (now PINS) should expect the relevant parties to have made appropriate efforts to work together to identify realistic and pragmatic solutions to the conflicts. In so doing, the parties should seek to protect the aims and interests of the other parties as far as possible.</p>		<p>undertaken for the Project and is summarised in Section 17.3</p>
<p>There are statutory requirements concerning lighting to tall structures. Where lighting is requested on structures that goes beyond statutory requirements by any of the relevant aviation and defence consultees, the IPC (now PINS) should satisfy itself of the necessity of such lighting taking into account the case put forward by the consultees. The effect of such lighting on the landscape and ecology may be a relevant consideration.</p>	<p>EN-1, Section 5.4.16</p>	<p>Potential mitigation measure in relation to aviation and radar, including lighting requirements are presented in including lighting requirements, are presented in Section 17.4.7 and Section 17.7.</p>
<p>Where, after reasonable mitigation, operational changes, obligations and requirements have been proposed, the IPC (now PINS) considers that:</p> <ul style="list-style-type: none"> a development would prevent a licensed aerodrome from maintaining its licence; the benefits of the proposed development are outweighed by the harm to aerodromes serving business, training or emergency service needs, taking into account the relevant importance and need for such aviation infrastructure; or the development would significantly impede or compromise the safe and effective use of defence assets or significantly limit military training; the development would have an impact on the safe and efficient provision of en route air traffic control services for civil aviation, in particular through an adverse effect on the infrastructure required to support communications, navigation or surveillance systems; <p>consent should not be granted.</p>	<p>EN-1, Section 5.4.17</p>	<p>Potential impacts, mitigation measures and residual effects are presented in this Chapter in Section 17.6 and 17.7.</p> <p>The summary of the assessment is outlined in Section 17.12.</p>
<p>Detailed discussions between the applicant for the offshore wind farm and the relevant consultees should have progressed as far as reasonably possible prior to the submission of an application to</p>	<p>EN-3, Section 2.6.187</p>	<p>Consultation with relevant aviation and radar stakeholders has been undertaken for the Project and is summarised in Section 17.3.</p>

NPS Requirement	NPS Reference	ES Reference
the IPC (now PINS). As such, appropriate mitigation should be included in any application to the IPC, and ideally agreed between relevant parties		Additional mitigation measures are presented in Section 17.7.
Aviation and navigation lighting should be minimised to avoid attracting birds, taking into account impacts on safety.	EN-3, Section 2.6.107	Chapter 11: Offshore Ornithology outlines the potential impacts on birds, including those of lighting.

Marine Policy Statement

- 17.2.1.1 The Marine Policy Statement (MPS) provides the policy framework for the preparation of marine plans and establishes how decisions affecting the marine area should be made in order to enable sustainable development. The MPS was adopted by all UK administrations in March 2011. The MPS sets out a vision of having “*clean, healthy, safe, productive and biologically diverse oceans and seas*” by supporting the development of Marine Plans. It also sets out the framework for environmental, social and economic considerations that need to be considered in marine planning.

Welsh National Marine Plan

- 17.2.1.2 The Welsh Government published its first marine plan for Welsh inshore and offshore waters, the Welsh National Marine Plan (WNMP), in November 2019. The WNMP was developed in accordance with the MCAA 2009 and the UK MPS. The WNMP covers a 20-year period from its adoption in 2019. The publishing of the WNMP in November 2019 followed a period of consultation from 7 December 2017 to 29 March 2018. The WNMP is discussed further in Chapter 5: Policy and Legislation.
- 17.2.1.3 There are no specific policies relevant to aviation and radar in either the UK MPS or the WNMP.

17.2.2 Guidance

- 17.2.2.1 Relevant guidance documents have been reviewed and considered as part of this assessment. Of relevance, as a minimum, considered during the EIA process are:
- Civil Aviation Authority (CAA), Civil Aviation Publication (CAP) 764: Policy and Guidelines on Wind Turbines (CAA, 2016a);
 - CAA CAP 032: United Kingdom (UK) Integrated Aeronautical Information Package (IAIP). (CAA, 2021a);
 - CAA CAP 168: Licensing of Aerodromes. (CAA, 2019a);
 - CAA CAP 393: The Air Navigation Order (ANO) 2016 and Regulations (CAA, 2016b); Includes guidance regarding the aviation and maritime lighting of WTGs in UK territorial waters;
 - CAA CAP 493: Manual of Air Traffic Services Part 1. (CAA, 2021);
 - CAA CAP 670: Air Traffic Services Safety Requirements. (CAA, 2019b);
 - CAA CAP 738: Safeguarding of Aerodromes. (CAA, 2020);
 - CAA CAP 1434: UK Flight Information Services (CAA, 2016c);

- CAA Visual Flight Rules Chart (CAA, 2021b);
- Ministry of Defence (MOD), Military Aviation Authority Regulatory Publications (MRP) including Regulatory Articles (RA) and Manuals;
- MOD UK Military Low Flying Handbook (MOD, 2014);
- MOD Wind farms: MOD safeguarding (MOD, 2018);
- MOD Military Aeronautical Information Publication (Mil AIP) (MOD, 2021);
- Maritime and Coastguard Agency (MCA) MGN 654 (M+F) Offshore Renewable Energy Installations (OREI) safety response (MCA, 2021); and
- Pooleys Flight Guide.

17.3 Consultation and Scoping

17.3.1.1 Consultation is a key part of the development process. Consultation regarding aviation and radar has been conducted through direct formal technical engagement and online meetings. A summary of the key issues raised during engagement, specific to aviation and radar, is outlined below in Table 17.2, together with how issues raised have been considered.

17.3.1.2 Comments were made with respect to aviation and radar in NRW formal EIA Scoping Opinion (NRW, 2020), by the MOD, which have been considered in this chapter and are outlined in Table 17.2.

Table 17.2 - Aviation and Radar Consultation Engagement (Aviation Receptors and Stakeholders identified from the Baseline Study)

Consultee	Response	Applicant Action
UK Civil Aviation Authority (CAA) February 2021	The CAA would look to the Proposed Development incorporating offshore aviation obstacle lighting and marking in accordance with the ANO Article 223. A forthcoming amendment to the ANO (not yet published) will introduce a new Article 225A which will mandate the reporting of obstacles over 100m, whether temporary or permanent, to the CAA (the CAA continue to share such information with Defence Geographic Centre (DGC) and from there into the IAIP). This is likely to come into force and effect from July 2021.	A lighting and marking plan in accordance with ANO Article 223 and 225A (CAA, 2016b), see Section 17.6.3.5
Irish Aviation Authority (IAA) (Consultation) March and April 2021	No response at date of publication.	None

Consultee	Response	Applicant Action
UK Ministry of Defence Infrastructure Organisation (DIO) (Scoping Opinion) January 2020	<p>“In the interests of air safety, the MOD have noted that are likely to request fitting of MOD accredited aviation safety lighting in accordance with the Civil Aviation Authority, Air Navigation Order 2016 should the project be progressed. Further information about the effects of wind turbines on MOD interests can be obtained from the following website: https://www.gov.uk/government/publications/wind-farms-ministry-of-defence-safeguarding”</p>	<p>A lighting plan in accordance with ANO Article 223 and MOD accredited visible or infrared aviation safety lighting. (CAA, 2016b) see Section 17.6.3.5.</p>
UK Ministry of Defence Infrastructure Organisation (DIO) (Consultation Response) March 2021	<p>DIO has calculated that your development will be detectable by, one or more MOD radars as specified below. Consequentially, we may object should you proceed with a planning application for the development in its current form... The turbines will be approximately 95 km from and detectable by the ATC radar at MOD Hartland Point. Wind turbines have been shown to have detrimental effects on the performance of MOD ATC and Range Control radars. These effects could include the desensitisation of radar in the vicinity and the creation of "false" aircraft returns which air traffic controllers must treat as real... Fixed Wing military low flying training takes place throughout the United Kingdom down to a height of 250ft above ground level and in certain designated areas down to a height of 100ft above ground level. ...A turbine development of the height and at the location you propose may have an impact on low flying operations... Regardless of whether we object to your proposal, it is probable the MOD will request the turbines be fitted with MOD accredited visible or infrared aviation safety lighting.</p>	<p>The Project sought further advice from DIO on the conclusions of this response and what, if any mitigation might be required.</p>
UK Ministry of Defence Infrastructure Organisation (DIO) (Meeting) July 2021	<p>Meeting was held to discuss MOD DIO initial pre-application responses, including concerns regarding impacts from the Project on the Primary Surveillance Radar (PSR) at Hartland Point and how to engage with MOD DIO prior to consent application submission in December 2021. DIO confirmed response from 15.03.2021 was based on technical assessment only. Operational assessments are not usually done during pre-application, however, if the Project were to formally request an operational assessment to inform consent application and EIA this would be processed. DIO would also consult with Royal Navy (Air) to inform the operational assessment. The DIO confirmed this operational assessment would be the same as that undertaken during the formal consenting process.</p>	<p>The Project submitted a request (05/07/2021) to the DIO for an operational assessment to further inform the EIA.</p>

