OSPREY
CONSULTING SERVICES

Blue Gem Wind (BGW) Project
Erebus Offshore Windfarm

Aviation Impact Assessment

REPORT

Document Details

Reference	Description
Document Title	Blue Gem Wind (BGW) Project Erebus Offshore Windfarm
	Aviation Impact Assessment
Document Ref	71451 007
Issue	Issue 2.1
Date	14 June 2021
Client Name	BGW
Classification	Commercial in Confidence

Issue	Amendment	Date
Issue 1		13th April 2021
Issue 2.1		14th June 2021

Approval Level	Authority	Name
Author	Osprey CSL	Richie Hinchcliffe
Quality Assurance	Osprey CSL	Lindsay Perks

Executive Summary

Overview

This report presents the results of the Aviation and Radar Impact Assessment of the Blue Gem Wind (BGW) Project Erebus Offshore Windfarm (the Project). The assessment has been carried out by Osprey Consulting Services Ltd (Osprey) to identify and determine the likely effects on aviation and radar receptors within range of the site.

The Project covers an area of approximately 43.5km^2 in the Celtic Sea and is located approximately 35km southwest of the Pembrokeshire coastline. The Project will have a generation capacity of up to 100 Megawatts (MW).

Scope of this Report

This initial assessment was based on the development site boundary and an indication of potential tip height options for the Wind Turbine Generators (WTG).

The study area encapsulates the Project and for the purposes of the assessment of cumulative effects also includes any other offshore windfarms in the north-eastern Celtic Sea (littoral Celtic Sea, bounded by the North Devon/Cornwall, Pembrokeshire, County Cork and then out to a line St Ives-Kinsale) that could have potential effects on identified civil, military aviation, airport and radar stakeholders.

The assessment considers the impact of the WTGs once they are fully installed and does not consider any safety issues relating to the construction, installation, through life support, decommissioning or visibility of the WTGs on the site. However, Osprey has included some information within this report relating to notification requirements which the applicant should consider when assessing the safety of any installation, construction, or maintenance phases with respect to aviation interests.

Assessment Summary

The following aviation receptors and considerations were included in the assessment:

- Hartland Point Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR) used for the provision of en-route air navigation services.
- Remote Radar Head (RRH) Portreath Air Defence Radar operated by the Ministry of Defence (MOD).
- Military Low Flying Exercise areas (PEXA)
- Newquay, Swansea, Cardiff and Dublin Airports
- Search and Rescue (and other helicopter operations)
- Meteorological Radar
- Transboundary Effects
- Cumulative Effects

Hartland Point

The PSR at Hartland Point does have theoretical radar Line of Sight (LoS) to the Project WTGs at 270 m tip meaning that the radar is likely to detect WTGs placed within the development area.

Portreath Remote Radar Head (Air Defence Radar (ADR) RRH)

Initial radar LoS analysis indicates that the Portreath RRH operated by the MOD does not have theoretical radar LoS to the Project WTGs at 270 m tip.

Military Low Flying and PEXAs

During the operational phase of the Project, WTGs could pose a physical obstruction to the flight of aircraft operating in the vicinity of the Project array area, specifically to low flying aircraft.

Newquay, Cardiff, Swansea and Dublin Airports

No effects on Newquay, Cardiff, Swansea and Dublin Airports were identified during the assessment.

Helicopter Main Routes (HMR)

A network of HMRs is not established in the vicinity of the Project area however there are some helicopter operations to Lundy and the operators are included in the consultation requirements.

Aeronautical Search and Rescue (SAR)

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). An Emergency Response Co-operation Plan (ERCoP) would be in place for the operation and maintenance phase of the Project.

Met Radar

There are no weather radar stations within 20 km of the Project WTGs and therefore Meteorological Office radar systems are scoped out.

Transboundary Considerations

Global airspace is divided into Flight Information Regions (FIR) defining which authority has responsibility for providing air traffic control services to aircraft flying within it. The Project lies within the London FIR where NATS is the controlling authority, operating from the London Area Control Centre (LACC) and Scottish ACC. The Shannon FIR is approximately 42 NM (78 km) from the northern boundary of the Project; the Irish Aviation Authority (IAA) provides an Air Traffic Service (ATS) in the Shannon FIR and there are cross-FIR boundary arrangements, based on the UK-Ireland Functional Airspace Block (FAB), in the area.

Aviation Cumulative Effect

The Valorous Floating Offshore Windfarm (FLOW) development and the Marine Energy Test Area (META) Wales (East Pickard Bay) Test Site on the northern boundary of D113A are within the Project aeronautical Zone of Influence (ZoI). The small geographical extent, position, distance from the Project and scale of the META FLOW Test Site (being limited to the testing of

floating foundation components only and not complete floating WTGs) strongly mitigates against any current potential for aviation cumulative effects of the Project. The Valorous FLOW development would have an effect on radar and the available low-level airspace and because of the potential increase of up to 31 WTGs in the zone.

Next Steps

Initial stakeholder engagement should be as follows:

- UK Civil Aviation Authority (CAA) regarding Aviation Obstacle Lighting and Transboundary Considerations
- MOD regarding Portland Air Traffic Management (ATM), ATS, ADRs PEXAs and Low Flying
- NATS regarding ATM, ATS and Transboundary Considerations
- IAA regarding Transboundary Considerations
- Maritime and Coastguard Agency (MCA) regarding any comments they might have relating to Lighting, SAR and an ERCoP
- Lundy Helicopter Service regarding its operation
- META Wales regarding cumulative aviation effects.

Table of Contents

Table of Figures

Table of Tables

1 Introduction

1.1 General

The Blue Gem Wind (BGW) Project Erebus (the Project) covers an area of approximately 43.5km^2 in the Celtic Sea and is located approximately 35km southwest of the Pembrokeshire coastline. The Project will have a generation capacity of up to 100 Megawatts (MW). The Project will be connected to the shore by an offshore export cable installed within a provisional offshore cable corridor.

The Project will also require onshore infrastructure to connect the offshore windfarm to the National Grid, which in summary will comprise:

- Landfall;
- Onshore cable relay station if using AC technology;
- Underground onshore cables; and
- Onshore substation.

1.2 Zone of Influence (Study Area)

The Zone of Influence (ZoI) encapsulates the Project and for the purposes of the assessment of cumulative effects also includes any other offshore windfarms in the north-eastern Celtic Sea (littoral Celtic Sea, bounded by the 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. Specifically, the ZoI includes:

- Radars on the littoral Celtic Sea coasts that could potentially detect 886 feet (ft) (270 meters (m)) high (blade tip) Wind Turbine Generators (WTG) within the Project boundary (although the final WTG blade tip height is yet to be finalised).
- Helicopter operations within the proximity of the Project, including consideration of airborne Search and Rescue (SAR) operations.
- Offshore platforms that have nine nautical mile (9 nm) consultation buffers that overlap with the Project; and
- Littoral Meteorological radar.

