NORTH FALLS

Offshore Wind Farm

ENVIRONMENTAL STATEMENT

Chapter 17 Aviation and Radar

Document Reference:	3.1.19
Volume:	3.1
APFP Regulation:	5(2)(a)
Date:	July 2024
Revision:	0

NORTH FALLS
Offshore Wind Farm

Project	North Falls Offshore Wind Farm
Document Title	Environmental Statement Chapter 17 Aviation and Radar
Document Reference	3.1.19
APFP Regulation	5(2)(a)
Supplier	Royal HaskoningDHV
Supplier Document ID	PB9244-RHD-ES-OF-RP-OF-0201

Revision	Date	Status/Reason for Issue	Originator	Checked	Approved
0	July 2024	Submission	Cyrrus	NFOW	NFOW

Contents

Tables

Figures (Volume 3.2)

Appendices (Volume 3.3)

Glossary of Acronyms

AD	Air Defence
AD&OW	Air Defence and Offshore Wind
ADR	Air Defence Radar
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
ALARP	As low as reasonably practicable
amsl	above mean sea level
ANO	Air Navigation Order
ANSP	Air Navigation Service Provider
ASACS	Air Surveillance and Control System
ATA	Aerial Tactics Area
ATC	Air Traffic Control
ATS	Air Traffic Service
ATSOCAS	Air Traffic Services Outside Controlled Airspace
BEIS	Department for Business, Energy and Industrial Strategy
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
cd	candela
CEA	Cumulative Effects Assessment
CNS	Communication, Navigation and Surveillance
CTA	Control Area
DASA	Defence and Security Accelerator
DCO	Development Consent Order
DESNZ	Department for Energy Security and Net Zero
EEA	European Economic Area
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ERCoP	Emergency Response and Cooperation Plan
ES	Environmental Statement
FIR	Flight Information Region
FL	Flight Level
ft	feet
GASCo	General Aviation Safety Council
HAT	Highest Astronomical Tide
HMRI	Helicopter Main Routing Indicator
HTZ	Helicopter Traffic Zone
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current

ICAO	International Civil Aviation Organisation
IFP	Instrument Flight Procedure
IFR	Instrument Flight Rules
ILT	Inspectie Leefomgeving en Transport
km	Kilometre
m	metre
MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note
MoD	Ministry of Defence
NAIZ	Non-Auto Initiation Zone
NATS	National Air Traffic Services
NERL	NATS (En Route) plc
nm	nautical miles
NOTAM	Notice to Airmen
NPS	National Policy Statement
NSL	NATS (Services) Limited
OCP	Offshore Converter Platform
OREI	Offshore Renewable Energy Installation
OSP	Offshore Substation Platform
Pd	Probability of Detection
PEIR	Preliminary Environmental Information Report
PEXA	Practice and Exercise Areas
PSR	Primary Surveillance Radar
RAF	Royal Air Force
RLoS	Radar Line of Sight
RNP	Required Navigation Performance
RRH	Remote Radar Head
RWE	RWE Renewables UK Swindon Limited
S&IP	Strategy and Implementation Plan
SAR	Search and Rescue
SEER	SSE Renewables Offshore Windfarm Holdings Limited
SSR	Secondary Surveillance Radar
UK	United Kingdom
UXO	Unexploded Ordnance
VFR	Visual Flight Rules
WTG	Wind Turbine Generator