Consultee	Response	Applicant Action
<p>UK Ministry of Defence Infrastructure Organisation (DIO)</p> <p>(Response to Operational Assessment Request)</p> <p>October 2021</p>	<p>Pre-application operational assessment response received from the MOD DIO. Assessment undertaken on up to 10 wind turbine generators at 270 m in height. Comments:</p> <ul style="list-style-type: none"> - A turbine development of the height and at the location you propose may have an impact on low flying operations. We have produced a map which indicates areas in the UK where the MOD is more likely or less likely to object to wind turbine planning applications on the grounds of interference with low flying operations. The following link will take you to this map, which has been produced only for guidance and does not offer definitive advice on the MODs position. - Regardless of whether we object to your proposal, it is probable the MOD will request the turbines be fitted with MOD accredited visible or infrared aviation safety lighting. - The Met Office is now a statutory consultee for planning relating to their technical infrastructure, therefore the MOD has not informed the Met Office of this pre-application. If your development falls within any of the Met Office safeguarded zones you will need to contact the Met Office directly. 	<p>Consideration of lighting is presented in Section 17.6.4.1 and Section 17.9 and Chapter 11: Ornithology and Chapter 13: Seascape and Visual Impacts.</p>
<p>National Air Traffic Service (NATS)</p> <p>April 2021</p>	<p>Conclusions to En-route Consultation and Technical and Operational Assessment (TOPA): The proposed development has been examined by technical and operational safeguarding teams. No impact is anticipated.</p>	<p>No further action required at this stage as NATS En-Route TOPA concluded no impact is anticipated.</p>
<p>UK Maritime Coastguard Agency (MCA) Aeronautical Search and Rescue (SAR)</p> <p>March 2021</p>	<p>The MCA would look to the Proposed Development incorporating the specific requirements of lighting, marking and control guidance contained within <i>Requirements, Guidance and Operational Considerations for SAR and Emergency Response</i> (Offshore Renewable Installations (OREI)) MGN 543 Annex 5 (MCA, 2016b).</p>	<p>An Emergency Response Cooperation Plan (ERCoP) be developed and put in place for the construction, operation, and decommissioning phases of any OREI. These plans are designed to ensure that HM Coastguard, SAR resources and the developer/operator have necessary information about the fundamental details of an OREI and that both the developer/operator and Her Majesty's Coast Guard (HMCG) have access to emergency contact</p>

Consultee	Response	Applicant Action
		numbers to permit <i>rapid</i> contact, information sharing and effective cooperation during an emergency situation, see Section 17.4.6.5.
Lundy Island Trust (Lundy Helicopters) March 2021	No effect to Lundy Helicopter operations.	No further action required at this stage as no effect to Lundy Helicopter operations.

17.4 Assessment Methodology and Significance Criteria

17.4.1.1 This assessment has been based on the existing baseline environment, as described in Section 17.5 (see also Volume 3, Technical Appendix 17.1: Aviation, Military and Radar Technical Report) and the PDE as detailed in Chapter 4: Proposed Development Description. Specific parameters that have been the basis of this assessment are provided in Table 17.7.

17.4.1.2 Effects have been assessed for the following three distinct phases of the Proposed Development:

- Construction;
- Operation (and maintenance); and
- Decommissioning.

17.4.1.3 Potential aviation stakeholders identified in accordance with CAP 764 (CAA, 2016a), were considered regarding en-route and other radar systems, and flight operations within operational range of the array area. The identification stage also considered military areas of operation, tactical training and Practice and Exercise Areas (PEXA). Effects on identified stakeholders considered potential impacts on radar activity and flight operations.

17.4.1.4 Identified effects and stakeholder responses, at this stage, are detailed above in Section 17.3.

17.4.2 Study Area

17.4.2.1 The Study Area encapsulates the array area and, for the purposes of the assessment of cumulative effects, also includes any other offshore wind farms in the northeastern Celtic Sea that could have potential effects on identified civil, military aviation, airport, and radar stakeholders. Key aviation and radar features within the Study Area are depicted in Volume 2, Figure 17.2.

17.4.3 *Desk Study*

- 17.4.3.1 A desk study was undertaken to obtain information on aviation and radar receptors (Volume 3, Technical Appendix 17.1: Aviation, Military and Radar Technical Report). A variety of aviation publications, which contain information and guidance (Section 17.2.2) relating to the potential effects of an offshore wind development on aviation stakeholders were reviewed.
- 17.4.3.2 No technical limitations or difficulties were encountered in compiling the information required for the completion of the aviation and radar baseline study.

17.4.4 *Site Visit / Surveys*

- 17.4.4.1 Consultation responses from relevant stakeholder were deemed sufficient to inform the baseline study. Therefore, no site visits or aviation specific surveys have been required for the Project for the purposes of aviation and radar.

17.4.5 *Assessment of Potential Effect Significance*

- 17.4.5.1 The criteria for determining the significance of effects is a two-stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts. The criteria for defining sensitivity in this chapter are outlined in Table 17.3.

Table 17.3 - Sensitivity Levels for Aviation Receptors

Sensitivity	Description
High	Receptor has very limited capacity to avoid, adapt to, accommodate, or recover from the anticipated impact. Receptor or the activities of the receptor, is of high value/critical importance to the local, regional or national economy; and/or the receptor or the activities of the receptor, is highly vulnerable to impacts that may arise from the Project and/or recoverability is slow and/or costly, long term or not possible.
Medium	Receptor has limited capacity to avoid, adapt to, accommodate, or recover from the anticipated impact. Receptor or the activities of the receptor, is of moderate value to the local, regional or national economy; and/or the receptor or the activities of the receptor, is somewhat vulnerable to impacts that may arise from the Project and/or has moderate to high levels of recoverability.
Low	Receptor has some tolerance to avoid, adapt to, accommodate, or recover from the anticipated impact. Receptor or the activities of the receptor, is of low value to the local, regional or national economy; and/or the receptor or the activities of the receptor, is somewhat vulnerable to impacts that may arise from the Project and/or has high levels of recoverability.
Negligible	Receptor is generally tolerant to and can accommodate or recover from the anticipated impact. Receptor or the activities of the receptor, is of very low value to the local, regional, or national economy; and/or the receptor or the activities of the receptor, is not generally vulnerable to effects that may arise from the Project and/or has high recoverability.

- 17.4.5.2 The criteria for defining magnitude in this chapter are outlined in Table 17.4.

Table 17.4 - Magnitude Levels for Environmental Impacts

Magnitude	Description
High	Loss of resource, but not affecting integrity of the resource; partial loss of or damage to key characteristics, features or elements (adverse). Permanent/irreplaceable change, which is likely to occur. Improvement to, or addition of, key characteristics, features or elements of the resource; improvement of attribute quality (beneficial).
Medium	Minor loss of, or alteration to, one (or maybe more) key characteristics, features or elements; measurable change in attributes, quality or vulnerability (adverse). Long-term though reversible change, which is likely to occur. Minor improvement to, or addition of, one (maybe more) key characteristics, features or elements of the resource; minor improvement to attribute quality (beneficial).
Low	Very minor loss of, or alteration to, one (or maybe more) key characteristics, features or elements; noticeable change in attributes, quality or vulnerability (adverse). Short- to medium-term though reversible change, which could possibly occur. Very minor improvement to, or addition of, one (maybe more) key characteristic, feature or element; very minor improvement to attribute quality (beneficial).
Negligible	Temporary or intermittent very minor loss of, or alteration to, one (or maybe more) characteristic, feature or element; possible change in attributes, quality or vulnerability (adverse). Short-term, intermittent, and reversible change, which is unlikely to occur. Possible very minor improvement to, or addition of, one (maybe more) characteristic, feature or element; possible improvement to attribute quality (beneficial).