1.3 Wind Turbine Generator (WTG) Effects on Aviation Operations

The effects of WTGs on aviation interests have been widely publicised but the primary concern is one of safety. There are innumerable subtleties in the actual effects; however, there are two dominant potential objections from aviation stakeholders:

a. Physical Obstruction: WTGs can present a physical obstruction at or close to an aerodrome or in the military Low Flying environment; and
b. Radar/Air Traffic Services (ATS): WTG clutter appearing on a radar display can affect the safe provision of ATS as it can mask unidentified aircraft from the air traffic controller and/or prevent them from accurately identifying

aircraft under control. In some cases, radar reflections from WTGs can affect the performance of the radar system itself.

1.4 Purpose, Methodology and Scope

1.4.1 Purpose

The purpose of this report is to identify and assess the potential impact of the WTGs associated with the Project on aviation and radar receptors. Where potential adverse impacts are identified, this report considers the stakeholder consultation requirements and where possible, identifies potential mitigation or control measures.

1.4.2 Scope

This initial assessment considers the impact of the WTGs once they are fully installed and does not consider any safety issues relating to the construction, installation, through life support, decommissioning or visibility of the WTGs on the site. However, Osprey recommends that the applicant considers the information in this report when assessing the safety of any installation, construction, or maintenance phases with respect to aviation interests.

1.4.3 Notification and Lighting Requirements

Tall slender constructions such as WTGs or anemometer masts, despite their size, can be difficult to see from the air in certain weather conditions. Guidance has been issued by RenewableUK[1], which recommends that to facilitate safe visual flight, day or night, in the vicinity of anemometer masts and/or WTGs:

- Information regarding construction should be passed to the Defence Geographic Centre (DGC) and the General Aviation Awareness Council (GAAC) at least 10 weeks in advance of the erection or removal of an anemometer mast or first WTG and to follow up on the day with a confirmation that the activity has taken place.
    - Data should include location, height (of all structures over 150 feet (ft), 45.7 meters (m)), date of erection, date of removal and lighting type (none, infra-red or lighting brightness).
    - Local aerodromes identified during consultation should be notified, particularly any police helicopter or air ambulance unit; and
    - RenewableUK should be copied on the submission of all such information as an independent record and that they might share the information with other relevant official agencies.
- Guidance regarding the lighting of WTGs in UK territorial waters is contained in: Civil Aviation Authority (CAA) Civil Aviation Publication (CAP) 393 Air Navigation: The Air Navigation Order 2016 and Regulations - Article 223; and
- Appropriate information about the site construction and any associated lighting (where applicable), for example the height and temporary location of

[1] https://cdn.ymaws.com/www.renewableuk.com/resource/collection/0B792CF1-8B8A-474B-95B6-17886BF724A7/20180213-v0.3_RUK_Guidance_on_Low_Flying_Aircraft_and_Onshore_Tall_Structures_-_FINAL_-_V3.pdf

construction cranes, should be provided to the UK Aeronautical Information Service[2] (NATS Aeronautical Information Service (AIS)) for promulgation in applicable aviation publications including the UK Integrated Aeronautical Information Package (UK IAIP).

1.4.4 Notes on Radar Operation

Radar operates by alternately transmitting a stream of high-power radio frequency pulses and 'listening' to echoes received back from targets within its line of sight. Generally, air surveillance radars employ a rotating antenna that provides 360° coverage in azimuth; the typical scan rate is 15 rotations per minute (rpm) thus illuminating a given target every four seconds.

Primary Surveillance Radar (PSR) operates in two dimensions: the target range is measured based on the time for the transmitted signal to arrive back at the receiver, and the direction of the beam provides the position of the target in azimuth. A PSR such as the type in use at aerodromes across the UK has no height finding capability and as such the Air Traffic Control (ATC) Officer relies on Secondary Surveillance Radar (SSR) for this purpose. SSR is a collaborative radar system which means that the radar will 'interrogate' a transponder on the aircraft for useful information such as altitude and heading, which is then passed to the ATC display console. All military aircraft carry transponders which respond to secondary radar interrogation.

PSR can distinguish between moving and static targets; for targets that are moving towards or away from the radar, the frequency of the reflected signal from a moving target changes between each pulse (transmit and receive) which is known as the Doppler shift. This can be most practically explained by considering the change in frequency of the engine sound heard by a pedestrian when a car passes by on the road – the sound as the car approaches is higher than the sound heard by the pedestrian as it travels away. The Doppler shift has the effect of making the sound waves appear to bunch up in front of the vehicle (giving a higher frequency) and spread out behind it (lower frequency). The true frequency of the engine is only heard when the car is immediately next to the pedestrian. The radar receiver is 'listening' to the radio waves reflected from the moving object and working out whether the returned signal is of a higher/lower frequency (moving object) or if the returned frequency is the same as the transmitted signal (a stationary object).

More complicated mathematical signal processing techniques such as 'Moving Target Indicator' (MTI) processing are employed by the radar processor to determine targets moving tangential to the radar beam.

1.4.5 Notes on Radar Operation

WTGs are a significant cause of PSR false plots, or clutter, as the rotating blades can trigger the Doppler threshold (minimum shift in signal frequency) of the Radar Data Processor (RDP) and therefore may be interpreted as aircraft movements. Significant effects have been observed on radar sensitivity caused by the substantial Radar Cross-Section (RCS) of the WTG structural components (blades, tower and nacelle) which can exceed that of a large aircraft; the effect 'blinds' the radar (or the operator)

[2] https://www.nats.aero/do-it-online/ais/

to wanted targets in the immediate vicinity of the WTG. False plots and reduced radar sensitivity may reduce the effectiveness of radar to an unacceptable level and compromise the provision of a safe radar service to participating aircraft.

It is mainly for the above reasons that airport operators and other Air Navigation Service Providers (ANSP) object to windfarm developments that are within LoS to their radar. However, it is worth noting that detectability of WTGs does not automatically constitute a valid reason for objection. There are several relevant examples where the impact of offshore sites is managed on an operational basis without the need for technical mitigation.