Glossary of Terminology

Array area	The offshore wind farm area, within which the wind turbine generators, array cables, platform interconnector cable, offshore substation platform(s) and/or offshore converter platform will be located.
Air Navigation Service Provider (ANSP)	A public or private entity managing air traffic on behalf of a company, region or country. NATS is the main ANSP in the UK.
Controlled airspace	Defined airspace within which pilots must follow Air Traffic Control instructions implicitly. In the UK, Classes A, C, D and E are areas of controlled airspace.
Flight Information Region (FIR)	Airspace managed by a controlling authority with responsibility for ensuring air traffic services are provided to aircraft flying within it.
Flight Level (FL)	An aircraft altitude expressed in hundreds of feet at a standard sea level pressure datum of 1013.25 hectopascals.
Landfall	The location where the offshore export cables come ashore at Kirby Brook.
Offshore cable corridor	The corridor of seabed from the array area to the landfall within which the offshore export cables will be located.
Offshore converter platform	Should an offshore connection to an HVDC interconnector cable be selected, an offshore converter platform would be required. This is a fixed structure located within the array area, containing HVAC and HVDC electrical equipment to aggregate the power from the wind turbine generators, increase the voltage to a more suitable level for export and convert the HVAC power generated by the wind turbine generators into HVDC power for export to shore via a third party HVDC cable.
Offshore export cables	The cables which bring electricity from the offshore substation platform(s) to the landfall, as well as auxiliary cables.
Offshore project area	The overall area of the array area and the offshore cable corridor.
Offshore substation platform(s)	Fixed structure(s) located within the array area, containing HVAC electrical equipment to aggregate the power from the wind turbine generators and increase the voltage to a more suitable level for export to shore via offshore export cables.
Onshore cable route	Onshore route within which the onshore export cables and associated infrastructure would be located.
Onshore export cables	The cables which take the electricity from landfall to the onshore substation. These comprise High Voltage Alternative Current (HVAC) cables, buried underground.
Onshore substation	A compound containing electrical equipment required to transform and stabilise electricity generated by the Project so that it can be connected to the national grid.
Primary Surveillance Radar (PSR)	A radar system that measures the bearing and distance of targets using the detected reflections of radio signals.
Secondary Surveillance Radar (SSR)	A radar system that transmits interrogation pulses and receives transmitted responses from suitably equipped targets.
The Project or 'North Falls'	North Falls Offshore Wind Farm, including all onshore and offshore infrastructure.
Uncontrolled Airspace	Defined airspace in which Air Traffic Control does not exercise exclusive authority but may provide basic information services to aircraft in radio contact. In the UK, Class G is uncontrolled airspace.

17 Aviation and Radar

17.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the likely significant effects of the North Falls offshore wind farm (hereafter 'North Falls' or 'the Project') on marine mammals. The chapter provides an overview of the existing environment for the proposed offshore project area, followed by an assessment of likely significant effects for the construction, operation, maintenance and decommissioning phases of the Project.

2. This chapter of the Environmental Statement (ES) considers the likely significant effects of the North Falls Offshore Wind Farm (herein 'North Falls' or 'the Project') on aviation and radar, including the aviation interests of the United Kingdom (UK) Civil Aviation Authority (CAA), Ministry of Defence (MoD), regional airports, local aerodromes, NATS (formerly National Air Traffic Services, that currently comprises NATS (En Route) plc (NERL) and NATS (Services) Limited (NSL)), and other UK aviation stakeholders. The chapter provides an overview of the existing environment for the North Falls offshore project area, followed by an assessment of likely significant effects for the construction, operation, maintenance, and decommissioning phases of the Project.

3. This chapter has been written by Cyrrus Limited, with the assessment undertaken with specific reference to the relevant legislation, guidance and policy. Details of these and the methodology used for the Environmental Impact Assessment (EIA) and Cumulative Effects Assessment (CEA) are presented in Section 17.4.

4. The assessment should be read in conjunction with following linked chapters (Volume 3.1):

   - ES Chapter 13 Offshore Ornithology (Document Reference: 3.1.15) (due to the effect of aviation lighting);
   - ES Chapter 15 Shipping and Navigation (Document Reference: 3.1.17) (due to marine activities associated with Search and Rescue (SAR) operations);
   - ES Chapter 18 Infrastructure and Other Users (Document Reference: 3.3.20) (which considers military activities); and
   - ES Chapter 29 Seascape, Landscape and Visual Impact Assessment (Document Reference: 3.1.31) (due to the effect of aviation lighting).