17.4.5.3 The significance of the effects upon aviation and radar is determined by correlating the magnitude of the impact and the sensitivity of the receptor as shown in Table 17.5. Significance of aviation effects is typically difficult to establish; they are not strictly based on the sensitivity of the receptor or magnitude of change but on whether the industry regulations for safe obstacle avoidance or radar separation (from radar clutter) can be maintained in the presence of operational WTG. The effects determined have been informed by the results of the desktop assessment, receptors, stakeholder engagement, and with reference to the existing evidence base regarding the effects of WTG on aviation receptors.

17.4.5.4 On this basis potential effects are assessed as of negligible, minor, moderate and major significance (definitions are initially provided in Chapter 2: Overview of EIA Methodology). Any anticipated effect upon aviation stakeholders that results in restricted operations is considered to be of significance. For the purposes of this assessment, any effects with a significance level of minor or less have been concluded to be not significant in EIA terms.

Table 17.5 – Significance Matrix, Combining Receptor Sensitivity with Impact Magnitude

		Sensitivity			
		High	Medium	Low	Negligible
Magnitude	Major	Major	Major	Moderate	Minor
	Moderate	Major	Moderate	Minor	Minor
	Slight	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Minor	Negligible	Negligible

17.4.6 *Standard Mitigation*

- 17.4.6.1 There are several factors that need to be considered in relation to aviation mitigation and their application. This chapter and Volume 3, Technical Appendix 17.1: Aviation, Military and Radar Technical Report have assessed potential effects of the array area and WTG on civil and military aerodromes, aviation technical sites and other defence assets interests. Where appropriate, standard mitigation measures are embedded within the assessment at the relevant point in this chapter. The Project should be designed to minimise adverse impacts on the operation and safety of aerodromes and that reasonable mitigation is carried out. It may also be appropriate to expect aviation operators to consider making reasonable changes to operational procedures. When assessing potential operational changes to aerodromes, consideration must be given to the necessity, acceptability, and reasonableness of any changes. In the case of military operations, regards to interests of defence and national security should be made.
- 17.4.6.2 Through effective engagement and consultation, relevant parties and stakeholders should make appropriate efforts to work together to identify realistic and pragmatic solutions to conflicts and in doing so that the parties seek to protect the aims and interests of the other parties as far as is possible. As set out in the overarching NPS for Energy, EN-1 (see Table 17.1), where a proposed energy infrastructure development would significantly impede or compromise the safe and effective use of civil or military aviation or defence assets and or significantly limit military training, then planning conditions that relate to the use of future technological solutions to mitigate impacts, might be considered (DECC, 2011).
- 17.4.6.3 It is best practice to notify aviation stakeholders of the location and dimension of a wind energy development and the associated construction activities. Information regarding construction will be passed to the Defence Geographic Centre (DGC) and the General Aviation Awareness Council (GAAC) at least ten weeks in advance of the erection of the first WTG and will be followed up on the day with a confirmation that the activity has taken place. The data will include:
- Location, height (of all structures over 150 ft), dates of erection, dates of removal and lighting type (none, infra-red or lighting brightness); and
 - Local aerodromes identified during consultation should be notified, particularly any police helicopter, or air ambulance units.
- 17.4.6.4 Information will be circulated to relevant aviation stakeholders including NATS and the MOD. Information on potential aviation obstructions will be promulgated to all airspace users in accordance with CAP 032 (CAA, 2021a) process and procedure, and notified to DGC for marking on aeronautical related charts and documentation including the Digital Vertical Obstruction File (DVOF).

- 17.4.6.5 During aeronautical SAR missions, SAR aircraft are not constrained by the normal rules of the air and operate in accordance with their Aircraft Operator Certificate (AOC). Standard mitigation under the Requirements, Guidance and Operational Considerations for SAR and Emergency Response (Offshore Renewable Installations (OREI)) MGN 654 Annex 5 (MCA, 2021), requires an Emergency Response Co-operation Plan (ERCoP) to be implemented. The ERCoP is initially completed in discussion between the developer and the MCA, SAR and Navigation Safety Branches.
- 17.4.6.6 Detailed completion of the plan would then be in cooperation with the Maritime Rescue Coordination Centre (MRCC), responsible for maritime emergency response. The nearest UK SARs to the Project are Newquay Airport and St. Athan Airport. The ERCoP must then be submitted to and approved by the MCA. The ERCoP will detail specific marking and lighting of the WTG. The SAR helicopter bases will be supplied with an accurate chart of the Project WTG Global Positioning System (GPS) positions.
- 17.4.6.7 Appropriate liaison will be completed to ensure information on the construction, O&M and decommissioning of the Project is circulated in a Notice to Airmen (NOTAM) and other appropriate media. Lighting of the WTG and promulgation on aviation charts will also reduce any physical obstruction effects to aviation activities from the Project. These are considered standard and embedding mitigation within the Project.
- 17.4.6.8 The UK's database of tall structures (the DVOF) will be notified of all structures of 300 ft or more in order to ensure they are charted on aeronautical charts.
- 17.4.6.9 The impact assessments and conclusions on significance of effect presented in Section 17.6 assume that these standard mitigation measures listed above have been successfully implemented. Where significant environmental effects remain even after these standard measures have been factored in, then project-specific mitigation measures are detailed, and the residual significance of effect presented.

17.4.7 Additional Mitigation and Assessment for Residual Effect Significance

- 17.4.7.1 There are statutory requirements concerning lighting to tall structures (currently Article 223 of the ANO (CAP 393), (CAA, 2016b)). Where lighting that goes beyond statutory requirements is requested by any of the relevant aviation and defence consultees, consideration be given to the case put forward by consultees, as described by NPS EN-1 in Table 17.1.
- 17.4.7.2 Mitigation for effects on radar, communications and navigational systems may include reducing the scale of a project, although in some cases it is likely to be unreasonable, for example, where reducing the tip height of WTG in a wind farm would result in a material reduction in electricity generating capacity or operation would be severely constrained. However, there may be exceptional circumstances where a small reduction, or for example, reducing the number of turbines, but using more powerful turbines, in such function will result in proportionately greater mitigation and these will be considered if required.

17.4.8 Limitations to Assessment

- 17.4.8.1 Osprey used the *ATDI ICS LT* software (Version 22.4.7x64) to model the terrain elevation profile between the identified radar systems and the WTG boundary. Otherwise known as a point-to-point Line of Sight (LOS) analysis, the result is a graphical representation of the intervening terrain and the direct signal LOS (taking into account earth curvature and radar signal properties).

17.4.8.2 This is a limited and theoretical desk-based study; in reality there are unpredictable levels of signal diffraction and attenuation within a given radar environment that can influence the probability of a WTG being detected. The analysis is designed to give an indication of the likelihood of the WTG being detected, such that the operational significance of the Project relative to nearby aviation assets can be assessed.

17.4.8.3 The data used in this chapter are the most up to date, publicly available, information which can be obtained from the data sources, as cited. Data have also been provided through consultation as detailed in Section 17.3.

17.5 Baseline Conditions

17.5.1.1 This section presents the aviation and radar activity baseline conditions within the Study Area. Key aviation and radar activity receptors in relation to the Project are depicted in Figure 17.2.