1.4.6 Operational Assessment Methodology

The phases of the Aviation Impact Assessment (AIA) carried out by Osprey are outlined below:

- Stakeholder Identification: Osprey identifies a list of potential aviation stakeholders in accordance with CAP 764 and considers the en-route and other radar systems within operational range of the proposed wind development. The identification stage also considers military areas of operation, tactical training and Practice and Exercise Areas (PEXA).
- Stakeholder Impact: for each identified stakeholder Osprey considers radar impact and subsequently the operational impact of the WTGs being detectable by that radar.
- The operational impact pays heed to, but is not limited to, consideration of: the orientation of approach and departure flight paths, physical safeguarding of flight, types of aircraft flying near to the development, airspace characteristics and flight procedures as published in the UK IAIP (for civilian aviation activities) and the Military Aeronautical Information Package (Mil AIP); and
- Consideration of mitigation where applicable.

1.4.7 Mitigation and Monitoring

Where an impact assessment identifies that an aspect of the project is likely to give rise to significant environmental effects, mitigation measures will be proposed, in order to avoid impacts or reduce them to acceptable levels.

1.5 Assessing Significance of Effects

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. This section describes the criteria applied in this assessment to assign values to the sensitivity of receptors and the magnitude of potential impacts.

To date, guidance has not been produced by the UK and Welsh Governments on defining 'likely significant effects' particularly in the context of the amendments to the EIA Regulations in 2017. A series of principles has therefore been developed, drawing on recognized EIA guidance and technical guidelines (BSI, 2015; IEMA, 2016; EU, 2017; CIEEM, 2018) and further informed by discussions relating to the development of a proportionate EIA strategy for the UK (IEMA, 2017).

These principles provide the framework around which judgements on 'likely significant effects' will be based throughout the EIA process for the proposed Project:

- The assessment of significance will take account of the regulatory context, environmental consequences, and stakeholder expectations in determining the overall consequences of effects.
- A likely significant effect is a potential effect that may be a reasonably predicted consequence of the project.
- Trivial or inconsequential effects are not significant.
- The assessment of significance of effects will consider the extent, magnitude, duration and reversibility of the effects and the sensitivity of the receptor (as determined through the interactions of receptor's tolerance, adaptability and recoverability to each effect); and
- The assessment of likely significance of effects will consider mitigation measures (i.e., residual significance of effects).

The criteria for defining sensitivity for the aviation assessment are outlined in Table 1.

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.

Table 1 Sensitivity Levels for Aviation Receptors.

The criteria for defining magnitude in this chapter are outlined in Table 2.

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)..

Table 2 Magnitude Levels for Environmental Impacts.

The significance of the effect upon aviation and radar is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The method employed for this assessment is presented in Table 3.

For the purposes of this assessment, any effects with a significance level of slight or less have been concluded to be not significant in terms of the EIA Regulations.

		Sensitivity			
		High	**Medium**	**Low**	**Negligible**
Magnitude	**High**	major	major	moderate	minor
	Medium	major	moderate	minor	minor
	Low	moderate	minor	minor	negligible
	Negligible	minor	minor	negligible	negligible

Table 3 Significance Matrix, Combining Receptor Sensitivity with Impact Magnitude

1.6 Document Structure

The AIA utilises the following structure:

- Section 1 (this section) introduces the report and the assessment scope and method;
- Section 2 introduces the Project;
- Section 3 outlines the existing aviation baseline environment;
- Section 4 analyses the impact on NATS operations;
- Section 5 considers the impact on Ministry of Defence (MOD) Air Surveillance and Control Systems (ASACS) operations;
- Section 6 studies the potential impact on other regional aviation and radar stakeholders; and;
- Section 7 considers the conclusions of the assessment and next steps.

2 The Project

2.1 The Project Floating Offshore Windfarm (FLOW)

The Project located in the Celtic Sea, is a development of up to ten Wind Turbine Generators (WTGs) and associated infrastructure. The Project array area coordinates are in Table 4 below; all have a maximum tip height of 886 feet (ft) (270 meters (m)) above mean sea level (amsl).

Corner Reference ID	Latitude	Longitude	Easting	Northing
1	N51 29.5400	W05 38.8640	146821	183407
2	N51 29.6260	W05 34.9770	151351	183900
3	N51 26.8600	W05 33.1800	153153	178119
4	N51 25.4580	W05 33.1010	153119	175517
5	N51 25.5570	W05 35.9550	149822	175862
6	N51 25.4980	W05 38.6280	146721	175906

Table 5 Turbine coordinates and height

2.2 Colour Scheme and Marking

The WTGs would be painted and marked according to the requirements of the CAA and Maritime and Coastguard Agency (MCA). The windfloat will be painted, marked, and lit according to MCA Maritime Guidance Note (MGN) 543 specifications (MCA, 2016).

The final operational lighting layout design for the WTGs will be confirmed in consultation with Trinity House Lighthouse Service (THLS), the MCA and the CAA once the final project layout is determined.

2.3 Helicopter Operations Specific to WTGs

Helicopter hoisting platforms might be installed on each of the nacelles to enable crews to access the nacelle for maintenance. Any helicopter access would be designed in accordance with relevant CAA guidance and standards included in CAP 437 Standards for Offshore Helicopter Landing and CAP 764 CAA Policy and Guidance on Wind Turbines. The precise design details of a helicopter hoisting platform will be determined during the detailed design phase.

This assessment has not considered the assessment of any risk to helicopter or drone operators (receptors) where aviation assets are employed to support construction, operations and maintenance activities associated with the Project.