5. Additional information to support the aviation and radar assessment includes:

   - ES Appendix 17.1 Airspace Analysis and Radar Modelling (Document Reference: 3.3.18); and
   - ES Appendix 17.2 London Southend Airport Instrument Flight Procedure Assessment (Document Reference: 3.3.19).

6. ES Appendix 17.1 (Document Reference: 3.3.18) identifies the radars liable to detect the North Falls Wind Turbine Generators (WTGs) and gives details of the Radar Line of Sight (RLoS) analyses. It also sets out a detailed analysis of

the airspace occupied by the array area and summarises the effects that the Project is likely to have on aviation activities in the vicinity.

7. ES Appendix 17.2 (Document Reference: 3.3.19) assesses whether any of the North Falls WTGs would infringe the protected areas and surfaces associated with the Instrument Flight Procedures (IFPs) serving Southend Airport.

17.2 Consultation

8. Consultation with regard to aviation and radar has been undertaken in line with the general process described in ES Chapter 6 EIA Methodology (Document Reference: 3.1.8). The key elements to date have included scoping and ongoing technical consultation. The feedback received has been considered in preparing the ES. Table 17.1 provides a summary of how the consultation responses received to date have influenced the approach that has been taken.

9. This chapter has been updated following the consultation on the Preliminary Environmental Information Report (PEIR) in order to produce the final assessment submitted within the Development Consent Order (DCO) application.

Table 17.1 Consultation responses

Consultee	Date / Document	Comment	Response / where addressed in the ES
Ministry of Defence	16 August 2021 Scoping Response	The scoping report identifies that the turbines have the potential to be detectable to, and to have an effect on, the Air Defence Radar (ADR) at RAF Trimingham. The MOD agree both with this assessment, and that the applicant will need to address the effect of the development on the radar as part of progressing the scheme toward application.	The Trimingham ADR has been relocated to Remote Radar Head (RRH) Neatishead. Modelling in ES Appendix 17.1 (Document Reference: 3.3.18) indicates that WTGs in the array area would not be visible to Neatishead ADR. Impact on Neatishead ADR is considered in Section 17.6.2.1 and mitigation is discussed in Sections 113 and 17.6.2.1.4.
Ministry of Defence	16 August 2021 Scoping Response	The potential impact of the development on military low flying, specifically the creation of physical obstructions to aircraft and the associated potential restriction of access to the project area is mentioned within the report at 2.12.2. It is acknowledged that this will be addressed in future submissions. As a minimum MoD will require that appropriate data is submitted to allow accurate charting of the development and that MoD accredited aviation safety lighting is fitted to wind turbine generators and ancillary offshore infrastructure as may be applicable.	Notification of data to the MoD and lighting requirements are addressed in Sections 17.3.3.1 and 17.3.3.2 respectively.
The Planning Inspectorate	26 August 2021 Scoping Opinion	The assessment of the effects on military low flying arising from operation of the project in the ES should be undertaken using accurate charting of the WTGs. Where the final layout / height mix of WTGs has not been decided, the worst case scenario(s) should be assessed.	Realistic worst-case scenarios considered for the assessment are summarised in Table 17.2.