17.5.2 Airspace Environment

17.5.2.1 The airspace in the immediate vicinity of the Project, and over the Celtic Sea in general, is Class G Uncontrolled Airspace up to Flight Level (FL)195 (approx. 19,500 ft), where aircraft may fly when and where they wish, subject to the rules of the air. Above FL195 the airspace is Class C Controlled Airspace (CAS). Under these classifications of airspace, the following applies:

- Class G Uncontrolled Airspace: any aircraft can operate in this area of uncontrolled airspace without any mandatory requirement to be in communication with ATC. Pilots of aircraft operating under Visual Flight Rules (VFR) in Class G airspace are ultimately responsible for seeing and avoiding other aircraft and obstructions; and
- Class C CAS: all aircraft operating in this airspace must be in receipt of an ATS.

17.5.2.2 Military PEXAs are areas available for training use, primarily by the UK armed forces, but also those of overseas nations. They can be over land or water, or both, and may involve the firing of live ammunition and there are two danger areas nearby:

- Danger Area (D113A/B, Castlemartin), which extends from the surface to 40/45,000ft, lies approx. 10 nm (18.8 km) to the northeast of the Project. The activities associated with D113A/B are quoted as Ordnance, Munitions and Explosives/High Energy Manoeuvres/Unmanned Aircraft System (Visual (and Beyond) Line of Sight (VLOS/BVLOS)). D113A has the META Wales (East Pickard Bay) Test Site in its northern boundary; and
- Danger Area (D064B/C, Southwest Managed Danger Area (MDA)), which extends from the Flight Level (FL)100 (approx. 10,000 ft) to FL660 (66,000ft) lies approx. 10 nm (18.8 km) to the south of the Project. The activities associated with D064B/C are quoted as High Energy Manoeuvres.

17.5.2.3 Above and surrounding the array area, the Class G Uncontrolled Airspace below FL195 is subdivided into areas with the following aviation stakeholder responsibility:

- NATS En-Route Ltd (NERL) Area Control, air traffic controllers located at the Swanwick Area Control Centre (ACC) utilise NATS radar for the provision of Flight Information Services (FIS) to aircraft flying outside of CAS below FL195 within radar and radio coverage;
- Military En-Route Area Control, military air traffic controllers located at the Swanwick ACC utilise NATS radar for the provision of ATS to aircraft flying outside of CAS above FL100 within radar and radio coverage; and

- MOD Air Surveillance and Control System (ASACS) uses its ADR resources in support of operational flights in the protection of UK airspace and for military training exercises (in or outside of PEXAs);
- The UK Low Flying System (UKLFS) used for Military Low Flying activity covers the open airspace over the entire UK land mass and surrounding sea areas, generally out to 2 nm from the coastline (however, military low flying does take place further offshore), from the surface to 2,000 ft agl (above ground level) or above mean sea level (amsl);
- Military PEXAs are areas available for training use primarily by the UK armed forces but also those of overseas nations. They can be over land or water, or both, and may involve the firing of live ammunition; and
- NATS NERL uses Primary Surveillance Radar (PSRs) based in Burrington, Devon, to support its provision of ATS to aircraft operating between the UK, Ireland and over the Celtic Sea, and to those overflying the UK Flight Information Region (FIR) in the vicinity of the Project.

17.5.3 Airports and Aerodromes

- 17.5.3.1 Cardiff and Newquay Airports provide radar services to pilots on request of a Lower Airspace Radar Service (LARS). The service is available to all aircraft flying outside Controlled Airspace up to FL100, within the limits of radar/radio cover. The service is provided by Cardiff to a service radius of 30 nm and by Newquay to a service radius of 50 nm. The eastern and southern boundaries of the array area are located beyond these ranges and therefore are not expected to affect LARS provision.
- 17.5.3.2 Swansea Airport does not provide a radar service and the Project lies beyond Dublin Airport's PSR surveillance coverage.
- 17.5.3.3 Local aerodromes within the Study Area, such as Haverfordwest Airport, do not provide radar services.

17.5.4 Helicopter Operations

- 17.5.4.1 A network of Helicopter Main Routes (HMRs) is not established in the vicinity of the array area.
- 17.5.4.2 During the winter (beginning of November until the end of March), a helicopter service operates between Lundy Island and MOD Hartland Point on Mondays and Fridays. The route lies more than 20 nm (37 km) east of the Project.

17.5.5 Aeronautical Search and Rescue (SAR)

- 17.5.5.1 When on an operational mission, SAR aircraft are not constrained by the normal rules of the air and operate in accordance with their Aircraft Operator Certificate (AOC). This allows SAR pilots total flexibility to manoeuvre using best judgement, thus making them highly adaptable to the environment in which they are operating. The Project lies within the UK Region for Maritime, Aeronautical and Land Search and Rescue (UK SRR).

17.5.6 National Air Traffic Service (NATS)

- 17.5.6.1 NATS provides Air Traffic Services (ATS) at some airports in the UK and provide ATS to traffic en-route (overflying or flying between airports) in UK airspace. NATS operates several long-range Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR) positioned to provide maximum coverage of UK airspace. Additionally, NATS has a licence obligation to provide radar data to other aviation Stakeholders, to a high quality and performance standard, for the benefit of UK aviation as a whole. Any effect that the Project might have on NATS radars must be considered both in terms of effect on the civilian en-route services (under the FAB arrangements) and in the context of its remote users.
- 17.5.6.2 In addition, Military ATC Units are based in NATS Control Centres to facilitate the control of aircraft that require ATS outside CAS. NATS has a contracted responsibility to provide appropriate PSR coverage to support this task.
- 17.5.6.3 The world is divided into Flight Information Regions (FIR) for the responsibility of the provision of Air Traffic Services (ATS) to aircraft. The boundary between London FIR (under the regulation of the UK Civil Aviation Authority (CAA)) and Irish FIR (under the regulation of the Irish Aviation Authority (IAA)) is to the northwest of the Project.
- 17.5.6.4 NATS En Route Ltd (NERL) uses PSRs based in Berrington, Devon, to support its provision of ATS to aircraft operating between the UK, Ireland and over the Celtic Sea, and to those overflying the UK Flight Information Region (FIR) in the vicinity of the Project.

17.5.7 Military Air Traffic Management Operations (ATM)

- 17.5.7.1 Military Air Traffic Management (ATM) is supported by Military ATC radars. These are typically standard airfield ATC radars with an instrumented range of 60 nm. Military ATM is also supported by military landing aids, Precision Approach Radar (PAR) at certain airfields; these have a much shorter instrumented range and are only safeguarded out to 20 nm in certain directions.
- 17.5.7.2 The MOD Hartland Point and NATS Berrington (both located in Devon) PSRs are within the Study Area and the array area is within the operational range (370 km) of the radar systems. The Project WTG, with a blade tip height of 270 m amsl, are within the theoretical LOS of the MOD Hartland Point PSR.

17.5.8 MOD ASACS Operations

- 17.5.8.1 The MOD, through the Air Surveillance and Control Systems (ASACS) Force, is responsible for compiling a Recognised Air Picture (RAP) to monitor the airspace in and around the UK, in order to launch a response to any potential airborne threat. This is achieved through the utilisation of a network of long-range Air Defence Radar (ADR), some of which are located along the west coast of the UK. Any identified effect of WTG on the ASACS radar that serve the airspace above the Project would potentially reduce the capability of the ASACS Force.
- 17.5.8.2 The nearest ADR to the Project is the Type 102 radar located at Portreath Remote Radar Head in Cornwall. The Portreath Remote Radar Head does not have a theoretical LOS to the Project WTG with a blade tip height of 270 m amsl.

17.5.9 **Military Low Flying Operations**

17.5.9.1 The UK Low Flying System (UKLFS), used for military low flying activity, covers the open airspace over the entire UK land mass (excluding specific areas), and surrounding sea areas, generally out to 2 nm from the coastline (however, military low flying does take place further offshore), from the surface to 2,000 ft agl or amsl.

17.5.9.2 The airspace surrounding the Project in the Celtic Sea, part of the Southwestern Approaches, is considered by the MOD to be an important training area.

17.5.9.3 Following consultation with the DIO and completion of an operational assessment, 11 October 2021 it was confirmed;

Fixed Wing military low flying training takes place throughout the United Kingdom down to a height of 250ft above ground level and in certain designated areas down to a height of 100ft above ground level. A turbine development of the height and at the location you propose may have an impact on low flying operations.

