Salamander Offshore Wind Farm

Offshore EIA Report

Volume ER.A.3, Chapter 15: Aviation and Radar

SALAMANDER

Powered by Ørsted and
Simply Blue Group

Document Title:	Aviation and Radar
Document no:	08345230
Project:	Salamander Offshore Wind Farm
Revision	00
Originator	Osprey
Date	April 2024

Revision History:

Revision	Date	Status	Originator	Reviewed	Approved
00	19 April 2024	Final	Osprey	Salamander	Hugh Yendole

Table of Contents

List of Tables

List of Figures

Glossary

Term	Definition
Applicant	Salamander Wind Project Company Limited (formerly called Simply Blue Energy (Scotland) Limited), a joint venture between Ørsted, Simply Blue Group and Subsea7.
Aviation Radar Mitigation Scheme (ATCMS)	The ATCMS describes the process undertaken reaching a Radar Mitigation Strategy Agreement and confirms that the agreement includes sufficient mitigation measures.
Controlled Airspace	Airspace in which Air Traffic Control exercises authority. In the UK, Class A, C, D and E airspace is controlled. Within controlled airspace flights are subject to air traffic control service with standard separation maintained between aircraft.
Cumulative Effects	The combined effect of the Salamander Project with the effects from a number of different projects, on the same single receptor/resource.
Cumulative Impact	Impacts that result from changes caused by other past, present or reasonably foreseeable actions together with the Salamander Project.
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Energy Balancing Infrastructure (EBI)	Energy Balancing Infrastructure which will provide services to the electrical grid, such as storing energy to meet periods of peak demand and improving overall reliability, as well as additional services such as system monitoring and computing. EBI will be housed within buildings and / or containers will be co-located with the Onshore Substation.
Environmental Impact Assessment (EIA)	A statutory process by which the likely significant effects of certain projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the Environmental Impact Assessment (Scotland) Regulations (2017), including the publication of an Environmental Impact Assessment Report (EIAR).
Environmental Impact Assessment Report (EIAR)	A document reporting the findings of the EIA and produced in accordance with the EIA Regulations.
Export Cable Corridor (ECC)	The specific corridor of seabed (seaward of Mean High Water Springs (MHWS)) and land (landward of MHWS) from the Offshore Array Area to the Onshore Substation, within which the export cables will be located.
Helicopter Main Route Indicator (HMRI)	Routes which are established to facilitate safe helicopter flights in Instrument Flight Rules (IFR) conditions (i.e. when flight cannot be completed in visual conditions).

Term	Definition
Instrument Flight Rules (IFR)	The rules governing procedures for flights conducted on instruments.
Instrument Meteorological Conditions (IMC)	Weather conditions which would preclude flight by the Visual Flight Rules (VFR) (i.e. conditions where the aircraft is in or close to cloud or flying in visibility less than a specified minimum).
Landfall	The generic term applied to the entire landfall corridor between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all construction works, including the offshore and onshore Export Cable Corridor (ECC), and landfall compound, where the offshore cables come ashore north of Peterhead.
Minimum Safe Altitude (MSA) Note: also Minimum Sector Altitude when applied to, or associated with, an aerodrome flight procedure	Under aviation flight rules, the altitude below which it is unsafe to fly in Instrument Meteorological Conditions (IMC) owing to presence of terrain or obstacles within a specified area.
Offshore Array Area	The offshore area within which the wind turbine generators, foundations, mooring lines and anchors, and inter-array cables and associated infrastructure will be located.
Offshore Development	The entire Offshore Development, including all offshore components of the Project (Wind Turbine Generators (WTGs), Inter-array and Offshore Export Cable(s), floating substructures, mooring lines and anchors, and all other associated offshore infrastructure) required across all Project phases from development to decommissioning, for which the Applicant is seeking consent.
Offshore Development Area	The total area comprising the Offshore Array Area and the Offshore Export Cable Corridor.
Offshore Export Cable Corridor	The area that will contain the Offshore Export Cable(s) between the boundary of the Offshore Array Area and Mean High Water Springs (MHWS).
Onshore Development	The entire Onshore Development, including Construction Compounds at the Landfall, temporary working areas, Onshore Export Cables, Transition Joint Bay, Joint Bays, Onshore Substation and Energy Balancing Infrastructure, Construction Compounds, any associated landscaping (if required) and access (and all other associated infrastructure) across all Project phases from development to decommissioning, for which the Applicant is seeking consent.
Radar Shadow	A region shielded from radar illumination by an intervening object (e.g. a wind turbine).
Receptor	Any physical, biological or anthropogenic element of the environment that may be affected or impacted by the Salamander Project. Receptors can include natural

Term	Definition
	features such as the seabed and wildlife habitats as well as man-made features like fishing vessels and cultural heritage sites.
Salamander Project	The proposed Salamander Offshore Wind Farm. The term covers all elements of both the offshore and onshore aspects of the project.
Scoping	An early part of the EIA process by which the key potential significant impacts of the Salamander Project are identified, and methodologies identified for how these should be assessed. This process gives the relevant authorities and key consultees opportunity to comment and define the scope and level of detail to be provided as part of the EIAR – which can also then be tailored through the consultation process.
Uncontrolled airspace	Airspace in which Air Traffic Control does not exercise any executive authority but may provide basic information services to aircraft in radio contact. In the UK, Class G airspace is uncontrolled. Aircraft operating in uncontrolled airspace may be in receipt of an Air Traffic Service (ATS); however, within this classification of airspace, pilots are ultimately responsible for their own terrain and obstacle clearance.
Visual Flight Rules (VFR)	The rules governing flight conducted visually (i.e. with the crew maintaining separation from obstacles and other aircraft visually).
Visual Meteorological Conditions	A flight category which allows flight to be conducted under Visual Flight Rules (VFR) defined by in flight visibility and clearance from cloud.
Wind Turbine Generator	All the components of a wind turbine, including the tower, nacelle, and rotor.

Acronyms

Term	Definition
AGL	Above Ground Level
ACC	Area Control Centre
ACOMS	Airspace Coordination and Obstacle Management Service
AD	Air Defence (Radar)
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service

Term	Definition
AMSL	Above Mean Sea Level
ANO	Air Navigation Order
AoR	Area of Responsibility
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
CCS	Carbon Capture and Storage
CEA	Cumulative Effects Assessment
CNS	Communication Navigation and Surveillance
DE&S	Defence Equipment & Support
DESNZ	Department for Energy Security and Net Zero
DfT	Department for Transport
DGC	Defence Geographic Centre
DIO	Defence Infrastructure Organisation
DSLP	Design Specification and Layout Plan
DVOF	Digital Vertical Obstruction File
ECC	Export Cable Corridor
EEA	European Economic Area
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report

Term	Definition
ERCoP	Emergency Response Cooperation Plan
FIR	Flight Information Region
ft	feet
HMRI	Helicopter Main Route Indicators
IAIP	Integrated Aeronautical Information Package
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
ICAO	International Civil Aviation Organisation
IFP	Instrument Flight Procedures
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
JIP	Joint Industry Project
JV	Joint Venture
km	kilometres
LFA	Low Flying Area
LMP	Lighting and Marking Plan
LoS	Line of Sight
MCA	Maritime and Coastguard Agency
MDD	Mitigation Description Document
MD-LOT	Marine Directorate - Licensing Operations Team
MGN	Marine Guidance Notice
MHWS	Mean High Water Springs
Mil AIP	Military Aeronautical Information Publication
MMATM	Manual of Military Air Traffic Management

Term	Definition
MOD	Ministry of Defence
MSA	Minimum Sector Altitude
MW	megawatts
NAIZ	Non-Auto Initiation Zone
NLB	Northern Lighthouse Board
nm	Nautical Miles
NOTAM	Notification to Airmen
ODN	Ordnance Datum Newlyn
OGA	Oil and Gas Authority
ORE	Offshore Renewable Energy
OREI	Offshore Renewable Energy Installations
OspreyCSL	Osprey Consulting Services Limited
OWIC	Offshore Wind Industry Council
PEXA	Practice and Exercise Areas
PSR	Primary Surveillance Radar
RAP	Recognised Air Picture
RCS	Radar Cross Section
RDDS	Radar Data Display Screen
RRH	Remote Radar Head
SAR	Search and Rescue
SBES	Simply Blue Energy (Scotland) Limited
SEPA	Scottish Environment Protection Agency
SoCG	Statement of Common Ground

Term	Definition
SSR	Secondary Surveillance Radar
SWPC	Salamander Wind Project Company Ltd.
TMZ	Transponder Mandatory Zone
TOPA	Technical and Operational Assessment
TRA	Temporary Restricted Area
UKCS	United Kingdom Continental Shelf
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
WTG	Wind Turbine Generator

15 Aviation and Radar

15.1 Introduction

15.1.1.1 The Applicant, Salamander Wind Project Company Ltd. (SWPC), a joint venture (JV) partnership between Ørsted, Simply Blue Group and Subsea7, is proposing the development of the Salamander Offshore Wind Farm (hereafter 'Salamander Project'). The Salamander Project will consist of the installation of a floating offshore wind farm (up to 100 megawatts (MW) capacity) approximately 35 kilometres (km) east of Peterhead. It will consist of both offshore and onshore infrastructure, including an offshore generating station (wind farm), export cables to landfall, and connection to the electricity transmission network (please see **Volume ER.A.2, Chapter 4: Project Description** for full details on the Project Design).

15.1.1.2 This chapter of the Offshore Environmental Impact Assessment Report (EIAR) presents the results of the EIA of potential effects of the Salamander Project on Aviation and Radar. Specifically, this chapter considers the potential impact of the Salamander Project seaward of Mean High Water Springs (MHWS) during the construction, operation and maintenance, and decommissioning phases of the Offshore Development.

15.1.1.3 The chapter provides an overview of the existing environment for the proposed Offshore Array Area, followed by an assessment of significance of effect on Aviation and Radar receptors, as well as an assessment of potential cumulative effects with other relevant projects and effects arising from interactions on receptors across topics.

15.1.1.4 This chapter should be read alongside and in consideration of the following:

- **Volume ER.A.3, Chapter 14: Shipping and Navigation;**
- **Volume ER.A.4, Annex 15.1: Radar Line of Sight Assessment; and**
- **Volume ER.A.4, Annex 15.2: Aberdeen Airport IFP Assessment.**

15.1.1.5 This chapter has been authored by Osprey Consulting Services Limited (OspreyCSL). Further competency details of the authors of this chapter are outlined in **Volume ER.A.4, Annex 1.1: Details of the Project Team.**

15.2 Purpose

15.2.1.1 The primary purpose of this EIAR is for the application for the Salamander Project satisfying the requirements of Section 36 of the Electricity Act 1989 and associated Marine Licences. This EIAR chapter describes the potential environmental impacts from the Offshore Development and assesses the significance of their effect.

15.2.1.2 The EIAR has been finalised following the completion of the pre-application consultation (**Volume RP.A.4, Report 1: Pre-Application Consultation (PAC) Report**) and the Salamander EIA Scoping Report (Simply Blue Energy (Scotland) Ltd. (SBES), 2023) (and takes account of the relevant advice set out within the Scoping Opinion from Marine Directorate - Licensing Operations Team (MD-LOT) (MD-LOT, 2023) relevant to the Offshore Development. Comments relating to the Energy Balancing Infrastructure (EBI) will be addressed within the Onshore EIAR. The Offshore EIAR will accompany the application to MD-LOT for Section 36 Consent under the Electricity Act 1989, and Marine Licences under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009.

15.2.1.3 This EIAR chapter:

- Outlines the existing environmental baseline determined from assessment of publicly available data and stakeholder engagement;

- Presents the potential environmental impacts and resulting effects arising from the Salamander Project on Aviation and Radar receptors;
- Identifies mitigation measures designed to prevent, reduce, or offset adverse effects and enhance beneficial effects on the environment; and
- Identifies any uncertainties or limitations in the methods used and conclusions drawn from the compiled environmental information.

15.3 Planning and Policy Context

15.3.1.1 The preparation of the Aviation and Radar chapter has been informed by the following policy, legislation, and guidance outlined in **Table 15-1**.

Table 15-1 Relevant policy, legislation and guidance relevant to the Aviation and Radar assessment

Relevant policy, legislation, and guidance
Policy
Scotland's National Marine Plan (Scottish Government, 2015)
Scotland's National Planning Framework, NPF4 (Scottish Government, 2023)
Legislation
Civil Aviation Authority (CAA) Publication (Civil Aviation Publication (CAP)) 393: The Air Navigation Order (ANO) 2022
Marine and Coastal Access Act 2009
Guidance
CAA CAP 032: UK Aeronautical Information Package (AIP) (2023)
CAA CAP 168: Licensing of Aerodromes (2022)
CAA CAP 437: Standards for Offshore Helicopter Landing Areas (2023)
CAA CAP 670: Air Traffic Services Safety Requirements (2019)
CAA CAP 738: Safeguarding of Aerodromes (2020)
CAA CAP 764: Policy and Guidelines on Wind Turbines (2012)
CAA CAP 774: The UK Flight Information Services (2021)
CAA CAP 785B: Implementation and Safeguarding of Instrument Flight Procedures (IFP) in the UK (2022)
Maritime and Coastguard Agency (MCA) Maritime Guidance Note (MGN) 654: Safety of Navigation Offshore Renewable Energy Installations (OREIs) (2021)

Relevant policy, legislation, and guidance
Ministry of Defence (MOD) Obstruction Lighting Guidance (2020)
Manual of military air traffic management (MMATM) (Issue 12))

15.3.1.2 Further details on the requirements for EIA are presented in **Volume ER.A.2, Chapter 2: Legislative Context and Regulatory Requirements**.