3 Aviation Baseline Assessment

3.1 Airspace Environment

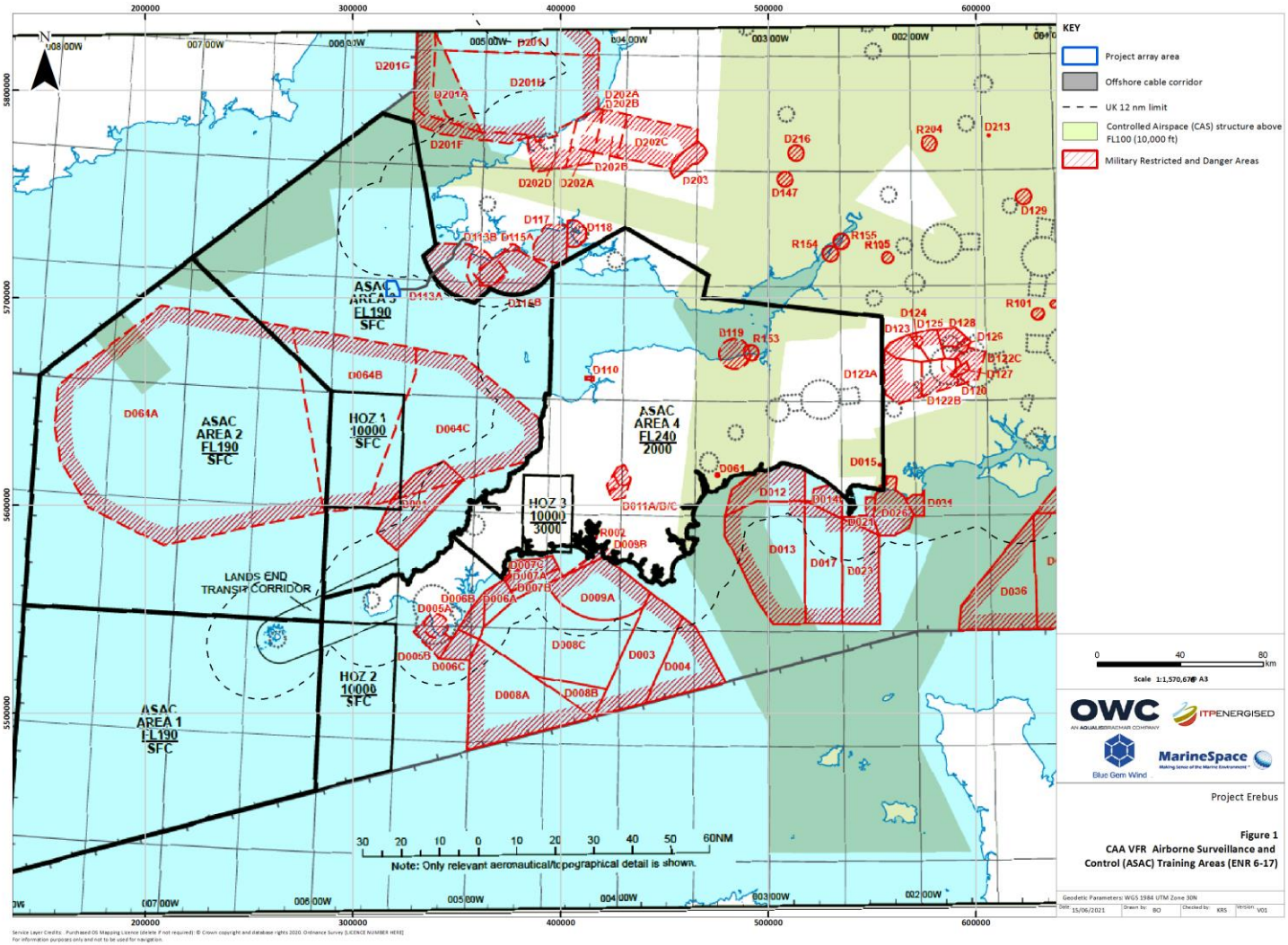
The airspace in the immediate vicinity of the Project, and over the Celtic Sea in general, is Class G Uncontrolled Airspace up to Flight Level (FL)195 (approx. 19,500 ft), where aircraft may fly when and where they wish, subject to the rules of the air. Above FL195 the airspace is Class C Controlled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

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 nautical miles (nm) (18.8 kilometres (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) FLOW 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 kilometres (km)) to the south of the Project. The activities associated with D064B/C are quoted as *High Energy Manoeuvres*.

Figure 3.1: PEXA Chart extract (CAA ENR 6-17) showing airspace local to the Project area WTGs



Above and surrounding the Project area, the Class G uncontrolled airspace below FL 195 is subdivided into areas with the following aviation stakeholder responsibility:

- Military En-Route Area Control, military air traffic controllers located at the Swanwick Area Control Centre (ACC) utilise NATS radar for the provision of ATS to aircraft flying outside of CAS above FL 100 within radar and radio coverage; and
- MOD Air Surveillance and Control System (ASACS), uses its Air Defence Radar (ADR) resources in support of operational flights in the protection of UK airspace and for military training exercises in:
    - ASACS Area 3 (surface to Flight Level (FL)190 (approx. 19,000 ft))
    - Air to Air Refuelling Area 12 (FL70 to FL280)

In aviation and airspace terms, the world is divided into Flight Information Regions (FIRs) to determine which country is responsible for the provision of ATS to aircraft. The Project is within the UK FIR. Above FL 195 NATS En-route Limited (NERL) (which is a subsidiary of NATS) are the main ATS provider utilising several long-range PSR and SSR systems positioned to provide maximum coverage of UK airspace. Additionally, NATS has a license obligation to provide radar data to other remote aviation stakeholders to a high quality and performance standard for the benefit of UK aviation. Any effect that an operational the Project might have on NATS radar systems must be considered both in terms of effect on the civilian en-route services and in the context of its remote users such as the MOD.

3.2 Military Operations

The UK Low Flying System (UKLFS) covers the open airspace of the whole UK land mass and surrounding sea areas out to 2 nm, from the surface to 2,000 ft above ground level (agl) or above mean sea level (amsl). The Project lies within, and underneath aviation military training areas, but outside Practice and Exercise Areas (PEXA) and Air to Air Refuelling Areas (AARA).

Preliminary engagement with the MOD (through the Defence Infrastructure Organisation (DIO) should take place to further define aviation scoping.

3.3 Cardiff, Swansea, Newquay and Dublin Airports

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 FL 100, 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 Project array area are located beyond these ranges and therefore are not expected to affect LARS provision. Swansea Airport does not provide a radar service and the Project lies beyond Dublin Airport's PSR surveillance coverage.

Engagement with Cardiff, Swansea, Newquay and Dublin Airports is not required and can be scoped out.

3.4 Aeronautical Search and Rescue (SAR)

When on an operational mission, Search and Rescue (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).

Preliminary engagement with the Maritime and Coastguard Agency (MCA), regarding SAR operations, should take place to further define aviation scoping.

3.5 Transboundary Considerations

Dublin Airport is approximately 114 nm (211 km) from the northern boundary of the Project. The Shannon FIR is approximately 42 nm (78 km) from the northern boundary of the Project; the Irish Aviation Authority (IAA) provides ATS in the Shannon FIR and there are cross-FIR boundary arrangements, based on the UK-Ireland Functional Airspace Block (FAB), in the area.

Preliminary engagement with both the CAA and IAA, regarding Transboundary Considerations, should take place to further define aviation scoping.

3.6 Aviation Cumulative Effect

There is the Valorous FLOW development and the META Wales (East Pickard Bay) Test Site on the northern boundary of D113A within the Project aeronautical Zone of Influence (ZoI). The META site is currently believed to be limited to the testing of floating foundations rather than full floating WTGs. The small geographical extent, position, distance from the Project and limited scale of the FLOW Test Site strongly mitigates against any current potential for aviation cumulative effects of the Project.