17.5.9.4 Furthermore the DIO stated “Regardless of whether we object to your proposal, it is probable the MOD will request the turbines be fitted with MOD accredited visible or infrared aviation safety lighting.”

17.5.9.5 The outcome of the DIO operational assessment has informed the impact assessment and is discussed further in Section 17.6 and Section 17.9.

17.5.10 **Military Practice and Exercise Areas (PEXA)**

17.5.10.1 Military PEXAs are areas available for training use primarily by the UK armed forces but also those of overseas nations. They can be over land or water, or both, and may involve the firing of live ammunition. The array area lies outside D064 and D113, but within ASAC 3 (surface to Flight Level (FL)190 (approx. 19,000 ft)), predominantly used by military helicopters engaged in airborne air, surface, and sub-surface surveillance training. The relevant ASACs are shown in Figure 17.3.

17.6 **Potential Environmental Effects**

17.6.1.1 The following assessment provides a summary of all effects identified via the technical consultation undertaken to inform this study. Each effect is not necessarily relevant to all stages of the Project, and thus effects have been assessed within the stage of the Project at which they will occur (construction, operation and maintenance, and decommissioning). Further information on the EIA process and methodology is outlined in Section 17.4 and Chapter 2: Overview of EIA methodology.

17.6.1.2 The receptors in Table 17.6 have been identified through review of data and feedback from consultation to be taken forward in the assessment:

Table 17.6 - Key Aviation and Radar Receptors Used in this Assessment

Receptor Group	Description
Airports and Aircraft	Airports for all aircraft including aeroplanes, helicopters and drones. Potential impacts through the creation of aviation obstacle.
Civil and Military Radar Systems	Potential impacts through interference from Project. Air traffic controllers may be unable to provide an effective surveillance service due to interference on radar displays

17.6.2 **Maximum Design Scenario**

- 17.6.2.1 The assessment of potential effects on aviation and radar is based on the Maximum Design Scenario (MDS) as identified from the PDE (Chapter 4: Proposed Development Description) and is specific to the potential effects identified in this chapter. The key parameters for the MDS, in terms of aviation and radar, include consideration of the maximum number of WTG at the maximum blade tip height of 270 m amsl, as set out in Table 17.7, within the maximum Project capacity. Only the largest WTG (18 MW) would have the maximum blade tip height of 270 m, therefore fewer WTG would be required to achieve a maximum generating capacity of up to 100 MW.
- 17.6.2.2 The MDS for effects on aviation radar services assumes that the entirety of the array area will be populated with WTG at the maximum blade tip height of 270 m amsl. The WTG within the array area with the greatest blade tip height will create the largest impact from a physical obstruction and radar interference perspective, leading to a greater potential effect on aviation receptors. Any aspects of the infrastructure that are lower in height than the WTG will not create an incremental effect on aviation interests. Key points to note are:
- Maximum physical obstruction to aviation operations due to size and number of above sea level infrastructure within the array area;
 - NATS and MOD air traffic controllers may be unable to provide an effective surveillance service due to interference on radar displays.

Table 17.7 - Project Design Envelope Parameters Relevant to Aviation and Radar

Potential Pathway Change / Impact	Realistic Worst-Case Scenario	Justification
Construction		
Creation of Aviation Obstacle	6 x WTG @ the maximum blade tip height of 270 m amsl and rotor diameter of 240 m	Greatest height and volume of airspace occupation
Operation and Maintenance (O&M)		
Creation of Aviation Obstacle	6 x WTG @ the maximum blade tip height of 270 m amsl and rotor diameter of 240 m	Greatest height and volume of airspace occupation
Interference to Civil and/or Military Radar Systems	6 x WTG @ the maximum blade tip height of 270 m amsl and rotor diameter of 240 m	Air traffic controllers may be unable to provide an effective surveillance service due to interference on radar displays
Decommissioning		
Creation of Aviation Obstacle	6 x WTG @ the maximum blade tip height of 270 m amsl and rotor diameter of 240 m	Greatest height and volume of airspace occupation

17.6.3 Construction

Creation of Aviation Obstacle to Fixed Wing and Rotary Aircraft Operating Offshore via WTG Infrastructure

- 17.6.3.1 There are two key stages during the Project construction phase where potential effects from the creation of aviation obstacles to aircraft could occur. These are described below, and the potential effects outlined in this Section:
- Fully assembled WTG on semi-submersible floating platform towed from port to the array area; and
 - Individual erect WTG installation at the array area until completion.
- 17.6.3.2 WTG infrastructure present above sea level during the construction phase could pose a physical obstruction to flight operations in the vicinity and specifically to low flying aircraft.
- 17.6.3.3 Erected WTG can be difficult to see from the air, particularly in poor meteorological conditions, leading to potential increased obstacle collision risk. Furthermore, during the construction phase, the presence and movement of fully assembled WTG mounted on the semi-submersible floating platform in transit from port to the array area may also present a potential obstacle collision risk to aircraft flight operations. An initial desktop review is being undertaken for the potential integration sites (ports where the WTG are integrated onto the semi-submersible floating platforms) to assess the high-level aviation impacts. This will inform the Tow-Out Passage Plan and Risk Assessment Method statement, which would cover the period between quayside departure and completion of the mooring connection being made. Further details on this are presented in Chapter 16: Shipping and Navigation and Volume 3, Technical Appendix 16.1: Navigational Risk Assessment.
- 17.6.3.4 Aviation stakeholders have been consulted with, in regard to the potential for the Project to create an obstruction to aviation activities conducted in the vicinity of construction infrastructure.
- The CAA highlighted the requirements of the Article 223 of the ANO (CAP 393) (CAA, 2016b) for offshore aviation obstacle lighting and that the individual locations of the WTG are provided for inclusion in the DVOF; and
 - The DIO operational assessment, undertaken in October 2021 to inform the EIA confirmed “*A turbine development of the height and at the location you propose may have an impact on low flying operations*”.
- 17.6.3.5 A range of mitigation measures, in the form of appropriate notification to aviation stakeholders, lighting (MOD accredited visible or infrared aviation safety lighting) and marking to minimise effects to aviation flight operations would apply to the Project. These will comply with current guidelines and will be agreed in consultation with appropriate stakeholders.
- 17.6.3.6 Pilots are obliged to plan their flying activities in advance and to be familiar with any en-route obstacles they may encounter; however, during flight, weather conditions or operational requirements may necessitate route adjustments. In Visual Meteorological Conditions (VMC), pilots are ultimately responsible for seeing and avoiding obstructions such as WTG and will be aware through notification procedures of the Project. Furthermore, when flying in Instrument Meteorological Conditions (IMC) pilots might utilise on board radar which detects obstructions, be operating above the area Minimum Safe Altitude (MSA) and be under the control of ATC with an appropriate level of ATS, which may include the provision of an ATC radar service.

- 17.6.3.7 The effect of the construction, and surface float transfer, of aviation obstacles is predicted to be of regional spatial extent, of short-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor directly, therefore, the magnitude of impact is considered to be negligible.
- 17.6.3.8 The specific receptor (fixed wing and rotary aircraft operating offshore) is judged to have a low sensitivity. This is based on the fact that the receptor has some tolerance to avoid, adapt to, accommodate or recover from the anticipated impact. The receptor or the activities of the receptor, is also assessed as having low value to the local, regional or national economy; and/or the receptor or the activities of the receptor, is somewhat vulnerable to impacts that may arise from the Project and/or has high levels of recoverability.
- 17.6.3.9 Overall, the sensitivity of the receptor is considered to be low and the magnitude of the impact is deemed to be negligible. The effect will, therefore, be of **negligible adverse** significance, which is not significant in EIA terms.