15.4 Consultation

15.4.1.1 Consultation is a key part of the application process. It has played an important part in ensuring that the baseline characterisation and impact assessment is appropriate to the scale of development as well as meeting the requirements of the regulators and their advisors.

15.4.1.2 An overview of the Salamander Project consultation process is outlined in **Volume ER.A.2., Chapter 5: Stakeholder Consultation**. Engagement regarding Aviation and Radar has been conducted through the EIAR phase as well as in the scoping process.

15.4.1.3 The issues raised during engagement specific to Aviation and Radar are outlined in **Table 15-2** including consideration of where the issues have been addressed within the EIAR. Consultees that had a 'nil' or 'no issue' response are not included in **Table 15-2**.

Table 15-2 Consultation Responses Specific to the Aviation and Radar Topic

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
Maritime and Coastguard Agency (MCA)	30 Nov 2022; Scoping Workshop	Proposed EIA Scoping and EIA assessment methodologies Also noted requirements of Marine Guidance Notice (MGN) 654 for Emergency Response Cooperation Plan (ERCoP) and aeronautical Search and Rescue (SAR).	**Sections 15.7 and 15.11** The production and approval of an ERCoP will be a condition of the Section 36 consent and/or Marine Licence.
NATS	21 June 2023; comments on EIA Scoping Report Technical and Operational Assessment (TOPA)	We refer to the application above. The proposed development has been examined by our technical safeguarding teams and conflicts with our safeguarding criteria. Accordingly, NATS (En Route) plc objects to the proposal. The reasons for NATS's objection are outlined in the attached report TOPA SG31659. *(This is summarised in italics below)* *En route and Airport Impact TOPA.* *The TOPA identified that the Project falls within the assessment area of the En Route Primary Surveillance Radar (PSR) at Alanshill and Perwinnes.* *Predicted Impact on Alanshill RADAR* • *Using the theory as described in Appendix A and development specific propagation profile it has been determined that the terrain screening available will not adequately attenuate the signal, and therefore this development is likely to cause false primary plots to be generated. A reduction in the RADAR's probability of detection, for real aircraft, is also anticipated.* *Predicted Impact on Perwinnes RADAR*	**Sections 15.7 and 15.11** An Air Traffic Service (ATS) provider such as NATS and the airport authorities affected (Aberdeen) may accept that although an impact may be present, it can be managed and accepted by implementing operational mitigation in airspace that is not regularly used for the separation of aircraft. However, in the airspace in which the proposed Offshore Array Area is located, operational acceptance of the effect created is unlikely to be acceptable to all ATC providers without mitigation. The Applicant and NATS are agreeing a Statement of Common Ground (SoCG) in regard of effects to NATS PSR.

<table>
<tr><th>Consultee</th><th>Date and Forum</th><th>Comment</th><th>Where it is addressed within this EIAR</th></tr>
<tr><td></td><td></td><td>
Using the theory as described in Appendix A and development specific propagation profile it has been determined that the terrain screening available will not adequately attenuate the signal, and therefore this development is likely to cause false primary plots to be generated. A reduction in the RADAR's probability of detection, for real aircraft, is also anticipated.
En-route operational assessment of RADAR impact
Where an assessment reveals a technical impact on a specific NATS' RADAR, the users of that RADAR are consulted to ascertain whether the anticipated impact is acceptable to their operations or not.
<table>
<tr><th>Unit or Role</th><th>Comment</th></tr>
<tr><td>Prestwick ATC</td><td>Unacceptable</td></tr>
<tr><td>Aberdeen ATC</td><td>Unacceptable</td></tr>
</table>
Note: The technical impact, as detailed above, has also been passed to non-NATS users of the affected RADAR, this may have included other planning consultees such as the MOD or other airports. Should these users consider the impact to be unacceptable it is expected that they will contact the planning authority directly to raise their concerns.

Predicted Impact on Navigation Aids
No impact is anticipated on NATS' navigation aids.
</td><td></td></tr>
</table>

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
		Predicted Impact on the Radio Communications Infrastructure • No impact is anticipated on NATS' radio communications infrastructure. The proposed Offshore Development has been examined by technical and operational safeguarding teams. A technical impact is anticipated, this has been deemed to be unacceptable from the perspective of both Prestwick sic (Area Control Centre (ACC)) and Aberdeen sic Airport Air Traffic Control (ATC) En route operations. *Representation by NATS predicts that the Proposed Development is likely to generate false primary plots and also a reduction in the probability of Alanshill and Perwinnes Radar to detect real aircraft. NATS advised that the Proposed Development will likely have significant adverse impacts on the Air Traffic Control at both Prestwick and Aberdeen. Furthermore, NATS state that no impact is anticipated on NATS navigational aids and radio communications infrastructure. The NATS representation states that it objects to the Proposed Development.*	
NATS	21 June 2023; comments on EIA Scoping Report	We would like to take this opportunity to draw your attention to the legal obligation of local authorities to consult NATS before granting planning permission. The obligation to consult arises in respect of certain applications that would affect a technical site operated by or on behalf of NATS (such sites being identified by safeguarding plans that are issued to local planning authorities).	Noted.
NATS	21 June 2023; comments on EIA Scoping Report	In the event that any recommendations made by NATS are not accepted, local authorities are obliged to follow the relevant directions within Planning Circular 2 2003 - Scottish Planning Series: Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) (Scotland) Direction 2003 or	Noted.

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
		Annex 1 - The Town And Country Planning (Safeguarded Aerodromes, Technical Sites And Military Explosives Storage Areas) Direction 2002.	
NATS	21 June 2023; comments on EIA Scoping Report	These directions require that the planning authority notify both NATS and the Civil Aviation Authority ("CAA") of their intention. As this further notification is intended to allow the CAA to consider whether further scrutiny is required, the notification should be provided prior to any granting of permission.	Noted.
NATS	21 June 2023; comments on EIA Scoping Report	It should also be noted that the failure to consult NATS, or to take into account NATS's comments when determining a planning application, could cause serious safety risks for air traffic.	Noted.
Met Office	21 June 2023; comments on EIA Scoping Report	We refer to your emails of 16th March 2023 seeking Met Office comments on the above Scoping Report and supporting information given the proximity of the Met Office weather radar at Hill of Dudwick, near Peterhead. I am therefore writing to confirm that Met Office have concerns about the proposal. As a consequence, we may object to a planning application for the development in its current form. Whilst Met Office accept that the proposal is located beyond the officially safeguarded 20 km zone of the Hill of Dudwick radar, it is not correct to conclude that the proposal will therefore not have any adverse impact on any meteorological radars.	**Sections 15.7 and 15.11** (further correspondence with Met Office (21 August 2023) on this comment described below)
Met Office	21 June 2023; comments on EIA Scoping Report	A key requirement for the Hill of Dudwick weather radar is to provide advance warning of severe weather and real-time information which is vital to the continued operation of military and civilian aviation as well as to forecasters in both Scotland and the wider	Noted

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
		UK (as part of the UK Weather Radar Network), including input to flood forecasting in coordination with the Scottish Environment Protection Agency (SEPA).	
Met Office	21 June 2023; comments on EIA Scoping Report	Wind turbines have been shown to have detrimental effects on the performance of Met Office weather radars. These effects include the blocking of radar data in the vicinity of the turbines and the creation of false 'clutter' returns which can imitate or obscure real precipitation signals.	Noted
Met Office	21 June 2023; comments on EIA Scoping Report	Met Office have reviewed the EIA Scoping Report and in particular those sections which reference the Met Office weather radar at Hill of Dudwick.	Noted
Met Office	21 June 2023; comments on EIA Scoping Report	At c. 46km from the Hill of Dudwick radar and based on the proposed blade tip height of up to 325m, the turbines may still be in line of sight of the radar where the lowest elevation scan is 310m. The proposal may therefore still result in degradation to the quality of Met Office services derived from weather radar data despite the turbines being located beyond the critical 20km consultation zone.	Noted and addressed in **Sections 15.7 and 15.11** (further correspondence with Met Office (21 August 2023) on this comment described below)
Met Office	21 June 2023; comments on EIA Scoping Report	Met Office have concerns about any turbines which are located in line of sight and in the beam of the weather radar. However, it may be possible to mitigate against the potential risk of the turbines of this proposed scheme affecting the radar beam if, for example, the tip height of the turbines was no greater than 310m, rather than 325m as per the current proposal.	**Sections 15.7 and 15.11** The Applicant acknowledged this comment.
Met Office	21 June 2023; comments on EIA Scoping Report	The Met Office wishes to be consulted and notified about the progress of any submissions relating to this proposal to verify that it will not adversely affect Met Office interests.	Noted

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
		I hope this adequately explains our position on the matter. Further information about the effects of wind turbines on Met Office interests can be obtained from the following website: Protecting our observing capability - Met Office.	
MD-LOT	21 June 2023; Scoping Opinion	With regard to baseline characterisation, the Scottish Ministers are content with the data sources listed in Table 9-8 of the Scoping Report. However, the Scottish Ministers draw attention to the representation from the MOD regarding anticipated effects of the Proposed Development on military practice and exercise areas.	Noted. Impacts to aeronautical PEXA have been scoped out of the assessment.
MD-LOT	21 June 2023; Scoping Opinion	Within Table 9-10 of the Scoping Report the Developer summarises the potential impacts to aviation and radar to be scoped in and out of the EIA Report during different phases of the Proposed Development. The Scottish Ministers agree with the impacts detailed however advise that the representations from Aberdeen Airport, the MOD and NATS must be fully addressed by the Developer including the points raised below.	Noted
MD-LOT	21 June 2023; Scoping Opinion	The Scottish Ministers direct the Developer to the representation received from Aberdeen Airport regarding Instrument Flight Procedures ("IFPs"). The Scottish Ministers agree and advise that impacts on IFPs must be taken into account within the assessment of aviation impacts and interference in the EIA Report.	Noted. An Aberdeen Airport IFP Assessment (**Volume ER.A.4, Annex 15.2**) has been made.
MD-LOT	21 June 2023; Scoping Opinion	The Scottish Ministers highlight the representation by NATS which predicts that the Proposed Development is likely to generate false primary plots and also a reduction in the probability of Alanshill and Perwinnes Radar to detect real aircraft. NATS advised that the Proposed Development will likely have significant adverse impacts on the Air Traffic Control at both Prestwick and Aberdeen. Furthermore, NATS state that no impact is anticipated on NATS navigational aids and radio communications infrastructure. The NATS representation states that it objects to the Proposed	**Sections 15.7 and 15.11** In the case of the NATS radar systems impacted (Allanshill and Perwinnes PSRs) previous acceptable mitigation of wind turbine impact to these systems has been achieved through agreement by NATS to radar blanking and infill. This will remove all wind turbine radar returns.