The potential cumulative impacts 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.

For those reasons identified above, including the absence of EIA Scoping Reports, the potential cumulative impacts of the recently announced Llyr 1, Llyr 2 and Whitecross FLOW projects are also omitted from this cumulative assessment.

The Valorous FLOW development would have an effect on radar and the available low-level airspace and because of the potential increase in WTGs in the zone.

Preliminary engagement with META Wales should enable early identification of any cumulative effects of the (East Pickard Bay) FLOW or Wavehub Test Site or with the Project.

3.7 Wind Turbine Generator (WTG) Effects on Radar

Radar detectable WTGs are a significant cause of radar false plots, or clutter, as the rotating blades can trigger the Doppler threshold (e.g., minimum shift in signal frequency) of the Radar Data Processor (RDP) and therefore may be interpreted as aircraft targets. Significant effects have been observed on radar sensitivity caused by the substantial RCS of the WTG structural components (blades, tower and nacelle) which can exceed that of a large aircraft; the effect 'blinds' the radar (or the operator) to wanted targets in the immediate vicinity of the WTG. False plots and reduced radar sensitivity may reduce the effectiveness of radar to an unacceptable level and compromise the provision of a safe radar service to participating aircraft and detection of aircraft targets.

In terms of WTGs, generally, the larger a WTG is, the larger its RCS will be, which will result in more energy being reflected and an increased chance of it creating unwanted returns (non-aircraft), known as 'clutter' to be produced on Radar Data Display Screens (RDDS). This issue is compounded by increasing numbers of WTGs that cause a cumulative effect of greater areas and densities of clutter. Generalised effects on radar systems are as follows:

- Twinkling appearance/blade flash effect;
- Masking of true aircraft targets by increased clutter on an RDDS;
- Increase in unwanted targets or false aircraft tracks;
- Receiver saturation;
- Receiver desensitisation causing loss of targets that are of a small RCS;
- Loss of targets due to Adaptive Moving Target Indication (AMTI) techniques;
- Shadowing behind the WTGs caused by physical obstruction (blocking of radar transmitted signal);
- Degradation of tracking capabilities; and
- Degradation of target processing capability.

Traditional radar systems in operation currently cannot distinguish between returns from WTGs (false returns, or 'clutter') and those from aircraft. ATC are required to assume that actual aircraft targets could be lost over the location of a wind farm; furthermore, identification of aircraft under control could be lost or interrupted.

It is mainly for the above reasons that aviation radar system operators object to wind farm developments that are within radar Line of Sight (LoS) to their radar systems, unless a satisfactory operational or technical mitigation solution can be agreed.

3.8 Caveat on Radar Line of Sight (LoS) Analysis

Osprey used the ATDI ICS LT (Version 22.4.7x64) tool to model the terrain elevation profile between the identified radar systems and the Project boundary WTGs. Otherwise known as a point-to-point 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).

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. Our analysis is designed to give an indication of the likelihood of the WTGs being detected such that the operational significance of the Project relative to nearby aviation assets can be assessed.

3.9 Conclusions of the Radar LoS analysis

Radar LoS analysis assessment results indicate that the Hartland Point radar system (assessed at a blade tip height of 196 m amsl, Figure 3.2) will then theoretically detect the WTGs of the Project at a blade maximum tip height of 886 feet (ft) (270 meters (m)) above mean sea level (amsl).

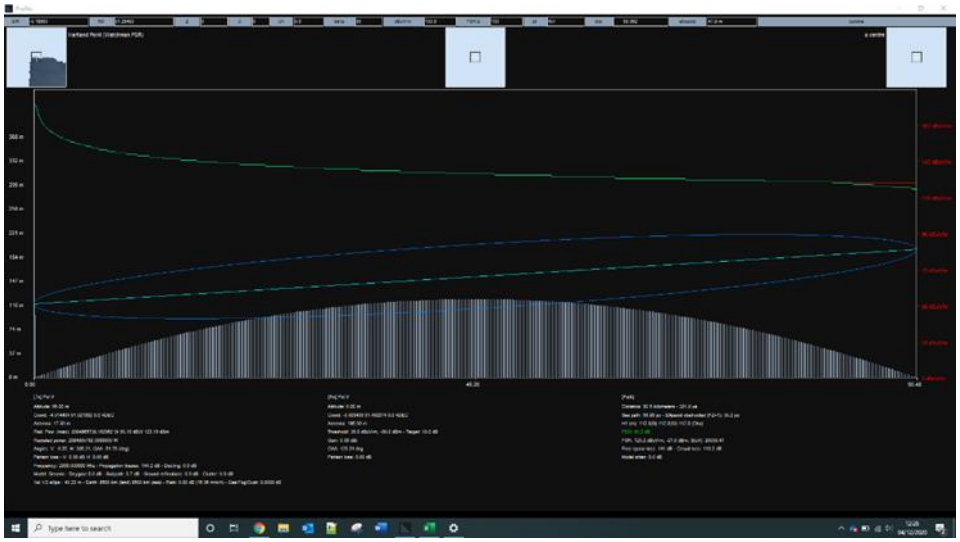


Figure 3.2 – Hartland LoS to the Project southern boundary (196 m Tip)

4 NATS and Military ATM Operations

4.1 Overview

NATS provide 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 operate several long-range Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR) positioned to provide maximum coverage of UK airspace. Additionally, NATS has a license 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.

In addition, Military ATC Units are based in NATS Control Centres to facilitate the control of aircraft that require ATS outside CAS. NATS have a contracted responsibility to provide appropriate PSR coverage to support this task.

The CAA, through CAP 764, advises that 24 km should be used as the trigger point for further discussions with the appropriate service provider who can make a more detailed, accurate assessment of the likely effect on their SSR. Most effects are likely to be within 10 km of an SSR but, because the possibility exists for effects out to 24 km, the greater distance should be utilized for consultation. The Project is more than 24 km from any SSR facility (Figure 4.1) and therefore no impact is assessed on SSR.

4.2 En-Route Operations

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.

NATS En Route Ltd (NERL) use PSRs based in Devon, Burrington, 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. Radar LoS analysis assessment results indicate that the Burrington radar system (assessed at a blade tip height of 270 m amsl) will not theoretically detect the WTGs of the Project at a blade maximum tip height of 886 ft (270 m) amsl (Figure 4.1 below).

Preliminary engagement with NATS should take place to further define aviation scoping. A Technical and Operational Assessment (TOPA) should be requested from NATS. It is anticipated that the results of the TOPA would indicate that no impact is anticipated on NATS surveillance, navigational aids or radio communication infrastructure. The Project is theoretically not detectable by the NERL PSRs which provides radar data for the provision of an en-route service to civil and military aircraft. The Project WTGs are not predicted to pose a significant restriction on aircraft using this airspace.