17.6.4 Operation

Creation of Aviation Obstacle to Fixed Wing and Rotary Aircraft Operating Offshore

- 17.6.4.1 During the operational phase of the Project, the WTG could pose a physical obstruction to the flight of aircraft operating in the vicinity of the array area, specifically to low flying aircraft.
- 17.6.4.2 Aviation stakeholders have been consulted with regard to the potential for the Project to create an obstruction to aviation activities conducted in the vicinity of the WTG. The DIO operational assessment, undertaken in October 2021 to inform the EIA confirmed “A turbine development of the height and at the location you propose may have an impact on low flying operations”. The MOD scoping response (NRW, 2020) requested that the Project be fitted with MOD accredited aviation safety lighting in accordance with the ANO (CAP 393), (CAA, 2016b). A range of mitigation measures, in the form of appropriate notification to aviation stakeholders (Section 17.4.6), lighting and marking to minimise effects to aviation flight operations will be agreed in consultation with appropriate stakeholders and apply to the Project.
- 17.6.4.3 Pilots are obliged to plan their flying activities in advance and to be familiar with any en-route obstacles they may encounter; however, during flight, weather conditions or operational requirements may necessitate route adjustments. In VMC, pilots are ultimately responsible for seeing and avoiding obstructions such as WTG and will be aware through notification procedures of the Project. Furthermore, when flying in IMC pilots might utilise on board radar which detects obstructions, be operating above the area Minimum Safe Altitude (MSA) and be under the control of ATC with an appropriate level of ATS, which may include the provision of an ATC radar service.
- 17.6.4.4 The impact of operation of the WTG is predicted to be of regional spatial extent, long-term duration, permanent and not reversible for the lifetime of the Project. It is predicted that the impact will affect the receptor directly; however, assuming the successful implementation of the standard mitigation measures listed in Section 17.4.6 the magnitude of impact is considered to be low.

- 17.6.4.5 The specific receptor (fixed wing and rotary aircraft operating offshore) is judged to have a medium sensitivity. This is based on the fact that the receptor has some limited capacity to avoid, adapt to, accommodate or recover from the anticipated impact. The receptor or the activities of the receptor, is of moderate value to the local, regional or national economy and/or the receptor or the activities of the receptor, is somewhat vulnerable to impacts that may arise from the Project and/or has moderate to high levels of recoverability.
- 17.6.4.6 Overall, the sensitivity of the receptor is considered to be medium and the magnitude of the impact is deemed to be low. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

WTG causing Interference on Civil and Military Radar Systems

- 17.6.4.7 Volume 3. Technical Appendix 17.1: Aviation, Military and Radar Technical Report provides indicative results of the radar LOS analysis completed around the WTG MDS array area. The operational WTG of the array area would be theoretically detectable by the MOD Hartland Point PSR.
- 17.6.4.8 WTG detectable by a PSR or ADR system might degrade the system by creating false targets, reduce system sensitivity, create radar shadowing behind the WTG and saturate the radar receiver leading to clutter potentially concealing real aircraft targets. The relevant systems are outlined below.

MOD Hartland Point PSR

- 17.6.4.9 The array area is within the operational range (370 km) of the MOD Hartland Point PSR located on the north coast of Devon. Radar LOS analysis (Volume 3, Technical Appendix 17.1: Aviation, Military and Radar Technical Report) concluded that a WTG with a blade tip height of 196 m amsl would be within the MOD Hartland Point PSR LOS and, therefore, it can be concluded that the Project WTG with a blade tip height of 270 m amsl will also be within the LOS. This could lead to a degradation of the system and the presentation of radar clutter.
- 17.6.4.10 MOD military, air traffic controllers located at Plymouth Military Radar (Plymouth Mil) utilise MOD Hartland Point PSR for the provision of FIS to aircraft flying outside of CAS below FL195 within radar and radio coverage.
- 17.6.4.11 The magnitude of impact (change in radar effectiveness) is assessed as low; it has a regional spatial extent but lies at the outer limit of the radar's operational coverage, is long-term and permanent.
- 17.6.4.12 The sensitivity of the receptor (military radar) is judged to be medium. The ability of the MOD to accurately use its radar system for the provision of an ATS could be impacted in the presence of WTG interference at the extremity of theoretical coverage. The MOD aims to ensure 'clutter free' radar to continue to deliver a safe and effective ATS. The receptor has limited capacity to avoid, adapt to, accommodate, or recover from the anticipated impact.
- 17.6.4.13 Overall, the sensitivity of the receptor is considered to be medium and the magnitude of the impact (on MOD Hartland Point PSR) is deemed to be low. The effect on MOD Hartland Point PSR will, therefore, be of **minor adverse** significance, which is not significant in EIA terms

MOD Portreath Point RRH

- 17.6.4.14 Military ADRs have a range in excess of 370 km and are used to protect the security interests of the UK. The array area is within the operational range of the Portreath Point RRH located on the north coast of Cornwall. However, radar LOS analysis (Volume 3, Technical Appendix 17.1: Aviation, Military and Radar Technical Report) concluded that a WTG with a blade tip height of 270 m amsl will not be theoretically detectable by the Portreath RRH, meaning the WTG at the maximum blade tip height would not be within the LOS. Therefore, no effect is predicted on the MOD radar at Portreath.

Additional Mitigation and Residual Effect

- 17.6.4.15 No additional mitigation measures are expected to be required for residual effects with respect to aviation and radar.

17.6.5 Decommissioning**Creation of Aviation Obstacle to Fixed Wing and Rotary Aircraft Operating Offshore**

- 17.6.5.1 During the decommissioning phase, the presence and movement of the WTG infrastructure may present a potential collision risk to low flying aircraft operating in the vicinity of the decommissioning Project area. As discussed in Sections 17.6.3 and 17.6.4 the DIO has confirmed the presence of WTGs may have an impact on low flying aircraft. Standard mitigation measures as listed in Section 17.4.6 would apply to the decommissioning of the Project.
- 17.6.5.2 Pilots are obliged to plan their flying activities in advance and to be familiar with any en-route obstacles they may encounter; however, during flight, weather conditions or operational requirements may necessitate route adjustments. Pilots are ultimately responsible for seeing and avoiding obstructions such as WTG infrastructure and will be aware through notification procedures of the Project. It is expected that any mitigation implemented will remain in place until the last WTG has been removed. The magnitude of the impact is assessed as negligible due to the short-term duration and intermittent nature.
- 17.6.5.3 The ability of aviation stakeholders to continue using the Celtic Sea airspace during decommissioning activities is deemed to be at risk; however, it is considered to have high recoverability, and high value with tolerance to avoid, adapt to, accommodate or recover from the anticipated decommissioning effect. The sensitivity of the receptor is therefore, considered to be low.
- 17.6.5.4 Overall, the sensitivity of the receptor is considered to be low and the magnitude of the impact is deemed to be negligible. The effect will, therefore, be of **negligible adverse** significance, which is not significant in EIA terms.

17.6.6 Effects on Human Health and Population

- 17.6.6.1 There will be no effects on population or human health in relation to aviation and radar.

17.7 Additional Mitigation

- 17.7.1.1 Additional mitigation measures, as detailed throughout this assessment, that have been proposed in order to reduce the significance of effects further after standard mitigation measures have been applied, are summarised in this section.

Construction

- 17.7.1.2 No additional mitigation is proposed for the construction phase in addition to the standard mitigation detailed in Section.
- 17.7.1.3 There are statutory requirements concerning lighting to tall structures (current Article 223 of the ANO (CAP 393), (CAA, 2016b)). Where lighting that goes beyond statutory requirements is requested on structures, during construction, operation or decommissioning, by any of the relevant aviation and defence consultees, the Applicant will agree in consultation with appropriate stakeholders.

Operation & Maintenance Phase

- 17.7.1.4 No additional mitigation is proposed for the operation & maintenance phase in addition to the standard mitigation detailed in Section 17.4.6.

Decommissioning Phase

- 17.7.1.5 No additional mitigation is proposed for the decommissioning phase in addition to the standard mitigation detailed in Section 17.4.6

17.8 Additional Monitoring

- 17.8.1.1 No aviation and radar monitoring to test the predictions made within the construction, O&M and decommissioning phase impact assessment is considered necessary.