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
		Development and the Scottish Ministers therefore advise that the Developer must consider this factor and address the NATS representation in full.	Consultation with NATS continues with the expectation that, if required, a technical mitigation solution will be agreed, which will reduce the magnitude of the impact; therefore, and when in place the residual effect to the impacted NATS PSR systems will be of minor or negligible adverse significance.
MD-LOT	21 June 2023; Scoping Opinion	In Table 9-9 of the Scoping Report, the Developer outlines the embedded mitigation with regard to the requirement to install aviation lighting. The MOD requests that the Proposed Development is fitted with MOD accredited aviation safety lighting in accordance with the CAA Air Navigation Order 2016. The Scottish Ministers agree with the MOD and advise the Developer that this must be considered within the EIA Report. The Scottish Ministers highlight that whilst the CAA have not provided any representation, the Scottish Ministers advise that the Developer should seek to engage with the CAA prior to the submission of the EIA Report. For the avoidance of doubt, the Scottish Ministers advise that impacts on RRH Buchan and the requirement for appropriate technical mitigation, must be fully assessed in the EIA Report.	**Sections 15.7 and 15.11** The Applicant acknowledged this comment. The Applicant is engaging with the CAA to discuss any concerns surrounding civil aviation. The Applicant is engaging with the MOD to discuss any concerns surrounding military AD radar.
Aberdeen Airport Safeguarding	21 June 2023; comments on EIA Scoping Report	Safeguarding The proposed site is located within the wind farm consultation zone and Instrument Flight Procedure (IFP) area for Aberdeen Airport and as such aviation impacts should be considered as part of the EIA. Some of the proposed turbines may be detected by Aberdeen Airport's primary surveillance radar and generate clutter on air traffic control displays and mitigation may be required.	**Sections 15.7 and 15.11** The Applicant is engaging with Aberdeen Airport Safeguarding to discuss any concerns with the IFPs. An ATS provider such as NATS and the airport authorities affected (Aberdeen) may accept that although an impact may be present, it can be managed and accepted by implementing operational mitigation in airspace that is not regularly used for the separation of aircraft. However, in the airspace in which the proposed Offshore Array Area is located, operational acceptance of the effect

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
			created is unlikely to be acceptable to all ATC providers without mitigation.
Aberdeen Airport Safeguarding	21 June 2023; comments on EIA Scoping Report	Our position with regard to this proposal will only be confirmed once the turbine details are finalized and we have been consulted on a full planning application. At that time we will carry out a full safeguarding impact assessment and will consider our position in light of, inter alia, operation impact and cumulative effects.	**Section 15.7 and 15.11** The Applicant is engaging with Aberdeen Airport Safeguarding to discuss any concerns with the IFPs. An ATS provider such as NATS and the airport authorities affected (Aberdeen) may accept that although an impact may be present, it can be managed and accepted by implementing operational mitigation in airspace that is not regularly used for the separation of aircraft. However, in the airspace in which the proposed Offshore Array Area is located, operational acceptance of the effect created is unlikely to be acceptable to all ATC providers without mitigation.
MOD Defence Infrastructure Organisation (DIO)	21 June 2023; comments on EIA Scoping Report	The MOD is identified in Section 9.3.3.1 as a stakeholder with particular interest in Aviation and Radar. Wind turbine development has the potential to affect, and be detectable by, radar systems and can have a significant and detrimental impact on the capability and operation of such systems. In Table 9-10, the report identifies the potential impact the development will have in relation to Remote Radar Head (RRH) Buchan. The impact of the development on this radar should be considered as the design is progressed and any impact will need to be mitigated, it will be for the applicant to provide appropriate technical mitigation(s).	**Sections 15.7 and 15.11** The Applicant is engaging with the MOD to discuss any concerns surrounding military AD radar. The Aviation Radar Mitigation Scheme (ATCMS) (**Volume ER.A.2, Chapter 1: Introduction**), related to Co45, describes the process undertaken reaching a Radar Mitigation Strategy Agreement and confirms that the agreement includes sufficient mitigation measures. Project proposed tertiary mitigation measures detailed in **Table 15-5.**

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
MOD Defence Infrastructure Organisation (DIO)	21 June 2023; comments on EIA Scoping Report	The applicant should be advised to take account of the current published MOD Practice and Exercise Areas (PEXA) in preparation of their development proposal. The MOD has highly surveyed routes which maybe relevant to the installation of the export cables & associated infrastructure. MOD should be consulted at the next stage of any application.	Noted. Impacts to aeronautical PEXA have been scoped out of the assessment. **Sections 15.7 and 15.11** The Applicant is engaging with the MoD to discuss any concerns surrounding military Air Defence (AD) radar. The MoD has been requested to confirm whether the turbines within the Offshore Array Area will be visible to the Remote Radar Head Buchan Air Defence Radar (AD) radar.
MOD Defence Infrastructure Organisation (DIO)	21 June 2023; comments on EIA Scoping Report	With regard to aviation safety, the requirement to install aviation safety lighting on the turbines proposed is set out in Table 9-9. The MOD would request that the development is fitted with MOD accredited aviation safety lighting in accordance with the Air Navigation Order 2016. The MOD will also require that sufficient information is submitted to ensure accurate marking of the development on aeronautical charts.	**Sections 15.7 and 15.11** The Applicant is engaging with the MOD to discuss any concerns surrounding military AD radar. The Aviation Radar Mitigation Scheme (ATCMS) (**Volume ER.A.2, Chapter 1: Introduction**), related to Co45, describes the process undertaken reaching a Radar Mitigation Strategy Agreement and confirms that the agreement includes sufficient mitigation measures. Project proposed tertiary mitigation measures detailed in **Table 15-5.**
NatureScot	21 June 2023; comments on EIA Scoping Report	Wet storage Section 4.6.2 (Floating Substructures) refers to the potential for wet storage of the substructures prior to their installation within the array area, either at the initial assembly site, the wind turbine integration site or a separate dedicated storage location. Section 4.7.1 (Floating Assembly) also indicates that once operational the	Wet storage of the floating substructures (and integrated WTGs) prior to tow-out to the Offshore Array Area is considered to be outside the scope of this EIA and the Marine Licence applications for the Offshore Development. This is due to the fact that at this stage of the Salamander Project it is not known which port(s) will be used for wet storage and therefore it is challenging to undertake

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
		substructures and Wind Turbine Generators (WTGs) will form an integrated assembly piece – the replacement of any major component parts of which is expected to be achieved by towing the assembly to port. Wet storage could represent a significant impact. Consideration of the potential impacts on all receptors needs to be addressed with the EIAR and HRA. We would welcome further discussion on this as and when further details are confirmed, noting the intention to seek a separate Marine Licence application for any requirements for wet storage out with the array area.	a meaningful assessment of impacts related to wet storage. The intent is that the Salamander Project will utilise the services of a port(s) that offer wet storage sites, which will have appropriate consents (obtained by the port authority) for wet storage of floating substructures, fabrication and assembly with the WTGs. To enable the availability of this option for the Salamander Project within the required timeframe, an owner of SWPC is an official member of the TS-FLOW UK-North Joint Industry Project (JIP) exploring the challenges of wet storage and identifying the opportunities and potentially suitable locations for these activities. This JIP is in collaboration with relevant ports and other floating offshore wind developers. Separate Marine Licences and associated impact assessments for wet storage areas out with the Offshore Development Area will be applied for and undertaken as appropriate.
MOD Defence Infrastructure Organisation (DIO)	20 June 2023; 5 December 2023 MSTeams (virtual) Meeting	Safeguarding. In response to the Scoping Report, the MOD and raised concerns to the development in a letter to the ECU dated 9th May 2023. These concerns related to the adverse impact the development would have upon the Air Defence (AD) Radar sited at Remote Radar Head (RRH) Buchan. The Applicant subsequently engaged the MoD's Defence Infrastructure Organisaiton (DIO) team through virtual meetings on 20 June 2023 and 5 December 2023.	**Sections 15.7 and 15.11** The Applicant has engaged with the MOD to discuss any concerns surrounding military AD radar and safeguarding. The MOD has been requested to confirm whether the turbines within the Offshore Array Area will be visible to the Remote Radar Head (RRH) Buchan ADR. The Applicant has kept DIO informed regarding the development of the proposed project and has identified a solution that will mitigate the impact that the Salamander WTGs will have upon the performance of the air defence radar located at Remote Radar

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
			Head Buchan. The Applicant is currently engaging with the DIO with the aim of agreeing the wording of suitable planning conditions. The Applicant will enter into discussions with MoD (DE&S), aimed at securing a mitigation agreement, should planning consent be granted.
NATS	19 July 2023 MSTeams (virtual) Meeting	En route and Airport Impact. In response to the TOPA, it was agreed that NATS Safeguarding would work with the Applicant towards agreement to a SoCG and that NATS Safeguarding would produce the internal Mitigation Description Document (MDD).	**Sections 15.7 and 15.11** In the case of the NATS radar systems impacted (Allanshill and Perwinnes PSRs) previous acceptable mitigation of wind turbine impact to these systems has been achieved through agreement by NATS to radar blanking and infill. This will remove all wind turbine radar returns. Consultation with NATS continues with the expectation that, if required, a technical mitigation solution will be agreed, which will reduce the magnitude of the impact; therefore, and when in place the residual effect to the impacted NATS PSR systems will be of minor or negligible adverse significance.
Met Office	21 August 2023; Email	Safeguarding Although beyond 20 km, the turbines may be detected and there may be an impact on the radar data from Hill of Dudwick. The base of the beam at its lowest elevation is 310m, so the turbines will be in the beam if the tip height exceeds this. To avoid any impact on our radar, we would like to request that the maximum tip height is no more than 310m.	**Sections 15.7 and 15.11** The Applicant acknowledged this comment and has updated turbine parameters accordingly. These amended proposals are for a maximum tip height of 310m AMSL (ODN). In view of this, it is anticipated that a potential Met Office objection (see left) is removed.

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
NATS	8 December 2023; Email	NATS Safeguarding. Thank you for your email, I have spoken to the Safeguarding Team who have stated that the only engineering solution we have with our present surveillance technology doesn't meet the requirements of one of the ATC units. They will continue to investigate other solutions and I will keep you informed of progress which will hopefully lead to a Mitigation being available.	**Sections 15.7 and 15.11** Consultation with NATS continues with the expectation that, if required, a technical mitigation solution will be agreed, which will reduce the magnitude of the impact; therefore, and when in place the residual effect to the impacted NATS PSR systems will be of minor or negligible adverse significance.
CAA	13 December 2023; Email	CAA requires notification of a change to aviation obstacles if it or they are 100 metres or more above sea level, in accordance with Article 225A of the Air Navigation Order (2016). This is a recent addition to the Air Navigation Order legislation. Additional consideration of the aviation obstacle environment may be required during the initial build phase and the temporary use of cranes that may extend above a height of 100 metres. The CAA works closely with NATS Aeronautical Information Services (providing the relevant information to inform the required publication of UK en-route obstacles in the Aeronautical Information Publication) and the MOD Defence Geographic Centre (obstacle data that the CAA receives is shared and vice versa). To notify new or existing obstacles, changes to existing obstacles and failures of aviation lighting, please register for the Airspace Coordination and Obstacle Management Service (ACOMS) via the CAA customer portal. Further information is available at: https://www.caa.co.uk/Commercial-industry/Airspace/Event-and-obstacle-notification/Obstacle-notification/Obstacle-notification/	**Sections 15.7 and 15.11** The Applicant acknowledged this comment.

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
		Information should be provided at least 8 weeks before the commencement of the planned works or as soon as reasonably practicable where there is insufficient time to give 8 weeks' notice or there is an urgent need to commence the planned works. Any temporary obstacles associated with wind farms that may extend to or above a height of 100 metres should also be notified to the CAA using the ACOMS service that will enable the necessary Notice to Aviation (NOTAM) to be generated.	
NATS	8 February 2024; MSTeams (virtual) Meeting	NATS Safeguarding. NATS Safeguarding produced the internal MDD for its end data users. A technical mitigation could be achieved; however, the Safeguarding Team have stated that the only engineering solution available with present surveillance technology doesn't meet the requirements of one dependent ATC unit. NATS will continue to investigate other solutions which will hopefully lead to a Mitigation being available.	**Sections 15.7 and 15.11** In the case of the NATS radar systems impacted the previous acceptable mitigation of wind turbine impact to Allanshill and Perwinnes PSR systems has been achieved through agreement by NATS to radar blanking and infill. However, this type of engineering solution is not acceptable to an external end data user ATC unit; as not meeting NATS' contractual obligation to the end data user ATS provider. Consultation with NATS continues with the expectation that, if required, a technical mitigation solution will be agreed, which will reduce the magnitude of the impact; therefore, and when in place the residual effect to the impacted NATS PSR systems will be of minor or negligible adverse significance.

15.5 Study Area

15.5.1.1 The Aviation and Radar Study Area has been defined on the basis of CAA recommended guidance (CAP 764) for wind farm developers to consult with aviation stakeholders operating around the Salamander Project Offshore Array Area which enables adverse effect on aviation in the immediate vicinity of the site to be determined. A secondary Aviation and Radar Study Area has been determined by the range of other affected radar operator receptors such as ATC and AD PSR systems. CAP 764 states that the operational range of a radar system is dependent on the type of radar used and its operational requirement. CAP 764 (CAA, 2016) provides a guide of 30 km for assessment of radar impact; however, impact is dependent on radar detectability of operational wind turbines, the radar's operational range and the use of airspace in which the development sits. These radars can have an operating range of up to 200 nm (370 km); however, it is only the likely radar coverage over the proposed Offshore Array Area that needs to be considered, as the question of whether the wind turbines themselves are visible to radar is the determining factor relating to adverse impact on PSR systems. This ensures that only the relevant radars and their stakeholders, affected by the offshore project area are identified. Guidance also states that the operators/owners of offshore helicopter installations (oil and gas platforms) within a defined 9 nautical mile (nm) (17 km) buffer zone of the Salamander Project Offshore Array Area should be consulted.