Consultee	Date / Document	Comment	Response / where addressed in the ES
The Planning Inspectorate	26 August 2021 Scoping Opinion	The Scoping Report states that the assessment will be supported by desk based studies in parallel with relevant stakeholder consultation bodies. No reference is made to a defined study area (other than a list of airports with their distance from the scoping boundary) and / or methodology that will be used to establish the baseline and assess impacts, nor is any criteria presented to identify how significance of effect will be determined. The ES should be clear how the assessment has been undertaken, taking into relevant guidance and aspect specific methodology.	The study area is defined in Section 17.3.1. Assessment methodology and impact significance is addressed in Section 17.4.3. Relevant guidance is referenced in Section 17.4.1.
The Planning Inspectorate	26 August 2021 Scoping Opinion	The Scoping Report identifies potential impacts to military and civil aviation, including through physical components of the project limiting access and on radar systems. The potential for inter relationships with other aspects e.g. infrastructure and other users, tourism and socioeconomics, should also be assessed in the ES if a significant effect is likely.	The inter-relationship with Offshore Ornithology, Shipping and Navigation, Infrastructure and Other Users, and Seascape, Landscape and Visual is discussed in Section 17.10. Inter-relationships with other aspects are not considered likely.
The Planning Inspectorate	26 August 2021 Scoping Opinion	The Inspectorate considers that there may be a requirement for aviation safety lighting to mitigate potential significant effects to military low flying from the presence of WTGs and other offshore infrastructure. The Applicant should seek to agree the specification of any aviation safety lighting with relevant consultation bodies. Any significant effects associated with the lighting on ecological receptors should also be assessed in the ES.	Marking and lighting requirements are addressed in Section 17.3.3.2. Effects associated with lighting on ecological receptors are considered in ES Chapter 13 Offshore Ornithology (Document Reference: 3.1.15).
NATS	07 September 2021 Scoping Response	Southern Turbines: No impact expected Northern Turbines: Cromer - The turbines are expected to be visible Debden - The turbines are expected to be visible approx. 5% of the time	The northern array area has been removed from the Project. Modelling in ES Appendix 17.1 (Document Reference: 3.3.18) confirms that Cromer and Debden Primary Surveillance Radars (PSR)s are unlikely to detect WTGs in the remaining array area, as stated in Section 17.5.2.
Noordzee Helikopters Vlaanderen (NHV) Group	17 June 2022 Consultation response	We have no comments.	Noted.
Southend Airport	24 June 2022 Online meeting	The Airport requested an assessment of the potential impact of the North Falls WTGs on the Airport's IFPs.	An IFP assessment was undertaken, as presented in Appendix 17.2 (Document Reference: 3.3.19), which shows that North Falls WTGs would have no impact on Southend Airport's existing published IFPs. There are also two Required Navigation Performance IFPs currently with