17.9 Inter-Related Effects

- 17.9.1.1 The assessment of effects on aviation or radar within this chapter has taken into account potential for inter-relationships between multiple effects acting on common receptors. These may include effects that occur throughout more than one phase of the project (construction, O&M, and decommissioning) to interact to potentially create a more significant effect on a receptor than if just assessed in isolation, or instances where effects of multiple activities affect a common receptor.
- 17.9.1.2 It is considered there is negligible risk of Project lifetime effects on aviation and radar receptors. Aircraft operating at a level to be in conflict with the array area will be impacted by construction and decommissioning infrastructure and WTG across all Project phases. Pilots are obliged to plan their flying activities in advance and to be familiar with any en-route obstacles they may encounter and will be notified of all project phases through notification procedures outlined in Section 17.4.6.
- 17.9.1.3 Therefore, across the Project lifetime, the effects on aviation and radar receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase.
- 17.9.1.4 The greatest potential for a more significant effect to be created on a receptor than if just assessed in isolation would be in relation to the interaction of an aviation obstacle and the reduction of airspace; and the inter-related effects of WTG lighting.
- 17.9.1.5 Spatial and temporal interactions are likely to occur due to interaction of an aviation obstacle and the reduction of airspace. The individual standalone effects were assigned significance of minor adverse. ATS provision and the rules of air, including the see and be seen principle, will mean reduced potential for interaction between inter-related effects. It is therefore anticipated the significance of these combined effects on airspace users will not be of any greater significance than the effects when assessed in isolation (moderate (prior to mitigation) or minor adverse).

- 17.9.1.6 The requirement for lighting of the WTGs under Article 223 of the ANO (CAP 393), (CAA, 2016b) may affect multiple receptors, specifically seascape and ornithology. A series of Dark Sky Discovery Sites have been established along the Pembrokeshire Coast National Park coastline (Pembrokeshire Coast, 2020) which may be impacted by the introduction of WTGs and associated aviation lighting. The significance of the effect is considered in detail in Chapter 13: Seascape and Visual Impact.
- 17.9.1.7 It is also understood that some species of seabirds, in particular Manx shearwater can be attracted to certain types of light (white and green light). The impact of aviation lighting associated with the WTGs on seabirds is assessed in detail in Chapter 11: Offshore Ornithology.
- 17.9.1.8 It is anticipated the significance of these effects will not be of any greater significance than the effects when assessed in isolation (moderate (prior to mitigation) or minor adverse).
- 17.9.1.9 There are no inter-related effects that are of greater significance than those assessed in isolation in terms of aviation and radar.

17.10 Cumulative Effects Assessment

- 17.10.1.1 Cumulative effects can be defined as effects upon a single receptor from the Project when considered alongside other developments, this includes all other reasonably foreseeable projects that result in a comparative effect that is not intrinsically considered as part of the existing environment. A screening process has identified the Valorous FLOW development (Figure 17.2) as a reasonably foreseeable development which may act cumulatively with the Project.
- 17.10.1.2 In assessing the potential cumulative effects for the Project, it is important to bear in mind that some developments, predominantly those 'proposed' or identified in development plans, may not actually be taken forward, or fully built out as described within their MDS. There is therefore a need to build in some consideration of certainty (or uncertainty) with respect to the potential effects which might arise from such proposals. For example, those projects under construction are likely to contribute to cumulative effects (providing effect or spatial pathways exist), whereas those proposals not yet approved are less likely to contribute to such an effect, as some may not achieve approval or may not ultimately be built due to other factors.
- 17.10.1.3 All developments and plans considered alongside the Project have been allocated into 'tiers' reflecting their current stage within the planning and development process. This allows the Cumulative Effect Assessment (CEA) to present future development scenarios, each with a differing potential for being ultimately built out. This approach also allows appropriate weight to be given to each scenario (tier) when considering the potential cumulative effect. An explanation of each tier is included in Table 17.8.

Table 17.8 - Cumulative Effect Assessment Project Tier Criteria

Tier 1	<ul style="list-style-type: none"> • Under construction; • Permitted application(s), whether under the PA2008 or other regimes, but not yet implemented; or • Permitted application(s), whether under the PA2008 or other regimes, but not yet determined.
Tier 2	<ul style="list-style-type: none"> • Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted.

Tier 1	<ul style="list-style-type: none"> • Under construction; • Permitted application(s), whether under the PA2008 or other regimes, but not yet implemented; or • Permitted application(s), whether under the PA2008 or other regimes, but not yet determined.
Tier 3	<ul style="list-style-type: none"> • Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has not been submitted; • Identified in the Development Plan (and emerging Development Plans – with appropriate weight being given as they move closer to adoption) recognising that there will be limited information available on the relevant proposals; or • Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

- 17.10.1.4 The plans and projects selected as relevant to the CEA to aviation and radar are based on an initial screening exercise undertaken on a long list (see Chapter 30: Cumulative Effects Assessment and Volume 3, Technical Appendix 30.1: Project Identification in Support of Cumulative Effect Assessment). A consideration of effect-receptor pathways, data confidence and temporal and spatial scales has been given to select projects for a topic-specific short-list.
- 17.10.1.5 The potential cumulative effects of the Pembrokeshire Demonstration Zone (PDZ) have not been considered at the time of writing due to the lack of detail with which to assess the effects of the proposed project. An EIA Scoping Report was produced and issued to NRW in 2018 for a proposed wave/floating wind project however based on discussions with Celtic Sea Power (the 3rd party agents for the PDZ) and recent public presentations by members of Celtic Sea Power, it is understood the PDZ will be repurposed as an offshore electrical hub. In the absence of an updated EIA Scoping Report and insufficient project information to allow the effects to be reasonably understood and a cumulative assessment undertaken, it has been omitted from this assessment.
- 17.10.1.6 For those reasons identified above, including the absence of EIA Scoping Reports, the potential cumulative effects of the recently announced Llyr 1, Llyr 2 and Whitecross FLOW projects are also omitted from this cumulative assessment.
- 17.10.1.7 As set out in PINS Guidance Note 17: Cumulative Effects Assessment, the Project proposed an assessment cut-off date of 1 October 2021 to allow the finalisation of the EIA and HRA assessments, even if project information came forward between the cut-off date and submission. This was agreed with NRW Marine Licensing, noting that in the absence of S.36/Marine Licence guidance the Project was drawing upon the best available advice. It is understood that should sufficient detail of these projects come forward following submission the Project may be requested to provide additional information during the determination period.
- 17.10.1.8 Therefore, the only project scoped into the CEA for aviation and radar is the Valorous FLOW project (Table 17.9). The Valorous FLOW project is included as it is considered a Tier 2 projects for which a scoping report has been submitted to the regulator and the project is due to commence after the data collection process for the Project and as such not included within the baseline characterisation. For the full list of projects considered, including those screened out; please see Chapter 30: Cumulative Effects Assessment and Volume 3, Technical Appendix 30.1: Project Identification in Support of Cumulative Effect Assessment.

17.10.1.9 Offshore and floating offshore wind farms seek consent for an MDS and the 'as built' project will be selected from the range of consented scenarios. In addition, the MDS quoted in the application, and the associated Environmental Report, are often refined during the determination period of the application. A process of refinement can result in a reduction to associated project parameters, for example the number and height of WTG to be installed. The CEA presented in this aviation and radar chapter has been undertaken on the basis of current information presented for the other projects, plans and activities. Given that this broadly represents an MDS, the level of cumulative impact on aviation and radar would highly likely be reduced from those presented here (Table 17.9).

Table 17.9 - Project Screened into the Aviation and Radar Cumulative Effects Assessment

Name	Tier	Distance from Project Array	Expected Completion Date	Reason for inclusion in CEA
Project Valorous	2	5.0 km	Planned commissioning in Q4 2029	Effect on available airspace and radar cumulative effect

17.10.1.10 The cumulative effects presented and assessed in this section have been selected from the details provided in the PDE, as well as the information available on other projects and plans to inform a current cumulative MDS. Effects of greater adverse significance are not predicted to arise should any other development scenario to that assessed here, based on details within the PDE (reduced WTG tip heights or numbers), be taken forward in the final design scheme. Certain effects assessed for the Project alone are not considered in the cumulative assessment due to:

- The highly localised nature of the effects (they occur entirely within array area only);
- Management measures in place for the Project will also be in place on, and be like, other projects, reducing their risk of occurring; and/or
- Where the potential significance of the effect from the Project alone has been assessed as negligible.