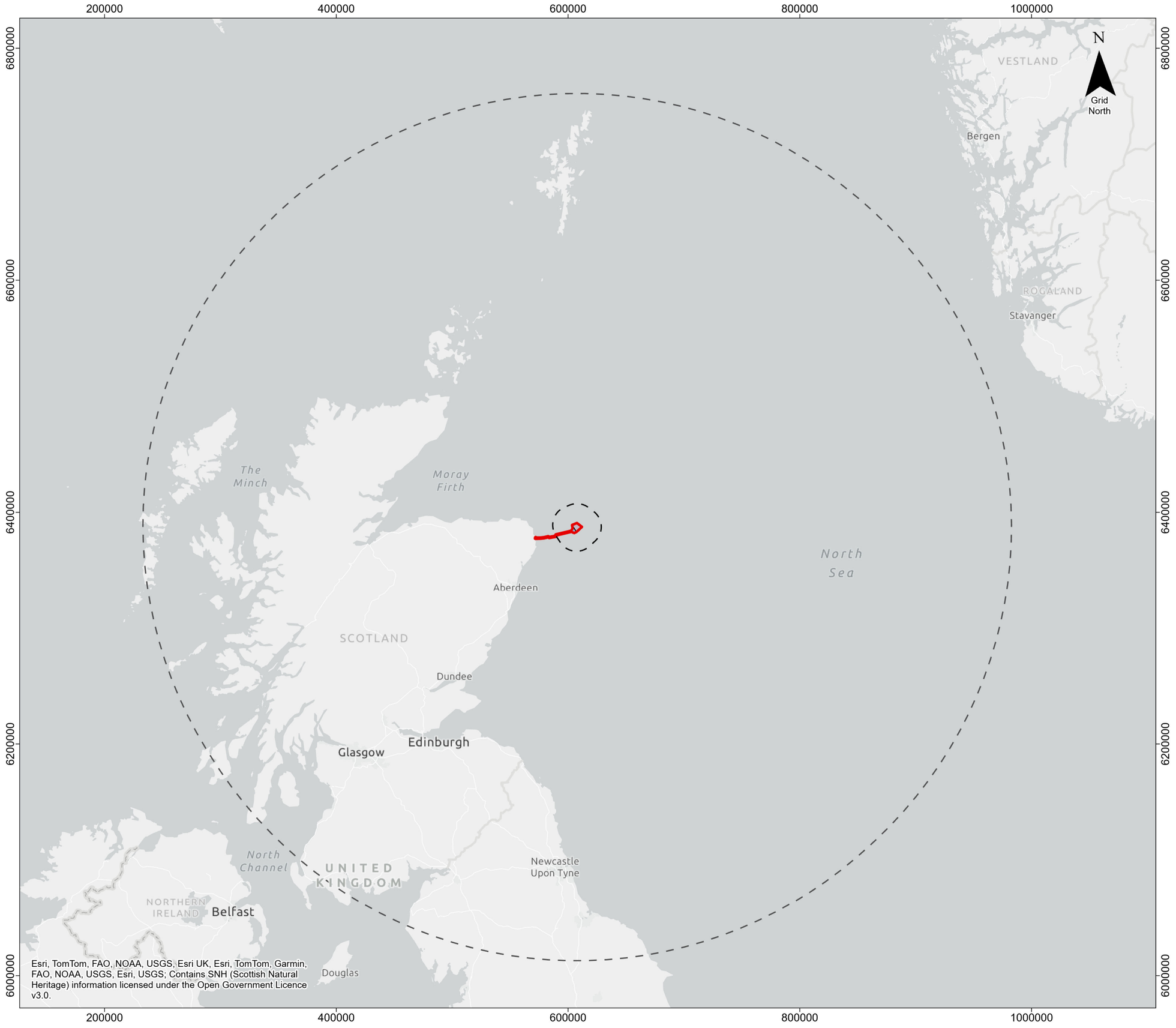
15.5.1.2 The Study Area for Aviation and Radar (the 9 nm and 200 nm Study Area buffers) is shown in **Figure 15-1**.

15.5.1.3 Airspace designations including low flying areas and military aeronautical Practice and Exercise Areas (PEXA) and, airspace, as necessary (Aberdeen Airport IFP and associated Minimum Sector Altitudes (MSA), used by fixed-wing aircraft, or helicopters operating on Helicopter Main Route Indicators (HMRI), are part of the Aviation and Radar Study Area.

Salamander

Figure 15-1

Aviation and Radar Study Area



Legend

- Offshore Array Area
- Offshore Export Cable Corridor
- Offshore Development Area
- 9 nm buffer
- 200 nm buffer

Coordinate System: WGS 1984 UTM Zone 30N

Scale @ A3 : 1:3,177,149

0 90 180 Kilometers

0 20 40 80 Nautical Miles

Rev	Description	Date
00	FINAL	16/04/2024
--	--	--
--	--	--
--	--	--

Doc. Title : Aviation and Radar Study Area
Doc. No : SWF01ER0345
Created by : AN
Checked by : IW
Approved by : RM

SALAMANDER

Powered by Ørsted and Simply Blue Group

15.6 Methodology to Inform Baseline

15.6.1 Site-Specific Surveys

15.6.1.1 No site-specific surveys were undertaken for assessment of Aviation and Radar receptors. Assessment within the chapter is entirely desk-based as existing data sources and discussions with stakeholders are sufficient to inform the assessment.

15.6.2 Data Sources

15.6.2.1 The data sources that have been used to inform this Aviation and Radar chapter of the EIAR are presented within **Table 15-3**.

Table 15-3 Summary of key publicly available datasets for Aviation and Radar

Source	Year	Spatial Coverage	Summary
MOD Military Aeronautical Information Publication (Mil AIP)	2023	UK	An AIP is defined by the International Civil Aviation Organisation (ICAO) as a publication "intended primarily to satisfy international requirements for the exchange of aeronautical information of a lasting character essential to air navigation
CAA 1:500,000 Visual Flight Rules (VFR) Aviation Chart Ed35	2022	Scotland	The NATS Aeronautical Information System (AIS) team manages changes to aeronautical features on the UK VFR charts from numerous data sources, many of which operate within a regulated framework and many of which do not.
MOD UK En Route Low Altitude North Sea West Off-Shore Installations (UK (L) 5 OIL	2023	UK East Coast	Military low altitude aviation chart showing civil and military airspace constructs, routes, exercise areas and offshore surface entities

15.7 Baseline Environment

15.7.1 Existing Baseline

15.7.1.1 In aviation and airspace terms, the world is divided into Flight Information Regions (FIRs) for the allocation of responsibility for the provision of an ATS to aircraft. The airspace above and around the proposed Offshore Array Area is used by both civil and military aircraft, which are tracked by radar systems operated by both NATS and the MOD. The proposed Salamander Project will be located within the Scottish FIR in an area of Class G[1] uncontrolled airspace, which is established from surface up to FL 105 (approximately 10,500 feet

[1] Class G airspace is uncontrolled, pilots may enter the airspace subject to a set of simple rules. Pilots are not obliged to contact air traffic control agencies, but many do for other traffic information. Pilots remain responsible for their own safety.

(ft)). From FL 105 to FL 195 (19,500 ft), Class E[2] Controlled Airspace (CAS) is established. Above this Class E Airspace, Class C[3] CAS is established from FL 195 up to FL 660 (approximately 66,000 ft).

15.7.1.2 All aircraft operating within CAS (except VFR traffic in Class E) must be in receipt of an Air Traffic Service (ATS) from NATS, military air traffic controllers located at a NATS ACC or under the control of military air defence controllers.

15.7.1.3 The Aviation and Radar Study Area contains a series of HMRIs which are used as transit routes between Aberdeen Airport and offshore oil and gas installations. Temporary Restricted Areas (TRAs) 007B and TRA 008B are also established to the south and north of the proposed Offshore Array Area (between FL 195 (19,500 ft) and FL 245 (24,500 ft)) and are utilised by military AD aircraft carrying out training exercises and supersonic flights. MOD AD controllers provide support to military operations in these TRAs and associated PEXAs using the Buchan AD radar.

Civil Aviation

15.7.1.4 The UK civil airport nearest to the Offshore Array is Aberdeen Airport, which is located on a bearing of approximately 240°/40 nm southwest of the proposed Offshore Array Area.

15.7.1.5 Airports with published IFP have associated MSA. A MSA defines the minimum safe altitude an aircraft can descend to within a sector of radius 25 nm (approximately 46 km). These sectors provide obstacle clearance protection of at least 1,000 ft to aircraft within that area. This allows pilots of aircraft flying under Instrument Flight Rules (IFR)[4] the reassurance of properly designated obstacle and terrain clearance protection whilst making an approach and landing at an airport in poor weather.

15.7.1.6 To inform the baseline, **Volume ER.A.4, Annex 15.2: Aberdeen Airport IFP Assessment**, has determined that the presence of wind turbines placed in the proposed Offshore Array Area, at the maximum blade tip height of 325 m AMSL[5], will not affect the IFPs and MSAs at Aberdeen Airport. It should be noted that the height of 325 m was used in assessment as this was the expected maximum height from initial Salamander Project proposed turbine parameters. During project development, and with a view to addressing Met Office responses regarding turbine heights in excess of 310 m AMSL (ODN), the maximum tip height proposed for the Salamander Project has been reduced to 310 m AMSL (ODN).

15.7.1.7 To inform the baseline, **Volume ER.A.4, Annex 15.1: Radar Line of Sight Assessment** has determined which radar systems have the potential to detect operational wind turbines at the maximum blade tip height placed within the proposed Offshore Array Area. No wind turbine site layout is available at the time of writing; however, layout of wind turbines does not have a material effect on establishing if theoretical radar LoS is

[2] Class E airspace is controlled airspace in which instructions provided to IFR pilots are mandatory. Subject to the flight conditions and type of flight, aircraft are separated from each other within this class of airspace. VFR pilots are not obliged to contact air traffic control agencies (do not require clearance to enter), but pilots are encouraged to so and comply with instructions; VFR pilots remain responsible for their own safety.

[3] Class C airspace is controlled airspace in which instructions provided to pilots are mandatory. Subject to the flight conditions and type of flight, aircraft are separated from each other within this class of airspace.

[4] Instrument Flight Rules (IFR) are rules which allow properly equipped aircraft to be flown under Instrument Meteorological Conditions (IMC).

[5] In this report Above Mean Sea Level based on Ordnance Datum Newlyn (ODN). MSL is 0.44m below ODN. For the purposes of this assessment this difference is considered negligible and AMSL and ODN may be used interchangeably.

possible. Therefore, to enable the analysis, points of reference in the form of a regular grid pattern were established across the proposed Offshore Array Area with turbines on the four (4) array corners at the maximum blade tip height of 325 metres (m) (and lower at 300 m) AMSL.

15.7.1.8 The radar LoS analysis indicates that the NATS Allanshill and Perwinnes PSR will theoretically detect operational wind turbines at a maximum height of 325 m and 300 m, which is likely to create an effect to the operation of the PSR. The generalised effects wind turbines have on radar systems through radar detection of operational wind turbines are as follows:

- Twinkling appearance/blade flash effect can distract the air traffic controller from their primary task.
- Masking of real aircraft targets caused by increased clutter being displayed on the radar data display screen (RDDS).
- Increase in unwanted targets or false aircraft tracks.
- Receiver saturation.
- Target desensitisation causing loss of valid aircraft targets that are of a small Radar Cross Section (RCS).
- Shadowing behind the wind turbines caused by physical obstruction (blocking of radar transmitted signal).
- Degradation of target processing capability and processing overload.
- Degradation of tracking capabilities including track seduction.

15.7.1.9 The CAA advises that effects on Secondary Surveillance Radar (SSR) are only relevant to consider when wind turbines are located less than 10 km from the SSR CAP 764. The proposed Offshore Array Area lies outside the area of interaction with any aviation related SSR systems.

15.7.1.10 The Applicant has engaged with the NATS Safeguarding (who safeguard NATS infrastructure) throughout 2023, including through a virtual meeting on and 08/02/24. The Applicant has kept NATS informed regarding the development of the proposed Salamander Project; however, NATS has not identified a solution that will mitigate the impact that the Salamander WTGs will have upon the performance of the Allanshill and Perwinnes PSRs. The Applicant is currently engaging with the NATS with the aim of agreeing a suitable solution.

15.7.1.11 A programme (Programme B) on civil aviation has been established including a new 3-in-1 study on Layout, Stealth and Data led by the Offshore Renewable Energy (ORE) Catapult. Working with the Department for Transport (DfT), Department for Energy Security and Net Zero (DESNZ), MOD, the CAA, and NATS; the Offshore Wind Industry Council (OWIC) is looking to establish a strategic solution around offshore Transponder Mandatory Zones (TMZ) and publish a study on the future requirements for offshore aviation Communication, Navigation and Surveillance (CNS). The Applicant will enter into discussions with NATS, aimed at securing a mitigation agreement (Co44), should consent be granted.

Helicopter Operations

15.7.1.12 Commercial offshore helicopter operations in this region encompass support to offshore oil and gas exploitation and SAR operations. Bristow Helicopters Ltd hold the UK Government national contract to

deliver SAR operations, often involving helicopters flying at low-level, on behalf of the MCA. The closest MCA SAR helicopter base[6] to the proposed Offshore Array Area is Inverness Airport.