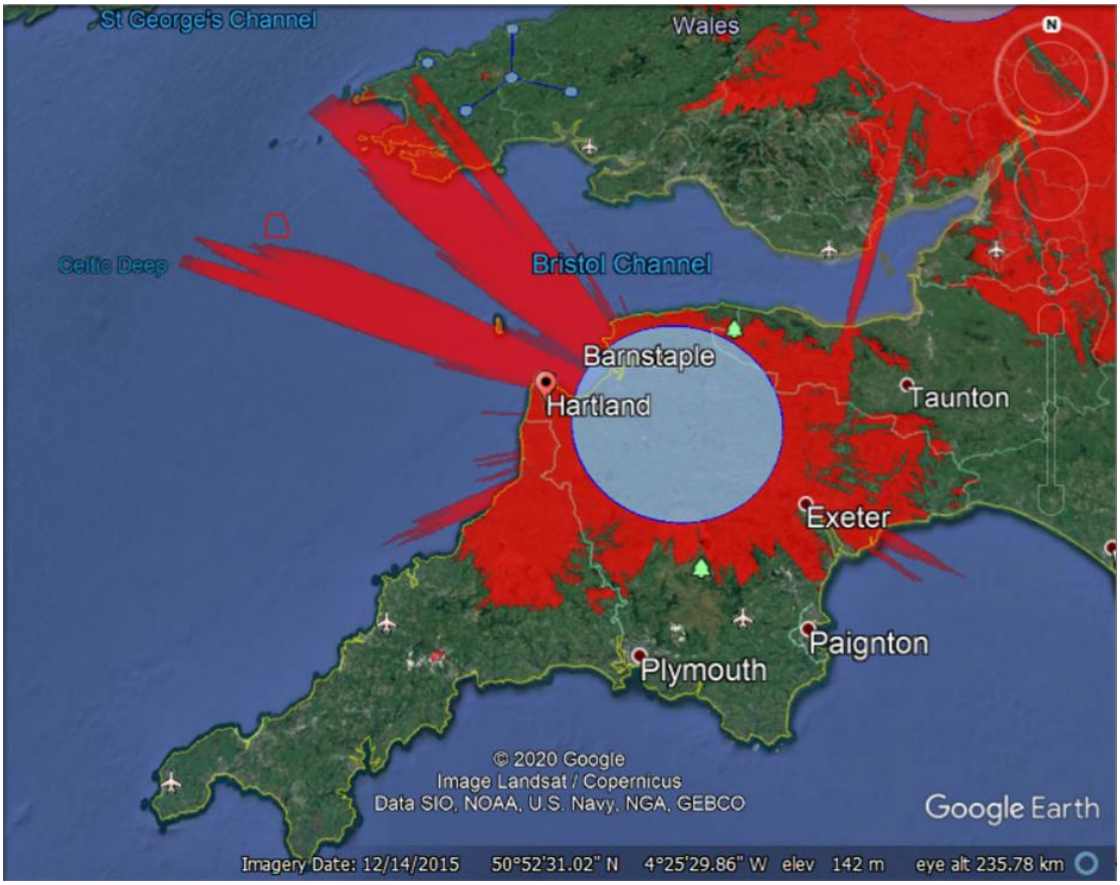


Figure 4.1 – General Project array area with NATS Radar Coverage (below 1000 ft agl/amsl) Overlay

4.3 Military Air Traffic Management (ATM)

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.

Analysis of the site boundary and preliminary parameters (assuming 270 m WTG height) predicts that WTGs in the Project would not be theoretically detectable by any aerodrome based Military ATC PSRs or Military landing aids. However, initial radar LoS analysis (sub-sections 3.8 and 3.9) indicates that the PSR operated by MOD at Hartland Point would have theoretical radar LoS to the Project WTGs at 270 m tip.

4.4 Magnitude and Sensitivity

WTGs detectable by a PSR or ADR system might degrade the system by creating false targets, reduce system sensitivity, create radar shadowing behind the WTGs and saturate the radar receiver leading to clutter potentially concealing real aircraft targets. During the operational phase of the Project, WTGs could pose an effect to civil and military ATM in the vicinity of the Project array area.

4.4.1 MOD Hartland Point

The PSR operated by the MOD at Hartland Point would have theoretical radar LoS to the Project WTGs at 270 m tip.

The Project array area is within the operational range (370 km) of the MOD Hartland Point and NATS Burrington (located in Devon) radars. Radar LoS analysis, which assessed a blade tip height of 196 m amsl , concluded that the operational WTGs of the Project would be therefore theoretically detectable by the MOD Hartland Point PSR system at a 270 m maximum tip height, leading to a degradation of the systems and the presentation of radar clutter. A measurable, long-term or permanent change in radar effectiveness of regional spatial extent is expected. It is predicted that the effect on the receptors is direct, the magnitude is considered to be **medium**.

Both NATS and the MOD aim to ensure 'clutter free' radar to continue to deliver a safe and effective ATS and to monitor UK airspace. The radar stakeholders are considered to be of high vulnerability, costly recoverability and high value. The sensitivity of these receptor is therefore, considered to be **high**.

4.4.2 MOD Hartland Point - Significance

Overall, the sensitivity of the MOD Hartland Point PSR is considered to be **high** and the magnitude of the impact is deemed to be **medium**. The effect the receptor considered would, therefore, be **major** (significant) as radar operators will require an uncluttered radar display to provide a safe and efficient ATS to aircraft under their control. Unmitigated, the radar clutter created will appear at or near the array area; however, there will not be a total loss of radar utility across all the system and therefore it is considered the effect will be **moderate** (significant). However, further investigation will be required through the EIA and stakeholder consultation to provide more certainty on the significance assessment made here based on radar LoS.

5 MOD ASACS Operations

5.1 Overview

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 WTGs on the ASACS radars that serve the airspace above the Project would potentially reduce the capability of the ASACS force.

The nearest ADR to the Project is the Type 102 radar located at Portreath, Cornwall.

- Portreath Remote Radar Head (ADR RRH)

Initial radar LoS analysis indicates that the Portreath RRH operated by the MOD does not have theoretical radar LoS to the Project WTGs at 270 m tip.

Engagement with MOD is required to confirm that its ADR systems can be scoped out.

5.2 Military Low Flying Operations

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..Figure 3.1 above provides an illustration of the S511 PSR and Terma PSR theoretical LoS to each turbine location.