17.10.1.11 Therefore, the impact that is considered in the CEA is as follows:

- Creation of an aviation obstacle to fixed wing and rotary low flying aircraft operating offshore; and
- WTG causing interference on civil and military radar systems.

17.10.1.12 There are no significant cumulative effects as a result of construction and decommissioning activities associated with the Project and other existing projects in the area. There is no physical or temporal effect-receptor overlap in regard of PEXAs, aeronautical navigation, communication, and surveillance (CNS) systems.

17.10.2 Operation

Creation of Aviation Obstacle to Fixed Wing and Rotary Aircraft Operating Offshore

- 17.10.2.1 WTG infrastructure above sea level could pose a physical obstruction to flight operations. There is potential for cumulative effect because of operational activities associated with the Project and the projected Tier 2 construction, O&M and decommissioning phases of the Valorous FLOW project (other developments). For the purposes of this ES, this additive effect has been assessed within 40 km of the Project, which is considered to be the maximum range where the creation of an aviation obstacle to fixed wing and rotary aircraft operating offshore may occur, although some effects are likely to be localised to the array area.
- 17.10.2.2 The volume of useable airspace in the immediate vicinity of the two FLOW array areas, including for military low flying aircraft, will be reduced in the construction phase as well as the future operational phase of the Valorous FLOW project.
- 17.10.2.3 The effect is predicted to be of regional spatial extent, medium-term duration, continuous and not reversible for the lifetime of the Project. It is predicted that the effect will directly affect the aviation receptors operating in the airspace. The magnitude of impact is therefore, considered to be low.
- 17.10.2.4 Aviation operations in the UK are highly regulated. The same rules of the air which maintain a safe operating environment in the current baseline will apply in the Celtic Sea during all phases of the Project. Aviation receptors operating offshore are deemed to be of low vulnerability, high recoverability, and high value. The sensitivity of the receptors is therefore, considered to be medium.
- 17.10.2.5 Overall, the sensitivity of the receptor is considered to be medium, and the magnitude of the effect is deemed to be low. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

WTG causing Interference on Civil and Military Radar Systems

- 17.10.2.6 There is potential for cumulative effect because of operational activities associated with the Project and the projected Tier 2 O&M phase of the Valorous FLOW project (other developments). For the purposes of this ES, this additive effect has been assessed within 100 km from the Project, which is considered to be the maximum range where aviation and radar cumulative effect may occur due to radar performance characteristics, although some effects are likely to be localised to the array area.
- 17.10.2.7 Theoretical, indicative results of the radar LOS analysis (Volume 3, Technical Appendix 17.1: Aviation, Military and Radar Technical Report) completed around the WTG MDS array area show that the operational WTG would be theoretically detectable by the MOD Hartland Point PSR. The Valorous FLOW project is considered likely to be detected by the MOD Hartland Point PSR. The potential cumulative effect will be to add to the radar clutter and possibly an increase in the individual signal processing demands of the radar system dependent on radar detectability.
- 17.10.2.8 The effect on radar systems is predicted to be of regional spatial extent, medium-term duration, intermittent (at the extremity of the radar coverage) and not reversible for the lifetime of the Project. However, on the basis that no wind farm would be permitted to operate without the necessary radar mitigation in place in agreement with key aviation stakeholders, it is considered that the Project, and the Valorous FLOW project, will not contribute to adverse cumulative effects on aviation radar. It is predicted that the effect will affect the receptors directly, and the magnitude is considered to be low.

- 17.10.2.9 The ability of the MOD to accurately use its radar system for the provision of an ATS could be affected by the presence of WTG interference and the production of radar clutter onto radar displays. Although, there appears to be a cumulative effect, it is likely that the Valorous FLOW project would adopt agreed mitigation with the MOD, if required. Therefore, considering cumulative mitigation it is more a case of considering cumulative effect on any, if indeed required, mitigation availability rather than a direct cumulative effect on radar systems. The MOD aims to ensure 'clutter free' radar to continue to deliver a safe and effective ATS. However, the radar stakeholder is somewhat vulnerable to impacts that may arise from the Project, high levels of recoverability and high value. The sensitivity of this receptor is therefore, considered to be medium.
- 17.10.2.10 Overall, the sensitivity of the receptor (MOD) is considered to be medium and the magnitude of the impact (on MOD Hartland Point PSR) is deemed to be low. The effect on MOD Hartland Point PSR will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

- 17.10.2.11 Due to the predicted minor adverse (not significant) cumulative effect of radar clutter at MOD Hartland Point PSR due to the presence of the Project no additional, project-specific mitigation will need to be applied, with the potentially future presence of Valorous FLOW WTGs in the Zol.

17.11 Transboundary

- 17.11.1.1 Transboundary effects are defined as those effects upon the receiving environment of other European Economic Area (EEA) states, whether occurring from the Project alone or cumulatively with other projects in the wider area.
- 17.11.1.2 There is the potential for transboundary impacts to arise from the presence of the WTG during the O&M phase disrupting civil radar coverage from the Republic of Ireland. The probability of effect (due to radar detectability of the WTG) is low due to the range of applicable Irish radar systems from the array area.
- 17.11.1.3 The Project is located in the UK FIR with no delegation of airspace to the Irish authorities. The sensitivity of the receptor is considered to be low and the magnitude of the impact is deemed to be negligible. Therefore, the potential transboundary impact of disruption of civil aviation radar coverage interference on aviation and radar is concluded to be of **negligible** significance which is not significant in EIA terms.

17.12 Summary

- 17.12.1.1 This chapter has provided an overview on the potential impacts which may occur to aviation and radar activity during the construction, O&M and decommissioning phases of the Project.
- 17.12.1.2 A review of the existing baseline conditions concluded that there are several aviation and radar activities within the Study Area and the Project will be situated in an area of Class G uncontrolled airspace (surface up to FL195). The baseline condition review identified the following aviation and radar receptors to be taken forward into the assessment:
- Airports and aircraft; and
 - Civil and military radar systems.

- 17.12.1.3 The assessment identified that the WTG, with a blade height of 270 m amsl will be within the LOS of the MOD Hartland Point PSR and may cause interference with the radar system which would be deemed minor adverse (not significant).
- 17.12.1.4 The potential effects to all other aviation and radar activity receptors considered by this assessment included the creation of aviation obstacles and the interference with radar systems. With consideration of the Standard and Additional Mitigation measures, the effect of these pressures was assessed as minor or negligible, even when assessed against the worst-case scenario. The Standard and Additional Mitigation measures will be implemented to ensure that the risks to aviation and radar are managed effectively over the lifetime of the project. The EIA concluded that the significance of effect was not significant, as outlined in Table 17.10.
- 17.12.1.5 No significant cumulative effects on aviation and radar activity have been identified (Table 17.11).

Table 17.10 - Summary of Effects in Relation to Aviation and Radar

Description of Effect	Significance of Potential Effect (assuming standard mitigation implemented)		Additional Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Construction					
Creation of Aviation Obstacle to Fixed Wing and Rotary Aircraft Operating Offshore	Negligible	-	None proposed beyond existing standard mitigation	Negligible	-
Operation and Maintenance (O&M)					
Creation of Aviation Obstacle to Fixed Wing and Rotary Aircraft Operating Offshore	Minor	Adverse	None proposed beyond existing commitments	Minor	Adverse
WTG causing Interference on Civil and Military Radar Systems	Minor	Adverse	Suitable mitigation of the effects on the MOD Hartland Point PSR will be identified by the MOD during consultation. Mitigation, if required, might include radar 'blanking' of the PSR in the vicinity of the operational Project to remove WTG radar returns.	Minor	Adverse
Decommissioning					
Creation of Aviation Obstacle to Fixed Wing and Rotary Aircraft Operating Offshore	Negligible	-	None proposed beyond existing standard mitigation	Negligible	-

Table 17.11 - Summary of Cumulative Effects in Relation to Aviation and Radar

Receptor	Effect	Cumulative Development(s)	Significance of Cumulative Effect	
			Significance	Beneficial/Adverse
MOD radar system	Unwanted WTG 'clutter'	Valorous FLOW Development (Tier 2)	Minor	Adverse

17.13 References

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