15.7.1.13 Helicopters supporting offshore oil and gas, in the northern North Sea, use HMRI[7], radiating from Aberdeen Airport (the main support base) on a hub/spoke radial pattern. Four HMRIs are located within, or in close proximity to, the proposed Offshore Array Area; these are HMRIs 062º, 065º, 068º and 071º which are used by helicopters routing to/from Aberdeen Airport and offshore helicopter installations located in the North Sea. HMRIs are indicators of 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. Compliance with the HMRI structure is not compulsory. In the general interests of flight safety, however, civil helicopter pilots are strongly encouraged to plan their flights using HMRIs wherever possible.

15.7.1.14 The construction of offshore wind turbines has the potential to create a physical obstacle to low-level helicopter operations. The CAA recommend within CAP 764 that there should be no obstacles within 2 nm either side of the centreline of a HMRI.

15.7.1.15 No offshore helicopter installations are located within 9 nm (16 km) of proposed Offshore Array Area, which is the CAA's recommended distance for wind farm developers to consult with the operators/owners of offshore helicopter installations (oil and gas platforms).

Air Defence and Military Aviation

15.7.1.16 The MOD through the Air Surveillance and Control System (ASACS) is responsible for compiling a Recognised Air Picture (RAP) to monitor the airspace in and around the UK to launch a response to any potential airborne threat. This is achieved through the utilisation of a network of long-range ADR systems, some of which are located along the east coast of the UK. ADR systems are similarly impacted by the detection of operational wind turbines as listed in **Section 15.7.1.8**. Due to their role in the defence of UK airspace, any identified effect of wind turbines on the ASACS radar systems that serve the airspace above the proposed Offshore Array Area may potentially reduce the capability of the ASACS Force. The nearest ADR to the Offshore Array is the TPS-77 (Type 92) ADR located at RRH Buchan, Aberdeenshire which is located on a bearing of approximately 255°/20 nm southwest of the proposed Offshore Array Area. RRH Brizlee Wood in Northumberland also operates a TPS-77 (Type 92) ADR and is located on a bearing of approximately 190°/130 nm south from the closest boundary point on the southwest of the proposed Offshore Array Area. Radar LoS analysis, **Volume ER.A.4, Annex 15.1: Radar Line of Sight Assessment** predicts that the operation of the Buchan ADR may be affected by the detection of operational wind turbines placed within the proposed Offshore Array Area. The Brizlee Wood ADR will theoretically not detect the majority of the Offshore Array at a blade tip height of 325 m; however, occasional detection cannot be ruled out in the southernmost part of the proposed Offshore Array Area (the closest to the radar location). During project development, and with a view to addressing Met Office responses regarding turbine heights in excess of 310 m AMSL (ODN), the maximum tip height proposed for the Salamander Project has been reduced to 310 m AMSL (ODN).

[6] Babcock Group Int also operates two specialist SAR aircraft to support the Oil and Gas industry from Aberdeen airport.

[7] HMRI promulgation does not predicate the flow of helicopter traffic. Whilst HMRIs have no airspace status and assume the background airspace classification within which they lie (in the case of the Northern North Sea, Class G), they are used by the air navigation service provider (NATS Ltd/ Aberdeen) and helicopter operators for flight planning and management purposes.

15.7.1.17 Leuchars Station PSR is located on a bearing of approximately 215°/90 nm from the closest boundary of the proposed Offshore Array Area; located outside of Leuchars ATC Area of Responsibility (AoR), which extends to around a 40 nm radius from the Leuchars Station PSR position. Within Class G airspace an ATS may be provided by NATS, or military controllers located at an ACC or AD controllers subject to suitable radar and radio coverage being available to them.

15.7.1.18 Military low flying activities take place in Class G airspace below 2,000 ft AMSL within defined onshore Low Flying Areas (LFA). The proposed Offshore Array Area is adjacent to LFA 14; and low flying activity also extends offshore in that area, therefore, military low flying is likely to take place above and around the proposed Offshore Array Area. The Applicant has engaged the MOD's Defence Infrastructure Organisation (DIO) team (who safeguard MOD infrastructure) throughout 2023, including through virtual meetings on 20/06/23 and 05/12/23. The Applicant has kept DIO informed regarding the development of the proposed Salamander Project and has identified a solution that will mitigate the impact that the Salamander WTGs will have upon the performance of the ADR located at RRH Buchan, which has been accepted by the MOD. The Applicant is currently engaging with the DIO with the aim of agreeing the wording of suitable consent conditions. The Applicant will enter into discussions with MOD Defence Equipment and Support (DE&S), aimed at securing a mitigation agreement, should consent be granted. The DIO has requested that aviation obstruction lighting is fitted to wind turbines in accordance with the ANO 2016 (as amended 2022, CAP 393). The fitment of aviation lighting will be detailed within a Lighting and Marking Plan (LMP) which will be produced and consulted on post-consent.

Met Office Radar

15.7.1.19 The Met Office safeguards its weather radar and provides site specific (radar) pre-planning advice for proposals sited in Met Office consultation zones. Met Office radar systems are safeguarded out to 11 nm (20 km). The nearest meteorological radar to the is located at Hill of Dudwick, Aberdeenshire, which is 25 nm (46 km) to the southwest of the proposed Offshore Array Area; inside the 200 nm Study Area. During project development, and with a view to addressing Met Office responses regarding turbine heights in excess of 310 m AMSL (ODN), the maximum tip height proposed for the Salamander Project has been reduced to 310 m AMSL (ODN).

15.7.2 Future Baseline

15.7.2.1 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment) Regulations 2007 require that "*an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge*" is included within the Environmental Impact Assessment Report. If the proposed Offshore Array Area does not come forward, an assessment of the future baseline conditions has been carried out and is described within this section.

15.7.2.2 It is difficult to define what the likely evolution of the aviation interests in the northern North Sea will be either with, or in the absence of the proposed Offshore Array Area. The Oil and Gas Authority (OGA) Annual Report and Accounts (OGA, 2022) reported a predicted decline in gas production and usage. Operators continue to find it difficult to predict production accurately as older fields mature and their reliability reduces. The OGA have studied energy integration "in which a range of opportunities in the United Kingdom Continental Shelf (UKCS) which have the potential to make a very significant 30%+ contribution towards the UK's overall net zero target, both through Carbon Capture and Storage (CCS) and through CCS plus hydrogen.

Offshore renewables (wind, wave and tidal) could well contribute a further 30%+ to the abatement required in 2050".

15.7.2.3 As old fields are decommissioned, helicopter use to those oil and gas platforms will decline; however, as helicopter support to offshore wind increases it is expected that there may be increased aviation activity as new offshore areas are developed to support net zero targets.

15.7.2.4 Based on the climate change projection scenario for the Salamander Project, the baseline environment for the Aviation and Radar assessment is not expected to change. The present airspace construct or usage, civil and military aviation, above and around the proposed Offshore Array Area is not expected to change significantly.

15.7.3 Summary of Baseline Environment

15.7.3.1 The key sensitivities identified as part of the baseline assessment are as follows:

- Aviation and radar systems; civil and military; and
- Civil and military low flying including HMRIs and SAR.

15.8 Limitations and Assumptions

15.8.1.1 The following limitations and assumptions have been identified for the Aviation and Radar (including Met Office weather radar):

- The data used in this chapter is the most up to date publicly available information which can be obtained from the data sources as cited. Data have also been provided through engagement with the stakeholders detailed in **Table 15-2** above.
- The results of the LoS analysis are considered to be conservative and are provided in order to establish the realistic worst-case possibility of potential significant impacts. Radar LoS results are theoretical in nature and analysis is based on an industry standard for establishing the impact to civil and military aviation radar systems from operational wind turbines.

15.8.2 Impacts Scoped Out of the Environmental Impact Assessment Report

15.8.2.1 The Aviation and Radar assessment covers all potential impacts identified during scoping, as well as any further potential impacts that have been highlighted as the EIA has progressed as outlined in **Section 15.11.**

15.8.2.2 However, following consideration of the baseline environment, the project description outlined in **Volume ER.A.2**, **Chapter 4: Project Description** and in line with the Scoping Opinion a number of impacts are not considered in detail within this EIAR, as illustrated in **Table 15-4**.

Table 15-4 Impacts scoped out of the Aviation and Radar assessment

Potential Impact	Project Aspect	Project Phase	Justification
Civil Airport (Aberdeen) and Military Aerodrome (Leuchars) IFPs	Offshore Array Area	Construction, Operation and Maintenance, Decommissioning	The proposed Offshore Array Area wind turbines are approximately 40 nm (74 km) to the northeast of Aberdeen Airport. **Volume ER.A.4, Annex 15.2: Aberdeen Airport IFP Assessment**, has determined that the presence of wind turbines placed in the proposed Offshore Array Area, at the maximum blade tip height of 325 m AMSL will not create physical obstacles to the civil airport IFPs. It can be inferred that, as military aerodromes are farther from the proposed Offshore Array Area, the presence of wind

Potential Impact	Project Aspect	Project Phase	Justification
			turbines placed in the proposed Offshore Array Area, at the maximum blade tip height of 325 m AMSL will not create physical obstacles to the military aerodrome IFPs.
Military ADR (Decommissioning)	Offshore Array Area	Decommissioning	Adverse effects on PSRs are only possible if the wind turbine blades are moving, therefore this impact is applicable to the construction (during commissioning) and operation and maintenance phases only.
Military Aerodrome ATC PSR	Offshore Array Area	Construction, Operation and Maintenance, Decommissioning	The initial desk-top review identified that wind turbines within the offshore project area will not be visible to any military ATC radars systems. Furthermore, preliminary RLoS analysis indicates that the Leuchars PSR will not theoretically detect operational wind turbines, at a maximum height of 325 metres (m), within the proposed Offshore Array Area. Furthermore, the proposed Offshore Array Area, which extends to around a 40 nm radius from the Leuchars PSR position, is located outside of Leuchars ATC AoR.
Civil Aerodrome ATC PSR	Offshore Array Area	Construction, Operation and Maintenance	Adverse effects on PSRs are only possible if the wind turbine blades are moving, therefore this impact is applicable to the construction (during commissioning) and operation and maintenance phases only.
Local airspace restrictions (Prohibited /Restricted /Danger Areas and PEXAs)	Offshore Array Area	Construction, Operation and Maintenance, Decommissioning	There are no military danger or training areas that will be affected by the proposed Offshore Array Area; it does not lie within, or underneath, any military PEXA. The two closest Danger Areas are D809(S) Moray Firth (South) and D613A, approximately 29 nm (50 km) to the northwest and 21 nm (40 km) to the south respectively.
Low flying (including UK SAR)	Offshore Array Area	Construction, Operation and Maintenance, Decommissioning	Embedded mitigation measures, as outlined **Table 15-5**, will be implemented prior to commencement of the construction phase. Therefore, any adverse impacts on military low flying and SAR helicopter operations will have been resolved prior to the operation and maintenance phase.
Offshore helicopter installation access	Offshore Array Area	Construction, Operation and Maintenance, Decommissioning	There are no offshore helicopter installations located within 9 nm (16 km), the CAA's recommended distance for wind farm developers to consult with the operators/owners of offshore helicopter installations (oil and gas platforms), of the proposed Offshore Array Area. The nearest offshore helicopter installation is the Buzzard platform, located 12 nm (22 km) to the northeast of

Potential Impact	Project Aspect	Project Phase	Justification
			the offshore project area. Helicopter procedures into this platform will not be affected by the proposed Offshore Development.
Met Office Radars	Offshore Array Area	Construction, Operation and Maintenance, Decommissioning	Met Office radars systems are safeguarded out to 11nm (20 km). The nearest meteorological radar is located at Hill of Dudwick which is 25 nm (46 km) to the west-south-west. The Project will therefore not have any adverse impact on any meteorological radars

15.8.3 Embedded Mitigation

15.8.3.1 The embedded mitigation relevant to the Aviation and Radar assessment is presented in **Table 15-5**.

Table 15-5 Embedded Mitigation for the Aviation and Radar assessment

Potential Impact and Effect	Mitigation ID	Mitigation	Project Aspect	Project Phase
Primary				
Wind turbines causing interference on rainfall radar systems	Co20	The maximum blade tip height is 310 m (above ODN) which has been reduced from 325 m (above ODN) proposed at scoping.	Offshore Array Area	Operation and Maintenance
Tertiary				
Low flying (including UK SAR) Satisfies regulatory aviation obstacle warning and lighting requirements	Co54	Approval and implementation of a Lighting and Marking Plan (LMP) in agreement with the Civil Aviation Authority (CAA), which will set out specific requirements in terms of aviation lighting to be installed on the wind turbines, as required under CAP 764, CAA Policy and Guidelines on Wind Turbines (Version 6, February 2016) and will include details of: - Lights and their shape, colour and character; and - Notifications and Inspections.	Offshore Array Area	Operation and Maintenance
General flight operations (including UK SAR)	Co41	CAA will be informed of the locations, heights and lighting status of the wind turbines, including estimated and actual dates of	Offshore Array Area	Construction