Military low flying is a demanding but essential skill for military aircrew, gained through progressive training and continuous practice. The ability to operate effectively at low level by day and night is vital to fast jet, transport aircraft and helicopters as they support forces on the ground. 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.

Preliminary engagement with the MOD should take place to further define aviation scoping.

5.3 ASACS, Military Practice and Exercise Areas (PEXA)

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 Project 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.

Preliminary engagement with the MOD should take place to further define aviation scoping.

5.4 Magnitude and Sensitivity

During the operational phase of the Project, WTGs could pose a physical obstruction to the flight of aircraft operating in the vicinity of the Project array area, specifically to low flying aircraft.

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) conditions, pilots are ultimately responsible for seeing and avoiding obstructions such as wind turbines and will be aware through notification procedures of the Project. When operating in Instrument Meteorological Conditions (IMC), pilots will be utilising on board radar which detects obstructions, will be operating above the Minimum Safe (Sector) Altitude (MSA) and be under the control of ATC with an appropriate level of radar service. A measurable, long-term or permanent change in radar effectiveness of regional spatial extent is expected. It is predicted that the effect on the receptors is direct, the magnitude is considered to be **medium**.

The ability of aviation stakeholders to continue to safely operate in the airspace available using the Celtic Sea airspace is deemed vulnerable but tolerant with high recoverability, and high value with tolerance to avoid, adapt to, accommodate or recover from the anticipated effect. The sensitivity of the receptor is therefore, considered to be **low**.

Initial radar LoS analysis indicates that the Portreath RRH operated by the MOD does not have theoretical radar LoS to the Project WTGs at 270 m tip. Any effect, if present, is predicted to be of regional spatial extent and of permanent duration. A measurable, long-term or permanent change in radar effectiveness of regional spatial extent is expected. It is predicted that the effect on the receptors is direct, the magnitude is considered to be **medium**. The MOD aims to ensure 'clutter free' radar to continue to deliver a safe and effective ATM and to monitor UK airspace. The ADR stakeholder is considered to be of high vulnerability, low recoverability and high value. The sensitivity of this receptor is therefore, considered to be **high**.

5.5 MOD Significance

5.5.1 Radar

The MOD continues to work with industry to resolve the current issues and in regard to offshore windfarms would, on a case-by-case basis, consider certain developments where impacts on operational capability is deemed to be acceptable. The assumption that suitable identified mitigation will be agreed with the MOD removes the impact created by the Project; with mitigation in place the residual effects to the Hartland Point system would be considered **minor** (not significant).

5.5.2 Aviation Lighting

The CAA have published regulations for the lighting and marking of offshore WTGs. Further consideration, if any, of lighting and marking following additional aviation stakeholder engagement (in large part with the MCA in regard to SAR operations), and the prior notification of the Project activities along with inclusion of appropriate

aviation charts and publications will mitigate the effect. The sensitivity of the receptors is considered to be **medium** and the magnitude of the impact is deemed to be **low**. The effect will, therefore, be **minor** (not significant).

The MOD would request some form of lighting and the CAA would highlight a potential for additional lighting and marking requirements to be fitted to the WTGs to ensure that the offshore array remain conspicuous to offshore low flying operations whilst not causing confusion to maritime users. Where lighting is requested the light should be fitted as close as possible to the top of the obstacle. In the context of WTGs, this should be translated to mean the fitting of a light on the top of the supporting structure rather than the blade tips.

The MOD minimum standard for offshore developments is a 2000cd flashing red light on wind turbines and, because MOD aircraft operate to lower altitudes over-sea (using altimeters) without night vision devices/systems, offshore developments therefore require both visible and IR lighting. In most cases though, this MOD requirement is exceeded by the CAA, Maritime and Coastguard Agency (MCA) and Trinity House statutory requirements .

It is considered that due to the fitment of aviation lighting as per extant regulations, together with prior notification of the Project activities and inclusion of the development on aviation charts and publications will mitigate the effect to **negligible** (not significant).

6 Other Aviation Stakeholders

6.1 Dublin (IAA)

Initial radar LoS review indicates that the PSR operated by the IAA at Mount Gabriel (County Cork) and Dublin do not have theoretical radar LoS to the Project WTGs at 270 m tip. The IAA use PSRs based in County Cork and Dublin, to support its provision of ATS to aircraft operating between the UK, Ireland and over the Celtic Sea.

Engagement with the IAA is required to confirm that its PSR systems can be scoped out. The IAA would need to confirm that none of its PSR systems have radar LoS to the Project; an equivalent technical or operational assessment should be requested from the IAA.

6.1.1 Magnitude and Sensitivity

An effect, if any, would be of regional spatial extent and of permanent duration. It is predicted that the effect on the receptors is direct, the magnitude is considered to be **medium**.

The IAA aim to ensure 'clutter free' radar to continue to deliver a safe and effective ATS and to monitor Irish airspace. There would be minor loss of some key characteristics, features or elements. The sensitivity of this receptor is therefore, considered to be **high**.

6.1.2 Significance

Overall, the sensitivity of the IAA PSRs is considered to be **high** and the magnitude of the impact is deemed to be **medium**. The effect, if any, for the receptor considered would, therefore, be **major** (significant) as radar operators would require an uncluttered radar display to provide a safe and efficient ATS to aircraft under their control. Unmitigated, the radar clutter created would appear at or near the array area; however, there would not be a total loss of radar utility across all the system and therefore it is considered the effect, if any, would be **moderate** (significant).

6.2 Newquay and Swansea Airports

Initial radar Line of Sight (LoS) analysis indicates that the PSR operated by Newquay Airport does not have radar LoS to the Project WTGs at 270 m tip.

Swansea Airport does not operate PSR.

6.3 Helicopter Operations

A network of HMRs is not established in the vicinity of the Project array area.

During the winter (beginning of November until the end of March), a helicopter service operates between Lundy Island and Hartland Point on Mondays and Fridays. The route lies more than 20 nm (37 km) east of the Project.

6.3.1 Magnitude and Sensitivity

During the operational phase of the Project, WTGs would pose no physical obstruction to the operation of the Lundy helicopter service. It is predicted that the impact would affect the receptor directly; however, the magnitude is considered to be **negligible**.

The ability of this aviation stakeholder to continue to safely operate in the airspace available using the Celtic Sea airspace is deemed to be of low vulnerability, high recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **low**.

6.3.2 Significance

It is considered that due to the fitment of aviation lighting as per extant regulations, together with prior notification of the Project activities and inclusion of the development on aviation charts and publications will mitigate the effect to **negligible** (not significant).