Potential Impact and Effect	Mitigation ID	Mitigation	Project Aspect	Project Phase
Satisfies regulatory aviation obstacle warning and lighting requirements		construction and the maximum heights of any construction equipment to be used, prior to the start of construction.		
General flight operations (including UK SAR) Satisfies regulatory aviation obstacle warning and lighting requirements	Co39	All structures of more than 91.4 m in height will be charted on aeronautical charts and reported to the Defence Geographic Centre (DGC), which maintains the UK's database of tall structures (Digital Vertical Obstruction File (DVOF)) at least ten weeks prior to construction.	Offshore Array Area	Construction
General flight operations (including UK SAR) Satisfies regulatory aviation obstacle warning and lighting requirements	Co40	Any temporary obstacles associated with wind farms which are of more than 91.4 m in height (e.g. construction infrastructure such as cranes and/or meteorological masts) are to be alerted to aircrews by means of the Notice to Airmen (NOTAM) system.	Offshore Array Area	Construction and Decommissioning
General flight operations (including UK SAR) Satisfies regulatory aviation obstacle warning and lighting requirements	Co31	An Emergency Response Cooperation Plan (ERCoP) will be developed through consultation with the Maritime Coastguard Agency (MCA) which will encompass appropriate risk assessments and designated evacuation plans for site personnel in the unlikely event of a fire breaking out on board vessels supporting the Offshore Development.	Offshore Array Area	Operation and Maintenance

15.8.3.2 The Salamander Project is in the process of agreeing a solution with the MOD that will mitigate the impact that the Salamander WTGs will have upon the performance of the ADR located at RRH Buchan[8]. A pre-construction plan ATCMS (**Volume ER.A.2, Chapter 1: Introduction**) developed post-consent, will describe

[8] On separate engagement, radar blanking, infill and a Transponder Mandatory Zone (TMZ) will be implemented, if required, to reduce wind turbine impact to NATS radar systems (Co44).

the process undertaken in reaching a Radar Mitigation Strategy Agreement and confirm that the agreement includes sufficient mitigation measures.

15.9 Project Design Envelope Parameters

15.9.1.1 Given that the realistic worst-case scenario is based on the design option (or combination of options) that represents the greatest potential for change, as set out in **Volume ER.A.2, Chapter 4: Project Description**, a confidence can be taken that development of any alternative options within the Project Design Envelope parameters will give rise to no effects greater or worse than those assessed in this impact assessment. The Project Design Envelope parameters relevant to the Aviation and Radar assessment are outlined in **Table 15-6**.

Table 15-6 Design Envelope parameters for Aviation and Radar

Potential Impact and Effect	Project Design Envelope parameters
Construction	
Creation of physical obstacle to aircraft operations	Maximum physical obstruction from the tallest wind turbine to aviation operations due to vertical extent (and number) of infrastructure AMSL within the proposed Offshore Array Area. • Offshore construction period has a window of 2.5 years, however, construction will only take place over a period of 18 months (excluding pre-construction surveys); • During the construction phase the potential creation of physical obstacles to aircraft operations will be gradual as the presence of infrastructure increases, reaching the realistic worst-case scenario outlined below in the operations and maintenance phase. The maximum design scenario in terms of the presence of infrastructure would be on the completion of construction, during the operations and maintenance phase.
Operation and Maintenance	
Creation of physical obstacle to aircraft operations	Maximum physical obstruction from the tallest wind turbine to aviation operations due to vertical extent (and number) of infrastructure AMSL within the proposed Offshore Array Area. • Operational lifetime of up to 35 years • Construction of up to seven wind turbines with a maximum blade tip height of 310m AMSL (ODN).
Wind turbines causing interference on civil and military PSR systems	Controllers may be unable to provide an effective surveillance service due to interference on radar displays.

Potential Impact and Effect	Project Design Envelope parameters
	Impact duration present during operations and maintenance. Maximum number and height of wind turbines is the realistic worst-case as it provides the maximum potential interference to radar propagation in the area. • Operational lifetime of up to 35 years. • Construction of up to seven wind turbines with a maximum blade tip height of 310m AMSL (ODN).
Wind turbines causing interference on Met Office rainfall radar systems	Wind turbines have been shown to have detrimental effects on the performance of Met Office weather radars. Impact duration present during operations and maintenance phase. Maximum number and height of wind turbines is the realistic worst-case as it provides the maximum potential interference to radar propagation in the area. • Operational lifetime of up to 35 years. • Construction of up to seven wind turbines with a maximum blade tip height of 310m AMSL (ODN).
Decommissioning	
Creation of physical obstacle to aircraft operations	Maximum physical obstruction from the tallest wind turbine to aviation operations due to vertical extent (and number) of infrastructure AMSL within the proposed Offshore Array Area. • During decommissioning, creation of physical obstacles to aircraft operations would gradually decrease from the operational maximum design scenario as structures are removed.

15.10 Assessment Methodology

15.10.1.1 **Volume ER.A.2, Chapter 6: EIA Methodology** sets out the general approach to the assessment of significant effects that may arise from the Salamander Project.

15.10.1.2 Whilst **Volume ER.A.2, Chapter 6: EIA Methodology** provides a general framework for identifying impacts and assessing the significance of their effects, in practice the approaches and criteria applied across different topics vary.

15.10.1.3 The proposed approach to the Aviation and Radar assessment that has been addressed in the EIAR is outlined below.

15.10.1.4 The approach to determining the significance of effects is a two-stage process that involves defining the magnitude of the impact and the sensitivity of the receptor. The significance of an effect is determined based on the sensitivity of a receptor (in aviation terms based upon standards, regulation and best practice guidance (defined in the CAA CAPs)) and the magnitude of an impact. This section describes the criteria

applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors.

15.10.1 Assessment Criteria

15.10.1.1 The criteria for determining the significance of effects is a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors (**Table 15-7** and **Table 15-8**). This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors. The terms used to define magnitude and sensitivity are based on those which are described in further detail in **Volume ER.A.2, Chapter 6: EIA Methodology** of the EIA.

Table 15-7 Definition of receptor sensitivity for Aviation and Radar

Sensitivity	Definition
High	The receptor has a very low capacity to accommodate a particular effect with a low ability to recover or adapt.
Medium	The receptor has a low capacity to accommodate a particular effect with a low ability to recover or adapt.
Low	The receptor has some tolerance to accommodate a particular effect or will be able to recover or adapt.
Negligible	The receptor is generally tolerant and can accommodate a particular effect without the need to recover or adapt.

Table 15-8 Definition of magnitude of impact for Aviation and Radar

Magnitude of Effect	Definition
No Change	There is no change or changes are indistinguishable from the existing baseline environment as a result of the Salamander Project.
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. Short-term, intermittent, and reversible change, which is unlikely to occur.
Low	Very minor loss of, or alteration to, one (or maybe more) key characteristics, features or elements; noticeable change in attributes, quality or vulnerability. Short- to medium-term though reversible change, which could possibly occur.
Medium	Minor loss of, or alteration to, one (or maybe more) key characteristics, features or elements; measurable change in attributes, quality or vulnerability. Long-term though reversible change, which is likely to occur.
High	Loss of resource, but not affecting integrity of the resource; partial loss of or damage to key characteristics, features or elements. Permanent/irreplaceable change, which is likely to occur.

15.10.2 Evaluation of Significance

15.10.2.1 The consideration of magnitude of a potential impact and sensitivity of the aviation or radar receptor determines, qualitatively and informed by expert judgement, the significance of the positive and negative impacts.

15.10.2.2 **Table 15-9** sets out how the magnitude of impact and the sensitivity of the receptor is combined to provide an assessment of effect significance.

Table 15-9 Significance of effect

Significance of effect		Sensitivity of receptor			
		Negligible	*Low*	*Medium*	*High*
Magnitude (of effect)	*Negligible*	Negligible	Negligible	Negligible	Negligible
	Low	Negligible	Negligible	Minor	Minor
	Medium	Negligible	Minor	Moderate	Moderate
	High	Negligible	Minor	Moderate	Major

15.10.2.3 The categories provide a threshold to determine whether or not significant effects might result from the Salamander Project, with 'Moderate' and 'Major' effects being defined as 'significant' in EIA terms, as highlighted in red and amber. A typical categorisation is shown below (**Table 15-10**), noting that effects can be either beneficial or adverse.

Table 15-10 Definition of significance of effect

Category	Definition of significance effect
Negligible	No detectable change to the environment or receptor resulting in no significant effect.
Minor	A detectable but non-material change to the environment or receptor, resulting in no significant effect or small-scale temporary changes.
Moderate	A material but non-fundamental change to the environment or receptor, resulting in a significant effect.
Major	A fundamental change to the environment or receptor, resulting in a significant effect.

15.11 Impact Assessment

15.11.1 Construction

15.11.1.1 Under the construction phase, the following potential impact has been assessed:

- Creation of physical obstacle to aircraft operations.

Creation of Physical Obstacle to Aircraft Operations

Magnitude of Impact

15.11.1.2 Wind turbine construction infrastructure AMSL could pose a physical obstruction to flight operations in the vicinity and specifically to military and other low flying operations including SAR and helicopters operating in the support of the offshore oil and gas industries. Construction infrastructure and erected wind turbines 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 associated infrastructure may present a potential obstacle collision risk to aircraft flight operations.

15.11.1.3 A range of adopted measures, in the form of appropriate notification to aviation stakeholders, regularity of layout and lighting and marking to minimise effects to aviation flight operations would apply to the proposed Offshore Array Area. These will comply with current guidelines, as outlined in **Table 15-1**, and will be agreed with the appropriate stakeholders. 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 wind turbines and will be aware through notification procedures of the proposed Offshore Array Area. Furthermore, when flying in Instrument Meteorological Conditions (IMC) pilots might be utilising on board radar, where available, which detects obstructions and be under the control of ATC with an appropriate level of radar service and flying at an altitude which provides the required separation from obstacles below them.

15.11.1.4 The Impact is predicted to be of regional spatial extent (in a small area), short-term duration, intermittent, but low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **Negligible**, a very slight change from the baseline conditions.

Sensitivity of the Receptor

15.11.1.5 The MOD, NATS and ATC service providers (Aberdeen Airport) have responded to the Salamander EIA Scoping Report (SBES, 2023) with regard to the potential for the proposed Offshore Array Area to create an obstruction to aviation activities conducted in the vicinity of construction infrastructure. Routes to mitigation are being discussed with NATS and MOD. The ability of the MOD, NATS and Aberdeen Airport to operate aircraft in the Aberdeen offshore environment could be impacted by the presence of physical obstructions.

15.11.1.6 The low flying aircraft operators (MOD and predominantly operators from Aberdeen Airport) are deemed to be of low vulnerability, high recoverability, and high value. The sensitivity of the receptor is therefore considered to be **Medium**.

Significance of the Effect

15.11.1.7 Overall, the magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **Negligible** significance, which is **Not Significant** in EIA terms.

15.11.2 Operation and Maintenance

15.11.2.1 Under the operation and maintenance phase, the following potential impacts have been assessed:

- Creation of physical obstacle to aircraft operations;
- Wind turbines causing interference on civil and military PSR Systems; and
- Wind turbines causing interference on Met Office rainfall radar systems.

Creation of Physical Obstacle to Aircraft Operations

Magnitude of Impact

15.11.2.2 Wind turbine infrastructure AMSL could pose a physical obstruction to flight operations in the vicinity and specifically to military and other low flying operations including SAR and helicopters operating in the support of the offshore oil and gas industries. Erected, operational wind turbines can be difficult to see from the air, particularly in poor meteorological conditions leading to potential increased obstacle collision risk.

15.11.2.3 A range of adopted measures (primary and tertiary mitigation), in the form of appropriate notification to aviation stakeholders, regularity of layout and lighting and marking to minimise effects to aviation flight operations would apply to the proposed Offshore Array Area. These will comply with current guidelines, as outlined in **Table 15-1**, and will be agreed with the appropriate stakeholders. 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 wind turbines and will be aware through notification procedures of the proposed Offshore Array Area. Furthermore, when flying in IMC pilots might be utilising on board radar, where available. This detects obstructions and allows pilots to be under the control of ATC with an appropriate level of radar service and flying at an altitude which provides the required separation from obstacles below them.

15.11.2.4 The impact is predicted to be of local spatial extent (in a small area; with a small number of turbines), long-term duration, but low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **Low**, a minor change from the baseline conditions.

Sensitivity of the Receptor

15.11.2.5 The MOD, NATS and ATC service providers have responded to the Salamander EIA Scoping Report (SBES, 2023) with regard to the potential for the proposed Offshore Array Area to create an obstruction to aviation activities conducted in the vicinity of construction infrastructure.

15.11.2.6 The low flying aircraft operators, in being able to use the northern North Sea, are deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be **Medium**.

Significance of the Effect

15.11.2.7 Overall, the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **Minor** significance, which is **Not Significant** in EIA terms.

Wind Turbines Causing Interference on Civil and Military PSR Systems

Magnitude of Impact

15.11.2.8 The operational wind turbine infrastructure AMSL in the proposed Offshore Array Area would be theoretically detectable by the NATS Allanshill and Perwinnes PSR and MOD (RRH) Buchan ADR (**Volume ER.A.4, Annex 15.1: Radar Line of Sight Assessment** Wind turbines detectable by a PSR/ADR system might degrade the system by creating false targets, reduce system sensitivity, create radar shadowing behind the wind turbines and saturate the radar receiver leading to clutter potentially concealing real aircraft targets.

15.11.2.9 The ability of NATS, airport authorities and the MOD to accurately use their respective radar systems for the provision of an ATS (and State defence capabilities in the case of MOD AD), could be impacted by the

presence of wind turbine interference (**Section 15.7.1.8**) and the production of radar clutter on radar displays.

15.11.2.10 All radar operators aim to ensure 'clutter free' radar to continue to deliver a safe and effective ATS and to monitor UK airspace. Without mitigation, the impact created by the detection of operational wind turbines is predicted to be of regional spatial extent and of long-term duration, repetitious, and continuous. It is predicted that the impact will affect the receptor directly and the magnitude of effect is considered to be **Medium**, a partial change to key elements / features of the baseline conditions.

Sensitivity of the Receptor

15.11.2.11 NATS, MOD and ATC service providers have responded to scoping regarding the potential for the proposed Offshore Array Area to create interference to PSR and ADR. Routes to mitigation are being discussed with NATS and MOD. The ability of NATS, MOD and airport authorities to accurately use the affected radar systems for the provision of an ATS, or for the provision of air defence capability, could be impacted in the presence of wind turbine interference and the production of radar clutter onto radar displays.

15.11.2.12 Both NATS and the MOD aim to ensure 'clutter free' radar to continue to deliver a safe and effective ATS. MOD require also a 'clutter free' radar environment to provide air defence security. The radar stakeholders are considered to be of high vulnerability, low recoverability and high value. The sensitivity of these receptors is therefore considered to be **High**.

Significance of the Effect

15.11.2.13 Overall, the magnitude of the impact is deemed to be medium, and the sensitivity of the receptor is high. The effect will, therefore, be of **Moderate** significance, which is **Significant** in EIA terms.

Mitigation and Residual Effect

NATS PSR

15.11.2.14 In the case of the NATS radar systems impacted (Allanshill and Perwinnes PSRs) previous acceptable mitigation of wind turbine impact to these systems has been achieved through agreement by NATS to radar blanking and infill. The mitigation solution will be subject to commercial agreement between the Applicant and NATS and will be implemented by radar blanking of the affected areas of the Allanshill and Perwinnes PSRs. This will remove all wind turbine radar returns. However, all other radar returns in the blanked area will also be removed. To resolve this, radar data from another NATS radar asset, not yet defined (which does not detect the wind turbines), will 'infill' the 'blanked' areas ensuring 'clutter free' radar coverage above the proposed Offshore Array Area or the use of a TMZ in the same area. The Applicant has engaged with the NATS Safeguarding (who safeguard NATS infrastructure) throughout 2023, and through a virtual meeting on 08/02/24. The Applicant has kept NATS informed regarding the development of the proposed Salamander Project; however, NATS has not identified a solution that will mitigate the impact that the Salamander WTGs will have upon the performance of the Allanshill and Perwinnes PSRs.

15.11.2.15 A programme (Programme B) on civil aviation has been established including a new 3-in-1 study on Layout, Stealth and Data led by the ORE Catapult. Working with the DfT, DESNZ, MOD, the CAA, and NATS; OWIC is looking to establish a strategic solution around offshore TMZ and publish a study on the future requirements for offshore aviation CNS. The Applicant will enter into discussions with NATS, aimed at securing a mitigation agreement, should consent be granted. Consultation with NATS continues with the expectation that, if required, a technical mitigation solution will be agreed, which will reduce the magnitude of the impact to

low; therefore, and when in place the residual effect to the impacted NATS PSR systems will be of **Minor** significance.

15.11.2.16 An ATS provider such as NATS and the airport authorities affected (Aberdeen) may accept that although an impact may be present, it can be managed and accepted by implementing operational mitigation in airspace that is not regularly used for the separation of aircraft. However, in the airspace in which the proposed Offshore Array Area is located, operational acceptance of the effect created is unlikely to be acceptable to all ATC providers without mitigation. This is because portions of airspace may be more important to some ATC establishments than others, due to the role and responsibility of ATC provision allocated to them.

Ministry Of Defence Buchan Air Defence Radar

15.11.2.17 In the case of RRH Buchan, previous acceptable mitigation of wind turbine impact to the MOD ADR systems has been achieved through agreement by MOD of the use of a Non-Auto Initiation Zones (NAIZ)[9]. The Applicant has engaged the MOD's DIO team throughout 2023, including through virtual meetings on 20/06/23 and 05/12/23. The Applicant has kept DIO informed regarding the development of the proposed Salamander Project and has identified a potential solution that will mitigate the impact that the Salamander WTGs will have upon the performance of the AD radar located at RRH Buchan, which has been accepted by the MOD. The Applicant is currently engaging with the DIO with the aim of agreeing the wording of suitable consent conditions. The Applicant will continue discussions with MOD (DE&S), aimed at securing a mitigation agreement, should consent be granted; therefore, once this mitigation agreement is in place the residual effect to the impacted MOD ADR system will be of **Minor** significance.

Post-secondary Mitigation Significance of Effect

15.11.2.18 The previous paragraphs describing mitigation and residual effect provide an overview of potential technical radar mitigation techniques which may be applicable to impacted radar systems. Further engagement and agreement will be required with the respective radar receptor on the mitigation solution to be utilised. With mitigation implemented; the overall magnitude of the impact would be deemed to be low with the sensitivity of the receptor considered as high. The effect would then be of **Minor** significance, which is **Not Significant** in EIA terms.

Wind Turbines Causing Interference on Met Office Rainfall Radar Systems

Magnitude of Impact

15.11.2.19 The operational wind turbine infrastructure greater than 310 m AMSL (ODN) in the proposed Offshore Array Area would be detectable by the Met Office Hill of Dudwick weather radar. Wind turbines detectable by a weather radar system might degrade the system by creating false targets ('clutter' returns), obscuring real precipitation signals.

15.11.2.20 The ability of the Met Office to accurately use its weather radar systems could be impacted by the presence of wind turbine interference (**Section 15.7.1.8**) and the production of radar clutter on radar displays. This could affect the ability to provide advance warning of severe weather. It could also preclude provision of real-time information that supports the continued operation of military and civilian aviation and the wider

[9] Non-Auto Initiation Zones (NAIZ) is a zone where a radar ignores interference. When implemented interference is rejected whilst genuine targets (aircraft) are displayed.

UK (as part of the UK Weather Radar Network), including coordination with the Scottish Environment Protection Agency (SEPA).

15.11.2.21 The Met Office aims to ensure 'clutter free' radar to continue to deliver an effective service. Without mitigation, the impact created by the detection of operational wind turbines is predicted to be of regional spatial extent and of long-term duration, repetitious, and continuous. It is predicted that the impact will affect the receptor directly and the magnitude of effect is considered to be **Low**, a minor shift away from the baseline conditions.

Sensitivity of the Receptor

15.11.2.22 The Met Office has responded to the Salamander EIA Scoping Report (SBES, 2023) regarding the potential for the proposed Offshore Array Area to create interference to weather radar. The ability of the Met Office to accurately use its weather radar systems for the provision of real-time weather information could be impacted in the presence of wind turbine interference and the blocking of weather radar data.

15.11.2.23 The Met Office aims to ensure 'clutter free' radar data within the officially safeguarded 20 km zone to continue to deliver an effective service. The radar stakeholder is considered to be of low vulnerability, low recoverability but high value. The sensitivity of this receptor is therefore considered to be **Medium**.

Significance of the Effect

15.11.2.24 Overall, the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is medium. The effect will, therefore, be of **Minor** significance, which is **Not Significant** in EIA terms.

Mitigation and Residual Effect

15.11.2.25 The Met Office might accept that although an impact may be present, that it can be managed and accepted in the airspace, 46 km from the Hill of Dudwick rainfall radar, in which the proposed Offshore Array Area is located.

15.11.2.26 During project development, and with a view to addressing Met Office responses regarding turbine heights in excess of 310 m AMSL (ODN), the maximum tip height proposed for the Salamander Project has been reduced to 310 m AMSL (ODN).

15.11.3 Decommissioning

15.11.3.1 Under the decommissioning phase, the following potential impact has been assessed:

- Creation of physical obstacle to aircraft operations.

15.11.3.2 At this stage, the realistic worst-case scenario envelope during decommissioning is considered equal to the realistic worst-case scenario during construction, with the exception of vessel movements, where more detailed information is available. Noting this, it is assumed that the realistic worst-case scenario will involve full removal of all infrastructure placed during the construction phase. This assumption is subject to best practice methods and technology appropriate at the time of decommissioning.

Creation of Physical Obstacle to Aircraft Operations

Magnitude of Impact

15.11.3.3 During the decommissioning phase, the presence and movement of decommissioning infrastructure may present a potential collision risk to aircraft in the vicinity and specifically to low flying aircraft. A range of measures will be adopted as part of the proposed Offshore Array Area to minimise environmental effects would apply to the decommissioning phase. These will comply with current guidelines, as outlined in **Table**

15-1 , and will be agreed with the appropriate stakeholders. 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 wind turbines and decommissioning infrastructure and will be aware through notification procedures of the proposed Offshore Array Area. When flying in IMC pilots will be utilising on board radar, where available, which detects obstructions and be under the control of ATC with an appropriate level of radar service and flying at an altitude which provides the required separation from obstacles below them. It is expected that any mitigation implemented will remain in place until the last wind turbine has been removed.

15.11.3.4 The Impact is predicted to be of regional spatial extent (in a small area), short-term duration, intermittent, but low reversibility (but the extent of removal vessels and equipment will diminish to zero over time). It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **Negligible**, a very slight change from the baseline conditions.

Sensitivity of the Receptor

15.11.3.5 The MOD, NATS and ATC service providers have responded to the Salamander EIA Scoping Report (SBES, 2023) with regard to the potential for the proposed Offshore Array Area to create an obstruction to aviation activities conducted in the vicinity of construction infrastructure.

15.11.3.6 The low flying aircraft operators are deemed to be of low vulnerability, high recoverability, and high value. The sensitivity of the receptor is therefore considered to be **Medium**.

Significance of the Effect

15.11.3.7 Overall, the magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **Negligible** significance, which is **Not Significant** in EIA terms.

15.11.4 Summary of Impact Assessment

15.11.4.1 A summary of the impacts and effects identified for the Aviation and Radar assessment is outlined in **Table 15-11**.

Table 15-11 Summary of Impacts and Effects for Aviation and Radar

Salamander Project Activity and Impact	Project Aspect	Embedded Mitigation	Receptor	Sensitivity	Magnitude	Significance of Effect	Additional Mitigation	Residual Significance of Effect	Significance of Effect in EIA Terms
Construction									
Creation of physical obstacle to aircraft operations	Offshore Array Area	Co31, Co39, Co40, Co41 and Co54	MOD, NATS and ATC service providers Low flying operations	Medium	Negligible	Negligible	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Section 15.8.3** as it was concluded that the effect was Not Significant.	Negligible	Not Significant
Operation and Maintenance									
Creation of physical obstacle to aircraft operations	Offshore Array Area	Co31, Co39, Co40, Co41 and Co54	MOD, NATS and ATC service providers Low flying operations	Medium	Low	Minor	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Section 15.8.3** as it was concluded that the effect was Not Significant.	Minor	Not Significant
Wind turbines causing interference on civil and military PSR systems	Offshore Array Area	Co20	MOD, NATS and ATC service providers	High	Medium	Moderate	NATS Radar blanking, infill and a TMZ will be implemented, if required, to reduce wind turbine impact to NATS radar systems.	Minor	Not Significant

Salamander Project Activity and Impact	Project Aspect	Embedded Mitigation	Receptor	Sensitivity	Magnitude	Significance of Effect	Additional Mitigation	Residual Significance of Effect	Significance of Effect in EIA Terms
							MOD The Salamander Project is in the process of agreeing a solution with the MOD that will mitigate the impact that the Salamander WTGs will have upon the performance of the ADR located at RRH Buchan.		
Wind turbines causing interference on rainfall radar systems	Offshore Array Area	Co20	Met Office	Medium	Low	Minor	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Section 15.8.3** as it was concluded that the effect was Not Significant.	Minor	Not Significant
Decommissioning									
Creation of physical obstacle to aircraft operations	Offshore Array Area	Co31, Co39, Co40, Co41 and Co54	MOD, NATS and ATC service providers Low flying operations	Medium	Negligible	Negligible	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Section 15.8.3** as it was concluded that the effect was Not Significant.	Negligible	Not Significant

15.12 Mitigation and Monitoring

15.12.1.1 The additional mitigation and monitoring as a result of the Aviation and Radar assessment is presented in **Table 15-12**.