6.4 Aeronautical SAR

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). An Emergency Response Co-operation Plan (ERCoP) would be in place for the operation and maintenance phase of the Project. The ERCoP is completed initially in discussion between the developer and the MCA, SAR and Navigation Safety Branches. 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 SAR 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 WTGs. The SAR helicopter bases will be supplied with an accurate chart of the Project WTG Global Positioning System (GPS) positions. The requirements for the lighting of WTGs are contained in Article 223 of CAP 393.

6.4.1 Magnitude and Sensitivity

The effect is predicted to be of regional spatial extent and of medium-term duration. It is predicted that the effect to the receptor would be direct; however, the magnitude is considered to be **low**.

The ability of SAR to continue to safely operate in the airspace available using the Celtic Sea airspace is deemed to be of low vulnerability, there is some tolerance to adapt to the anticipated effect. The sensitivity of the receptor is therefore, considered to be **low**.

6.4.2 Significance

An ERCoP will be in place for the operational phase of the Project.

The sensitivity of the receptors is considered to be **low,** and the magnitude of the impact is deemed to be **low**. The effect will, therefore, be **minor** (not significant).

6.5 Met Radar

Analysis of the site boundary and preliminary WTG parameters concludes that there are no weather radar stations within 20 km of the Project WTGs and therefore no impact on the Meteorological Office radar capability is considered.

7 Conclusions, Next Steps and Mitigation

7.1 Conclusions

7.1.1 Transboundary Considerations

The Project lies within the London FIR and the Shannon FIR is approximately 42 nm (78 km) from the northern boundary of the Project; the IAA provides ATS in the Shannon FIR and there are cross-FIR boundary arrangements, based on the UK-Ireland Functional Airspace Block (FAB), in the area.

7.1.2 MOD Hartland Point

The PSR operated by the MOD at Hartland Point would have theoretical radar LoS to the Project WTGs at 270 m tip.

7.1.3 Portreath (ADR RRH)

Initial radar LoS analysis indicates that the Portreath RRH operated by the MOD would not have theoretical radar LoS to the Project WTGs at 270 m tip.

7.1.4 Military Low Flying and PEXAs

During the operational phase of the Project, WTGs could pose a physical obstruction to the flight of aircraft operating in the vicinity of the Project array area, specifically to low flying aircraft.

7.1.5 Newquay, Cardiff, Swansea and Dublin Airports

Newquay, Cardiff, Swansea and Dublin Airports can be scoped out.

7.1.6 Helicopter Main Routes (HMR)

A network of HMRs is not established in the vicinity of the Project array area.

7.1.7 Aeronautical SAR

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). An Emergency Response Co-operation Plan (ERCoP) would be in place for the operation and maintenance phase of the Project.

7.1.8 Met Radar

There are no weather radar stations within 20 km of the Project WTGs and therefore Meteorological Office radar systems are scoped out.

7.1.9 Aviation Cumulative Effect

The Valorous FLOW development and the META Wales (East Pickard Bay) Test Site on the northern boundary of D113A are within the Project aeronautical ZoI. The small geographical extent, position, distance from the Project and scale of the FLOW Test Site strongly mitigates against any current potential for aviation cumulative

effects of the Project. The Valorous FLOW development would have an effect on radar and the available low-level airspace and because of the potential increase in WTGs in the zone.

7.2 Mitigation

7.2.1 Aviation Obstacle Lighting

Guidance regarding the lighting of WTGs in UK territorial waters is contained in: Civil Aviation Authority (CAA) Civil Aviation Publication (CAP) 393 Air Navigation: The Air Navigation Order 2016 and Regulations - Article 223; and

Appropriate information about the site construction and any associated lighting (where applicable), for example the height and temporary location of construction cranes, should be provided to the UK Aeronautical Information Service (NATS Aeronautical Information Service (AIS)) for promulgation in applicable aviation publications including the UK Integrated Aeronautical Information Package (UK IAIP).

7.2.2 Radar

The MOD continues to work with industry to resolve the current issues and in regard to offshore windfarms would, on a case-by-case basis, consider certain developments where impacts on operational capability is deemed to be acceptable. The assumption that suitable identified mitigation will be agreed with the MOD removes the impact created by the Project; with mitigation in place the residual effects to the Hartland Point system would be considered minor (not significant).

Suitable mitigation could be pursued through an application to the CAA via an Airspace Change Proposal as detailed in CAP 1616. The mitigation solution will be a two-stage process as follows:

- Stage 1. Application to the CAA for a change of airspace and subsequent approval by the Regulator (the CAA).
- Stage 2. Manipulation (blanking) of the affected radar system under commercial agreement. Blanking will not be agreed by MOD or NATS (although the process of commercial agreement may commence) until the CAA have approved the airspace change.

The airspace change process can take up to 2 years from application to regulatory decision; however, this may be reduced to between 12 to 18 months (on approval by the CAA once it has considered the scale of the proposal), dependent on the extent of the change and the consultation period required.

7.3 Next Steps

7.3.1 Stakeholder Engagement

Initial stakeholder engagement should be as follows:

- CAA regarding Aviation Obstacle Lighting and Transboundary Considerations
- MOD regarding Hartland Point PSR, ATM, ADRs PEXAs and Low Flying

- NATS regarding Portland ATM, ATS and Transboundary Considerations
- IAA regarding Transboundary Considerations
- MCA regarding SAR and an ERCoP
- Lundy Helicopter Service regarding its operation
- META Wales regarding cumulative aviation effects.

Stakeholder responses will be used to inform the Aviation and Radar EIA and to further understand where additional mitigation may be required to be developed in consultation with stakeholders.

7.3.2 Aviation and Radar Environmental Impact Assessment

The information within this AIA form the initial assessment of the potential interactions between the Project and aviation and radar receptors. The finding of the AIA, including standard mitigation measures, along with stakeholder consultation responses, will be taken forward to inform the Aviation and Radar EIA and develop further mitigation measures, should these be required.

8 Reference

Reference	Name	Origin
1	CAA CAP 393 – *The Air Navigation Order 2016 and Regulations*	CAA
2	CAP 764 - *Policy and Guidelines on WTGs Issue 6 February 2016*	CAA
3	CAA CAP 437 - *Standards for Offshore Helicopter Landing*	CAA
4	NATS CAP 032 - *UK Integrated Aeronautical Information Package (UK IAIP).* Effective December 2020; Retrieved December 2020	NATS
5	*Guidance on Low Flying Aircraft and Onshore Tall Structures Including Anemometer Masts and WTGs* February 2018	RenewableUK
6	CAP 493 - *Manual of Air Traffic Services Part 1* December 2017	CAA
7	*Offshore Renewable Energy Installations*	MCA