Table 15-12 Additional mitigation and monitoring for the Aviation and Radar assessment

Potential Impact and Effect	Mitigation ID	Mitigation	Project Aspect	Project Phase
Remove wind turbine generated unwanted radar returns 'clutter' Satisfies regulatory service provision and aviation safe separation requirements	Co42	Radar blanking, infill and a TMZ will be implemented, if required, to reduce wind turbine impact to NATS radar systems.	Offshore Array Area	Operation and Maintenance
Remove wind turbine generated unwanted radar returns 'clutter' Satisfies military regulatory service provision and airspace security requirements	Co43	The Salamander Project is in the process of agreeing a solution with the MOD that will mitigate the impact that the Salamander WTGs will have upon the performance of the ADR located at RRH Buchan.	Offshore Array Area	Operation and Maintenance

15.13 Cumulative Effect Assessment

15.13.1.1 A Cumulative Effects Assessment (CEA) has been made based on existing and proposed developments in the Study Area **Volume ER.A.4, Annex 6.2: Cumulative Effects Assessment Technical Annex**. The approach to the CEA is described in **Volume ER.A.4, Annex 6.2: Cumulative Effects Assessment Technical Annex**. Cumulative effects are defined as those effects on a receptor that may arise when the development is considered together with other projects.

15.13.1.2 The maximum spatial extent of potential effects on Aviation and Radar as identified within this chapter are determined by a range of 40 km for physical obstacles at low level and 100 km for radar effects within the Aviation and Radar Study Area. Areas beyond this range are unlikely to experience any measurable change. As such, only plans or projects with potential to overlap spatially or temporally will be included in the cumulative assessment.

15.13.1.3 Cumulative assessment has considered other projects at the following stages of development:

- Under construction;

- Permitted application;
- Submitted application;
- Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact; and
- Scoping report has been submitted and is in the public domain.

15.13.1.4 This approach is adopted to provide a clear assessment of the Offshore Array Area Generation Assets alongside other projects, plans and activities. The potential for cumulative effects, of the creation of an aviation obstacle and those effects created by the radar detection of the Offshore Array Area Generation Assets which exist to those radar systems that will also detect the wind farm developments listed in **Table 15-13.**

Table 15-13 List of other projects, plans and activities considered within the Cumulative Effects Assessment for aviation and radar

Development	Type	Project Phase	Closest Distance from Project		Reason for inclusion
			Array	*ECC*	
Green Volt Floating Offshore Wind Farm	Floating Offshore Wind Farm	Consent Application Submitted	33.6 km	38.9 km	The Green Volt project is included as it is scheduled to be operational by 2027. The Green Volt array is 33.6 km and 38.9 km from the Salamander Project's Offshore Array Area and ECC respectively. The Green Volt export cable is 0.3 km and overlaps the Salamander Project's Offshore ECC.
MarramWind Offshore Wind Farm	Floating Offshore Wind Farm	Scoping Submitted	47 km	59 km	The MarramWind array is 47 km and 59 km of the Offshore Array and ECC respectively. The MarramWind export cable corridor search area is 1.5 km from the Offshore Array Area and overlaps the Offshore ECC. Distances provided for MarramWind are based on the ECC area of search and should not be considered necessarily indicative of the route that will subsequently be proposed.
Muir Mhòr Offshore Wind Farm and associated export cable	Floating Offshore Wind Farm	Scoping Submitted	28.4 km	30.9 km	The Muir Mhòr project is included as the construction period could overlap with Salamander. The Muir Mhòr project's array is 28.4 km and 30.9 km from the Offshore Array and ECC respectively. The Muir Mhòr export cable corridor is 5.53 km from the Offshore Array Area and overlaps the Offshore ECC.
Caledonia Offshore Wind Farm	Floating Offshore Wind Farm	Scoping Submitted	80.3 km	62.9 km	The Caledonia project's array is 80.3 km and 62.9 km from the Offshore Array Area and Offshore ECC respectively.
Ossian Offshore Wind Farm	Floating Offshore Wind Farm	Scoping Submitted	79.5 km	79.5 km	The Ossian project's array is 79.5 km from the Offshore Array Area and Offshore ECC.

Development	Type	Project Phase	Closest Distance from Project		Reason for inclusion
			Array	*ECC*	
Morven Offshore Wind Farm	Offshore Wind Farm	Scoping Submitted	74.9 km	74.2 km	This project's array is 74.9 km and 74.2 km from the Offshore Array Area and Offshore ECC respectively.
Buchan Floating Offshore Wind Farm	Floating Offshore Wind Farm	Scoping Submitted	66.3 km	69.3 km	The Buchan project's array is 66.3 km and 69.3 km from the Offshore Array Area and Offshore ECC respectively. The Buchan project's ECC is 1.44 km from the Offshore Array and overlaps with the Offshore ECC.

15.13.1.5 An assessment of the potential impacts which may give rise to significant effects are considered in this section. Certain impacts assessed for the project alone are not considered in the cumulative assessment due to:

- The highly localised nature of the impacts (i.e. they occur entirely within the Offshore Array Area);
- Management measures in place for the WTGs will also be in place on other projects reducing their risk of occurring;
- Where the potential significance of the impact from the WTGs alone has been assessed as negligible; and
- A lack of data or confidence in data preventing meaningful assessment.

15.13.1.6 The impacts excluded from the CEA for the above reasons are as follows:

- Wind turbines creating an impact to offshore helicopter operations to oil and gas platforms; and
- Impact to IFPs.

15.13.1.7 Therefore, the impacts that are considered in the CEA are as follows:

- Creation of physical obstacle to aircraft operations; and
- Wind turbines causing interference on civil and military primary surveillance radar systems.

15.13.1.8 Overall, it is concluded that, arising from the proposed Offshore Array Area Generation Assets alongside other projects/plans:

- Creation of physical obstacle to aircraft operations. The nearest offshore wind development is over 10 km (and again of small numbers of turbines) With primary and tertiary mitigation in place on all offshore arrays the effect is expected therefore, to be of **minor** significance, which is not significant in EIA terms.
- Wind turbines causing interference on civil and military PRS systems. It is likely that other offshore wind developments are already mitigated, or receiving mitigation, against the effect to aviation PSRs. However, radar detectability of wind turbines does not automatically provide justification for an objection from radar stakeholders. Other factors will determine the nature and severity of the operational impact on the receptor, including airspace structure and its operational significance to the aviation stakeholder range of the array from the radar source as well as air traffic patterns and procedures in the region. The Cumulative Impact would be of wider regional special extent. However, with commonality of radar mitigation in place the effect is expected to be of **minor** significance, which is not significant in EIA terms.

15.14 Assessment of Impacts Cumulatively with the Onshore Development

15.14.1.1 The Onshore Development components are summarised in **Volume ER.A.2, Chapter 4: Project Description.** These Project aspects have been considered in relation to the impacts assessed within this chapter.

15.14.1.2 It is not anticipated that there will be any additional impacts from the Onshore Development on Aviation and Radar receptors as the Landfall is over 40 km from the proposed Offshore Array Area Generation Assets and there are no above ground associated high-speed moving parts to affect aviation PSR.

15.15 Transboundary Effects

15.15.1.1 Transboundary effects are defined as effects that extend into other European Economic Area (EEA) states. These may occur from the Salamander Project alone, or cumulatively with other plans or projects.

15.15.1.2 A screening of transboundary impacts has been carried out and has identified that there was no potential for significant transboundary effects with regard to Aviation and Radar from the proposed Offshore Array Area Generation Assets upon the interests of other states.

15.16 Inter-related Effects

15.16.1.1 The following assessment considers the potential for inter-related effects to arise across the three project phases (i.e. project lifetime effects) as well as the interaction of multiple effects on a receptor (i.e. receptor-led effects).

- Project lifetime effects are considered to be effects that occur throughout more than one phase of the project, (construction, operation and maintenance, and decommissioning) to interact to potentially create a more significant effect on a receptor, than if just assessed in isolation in these three key project stages (e.g. construction phase, operational phase and decommissioning).
- Receptor-led effects involve spatially or temporal interaction of effects, to create inter-related effects on a receptor or receptor group. Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

15.16.1.2 The significance of the individual effects, as determined in **Section 15.11** is presented herein for each receptor group. A descriptive assessment of the scope for these individual effects to interact to create a different or greater effect has then been undertaken. This assessment incorporates qualitative and, where reasonably possible, quantitative assessments. It should be noted that the following assessment does not assign significance of effect for inter-related effects; rather, any inter-related effects that may be of greater significance than the individual effects acting in isolation on a given receptor are identified and discussed.

15.16.1.3 There are no inter-related effects that are of greater significance than those assessed in isolation.

15.16.1.4 It is important to note that the inter-related effects assessment considers only effects produced by the offshore elements of the Salamander Project and not from other projects, which are considered within **Volume ER.A.4, Annex 6.2: Cumulative Effects Assessment Technical Annex.**

15.17 Conclusion and Summary

15.17.1.1 Information on Aviation and Radar within the Aviation and Radar Study Area was collected through desktop review, scoping response, and engagement. No site-specific surveys were undertaken for Aviation and Radar. This EIAR chapter:

- Outlined the existing environmental baseline determined from assessment of publicly available data and stakeholder engagement;
- Presented the potential environmental impacts and resulting effects arising from the Salamander Project on Aviation and Radar receptors;
- Identified mitigation measures designed to prevent, reduce, or offset adverse effects and enhance beneficial effects on the environment; and
- Identified any uncertainties or limitations in the methods used and conclusions drawn from the compiled environmental information.

15.17.1.2 Residual effects were categorised, with appropriate mitigation in place as minor or negligible . As mitigation will have been required for obstacle awareness and warning, and those radar systems which are affected by

operational and planned projects, no obstacle and radar cumulative effect will be apparent and therefore with mitigation in place the residual effect will be minor which is not significant in EIA terms for all scenarios. No monitoring is therefore considered necessary.

15.18 References

Civil Aviation Authority (CAA) (2016) Civil Aviation Publication (CAP) 764 Policy and Guidelines on Wind Turbines. Available online at: http://publicapps.caa.co.uk/MODalapplication.aspx?catid=33&pagetype=65&appid=11&MODe=detail&id=5609.

CAA (CAA) (2021) The Air Navigation Order.

CAA CAP 168 Licensing of Aerodromes (CAA) (2022). Available online at: https://publicapps.caa.co.uk/MODalapplication.aspx?appid=11&MODe=detail&id=6114.

CAA CAP 437 Standards for Offshore Helicopter Landing Areas (CAA) (2021). https://publicapps.caa.co.uk/MODalapplication.aspx?appid=11&MODe=detail&id=523.

CAA CAP 670 Air Traffic Services Safety Requirements (CAA) (2019). https://publicapps.caa.co.uk/MODalapplication.aspx?catid=1&pagetype=65&appid=11&MODe=detail&id=9124.

CAA CAP 032 UK Aeronautical Information Publication (CAA) (2022b). https://publicapps.caa.co.uk/MODalapplication.aspx?catid=1&pagetype=65&appid=11&MODe=detail&id=223.

IEMA (2016) Environmental Impact Assessment. Guide to Delivering Quality Development. Available online at: https://www.iema.net/download-document/7014.

Marine Directorate - Licensing Operations Team (MD-LOT) (2023). Scoping Opinion adopted by the Scottish Ministers under: The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017, The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, The Marine Works (Environmental Impact Assessment) Regulations 2007 and Electricity Act 1989 Salamander Offshore Wind Farm. 21 June 2023. https://marine.gov.scot/node/24085 [Accessed 14/11/2023].

Maritime and Coastguard Agency (MCA) Safety of Navigation Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response. (MCA) (2021). Available online at: https://www.gov.uk/government/publications/mgn-654-mf-offshore-renewable-energy-installations-orei-safety-response.

Ministry of Defence (MOD) (2022) Military Aeronautical Information Publication (Mil AIP).

Oil and Gas Authority (OGA) (2022) Oil and Gas Authority Annual Report and Accounts 2021–22. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1090783/oga-nsta-annual-report-accounts-2021-2022-web-optimised.pdf

Scottish Government, 2015. Scotland's National Marine Plan. Available online at: *https://www.gov.scot/publications/scotlands-national-marine-plan/*

Scottish Government, 2023. Draft Energy Strategy and Just Transition Plan. Available online at: *https://www.gov.scot/publications/draft-energy-strategy-transition-plan/*

Simply Blue Energy (Scotland) Ltd. (SBES) (2023). Salamander Offshore Wind Farm, Environmental Impact Assessment Scoping Report. Available online at: https://marine.gov.scot/sites/default/files/salamander_offshore_wind_farm_-_scoping_report.pdf.

The Institute of Environmental Management and Assessment (IEMA) (2016) Environmental Impact Assessment Guide to Delivering Quality Development.