Consultee	Date / Document	Comment	Response / where addressed in the ES
			the CAA awaiting approval. NATS have confirmed that North Falls WTGs would have no impact on the Required Navigation Performance IFPs (email 27 January 2023).
Ministry of Defence	02 September 2022 Pre-application advice – Northern array	The turbines will be 84.7km from and detectable by the Air Traffic Cover (ATC) radar at Honington. The turbines will be 66.2km from and detectable by the ATC radar at Wattisham. The turbines will be 83.8km from and detectable by the Air Defence (AD) radar at Air Surveillance and Control System (ASACS) Neatishead. The turbines will be 104.1km from and detectable by the Air Defence (AD) radar at ASACS Trimingham.	The northern array area has been removed from the Project.
Ministry of Defence	02 September 2022 Pre-application advice – Southern array	The turbines will be 72.6km from and detectable by the ATC radar at Wattisham. The turbines will be 105.8km from and detectable by the AD radar at ASACS Neatishead. The turbines will be 126.1km from and detectable by the AD radar at ASACS Trimingham.	Modelling in ES Appendix 17.1 (Document Reference: 3.3.18) confirms that WTGs within the array area would be in RLoS and detected by Wattisham radar. The Trimingham ADR has been relocated to RRH Neatishead. Modelling in ES Appendix 17.1 (Document Reference: 3.3.18) shows that WTGs within the array area would not be in RLoS of Neatishead radar. Consultation with MoD is ongoing to confirm the potential for any remaining radar detection. The impact of WTGs on radars is discussed in Section 17.6.2.1 together with possible mitigations.
Ministry of Defence	02 September 2022 Pre-application advice	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 areas which may be relevant to the installation of the export cables & associated infrastructure. The MoD would like to be consulted at the next stage of this application.	The existing military environment is described in Section 17.5.3. All areas of Special Use Airspace are well removed from the North Falls array area. The Ministry of Defence is a prescribed consultee for the North Falls DCO application and is being consulted on this ES.
Ministry of Defence	02 September 2022 Pre-application advice	Fixed Wing military low flying training takes place throughout the United Kingdom down to a height of 250ft above ground level and in certain designated areas down to a height of 100ft above ground level. A turbine development of the height and at the location you propose may have an impact on low flying operations. We have produced a map which indicates areas in the UK where the MOD is more likely or less likely to object to wind	The impact on military low flying is considered in Sections 17.6.1.2, 17.6.2.2 and 17.6.3.2. Lighting is addressed in Section 17.3.3.2.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		turbine planning applications on the grounds of interference with low flying operations. Regardless of whether we object to your proposal, it is probable the MoD will request the turbines be fitted with MoD accredited visible or infrared aviation safety lighting.	
Ministry of Defence	02 September 2022 Pre-application advice	The Met Office is now a statutory consultee for planning relating to their technical infrastructure, therefore the MoD has not informed the Met Office of this pre-application. If your development falls within any of the Met Office safeguarded zones you will need to contact the Met Office directly.	The North Falls array area is outside all Met Office consultation zones, as confirmed in Section 17.5.7.
NATS	17 May 2023 PEIR consultation response	It appears that the turbine envelope (in terms of area covered and turbine sizes) is unchanged from that which we looked at in late 2021. Our position therefore remains as stated then (email attached). Please keep us informed as the development design matures and when you are ready, we are happy to discuss what this radar impact means and what can potentially be done about it.	Noted. Modelling in ES Appendix 17.1 (Document Reference: 3.3.18) shows that Cromer and Debden PSRs are unlikely to detect WTGs in the array area. Further consultation has been undertaken to confirm that WTGs in the array area would have no impact on Cromer or Debden PSRs.
CAA	23 May 2023 PEIR consultation response	Aviation Obstacle Notification: The 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). 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 or in the case of pre-built turbines being towed from shore to final generating position.	The requirements of Article 225A are noted and outlined in Section 17.3.3.1. Consideration of the notification of temporary cranes and the towing of WTG components during construction is now included in the embedded mitigation outlined in Section 17.3.3.1.
CAA	23 May 2023 PEIR consultation response	Aeronautical Obstacle Lighting and Marking: A Lighting Management Plan (LMP) must be agreed and implemented in consultation with the CAA in order for the UK to meet its international obligations under the Chicago Convention. The CAA uses requirements set out in Article 223 of the Air Navigation Order (2016) as the basis for its requirements.	The requirement for an LMP is now included as embedded mitigation in Section 17.3.3.2. Lighting would be in accordance with Article 223.
CAA	23 May 2023 PEIR consultation response	Instrument Flight Procedures: An IFP is a set of instructions regarding navigation around aerodromes. Within the design of IFPs, rules are set out regarding obstacle clearance, to ensure the necessary safeguarding. The protected areas for IFPs are complex as it is necessary to consider where the obstacle is in relation to multiple stages of multiple flight paths for multiple types	An assessment of Southend Airport's IFPs was undertaken, as presented in ES Appendix 17.2 (Document Reference: 3.3.19), which shows that North Falls WTGs would have no impact on existing published IFPs. There are also two Required Navigation Performance IFPs currently with the CAA awaiting approval. NATS

Consultee	Date / Document	Comment	Response / where addressed in the ES
		of aircraft. This may be relevant for windfarms built within 30 nautical miles (~55km) of an aerodrome or pre-built turbines being towed from shore to final generating position.	have confirmed that North Falls WTGs would have no impact on the Required Navigation Performance IFPs (email 27 January 2023).
CAA	23 May 2023 PEIR consultation response	Impacts on civil aviation monitoring systems: Wind turbines located within the line-of-sight of surveillance systems (in particular, primary radar) can cause clutter and interference and can result in performance degradation. Radar line-of-sight analysis is theoretical; operationally there are other factors such as signal refraction, diffraction, attenuation and anomalous propagation within a given radar environment that can influence the probability of an operational wind turbine being detected. The CAA ensures that air navigation service providers undertake appropriate safeguarding activities in respect of their systems and equipment used for the provision of services, that changes to the operating environment are fully considered within their Safety Management Systems and that the operational systems and equipment are functional and being used safely. We recommend that engagement with all potentially affected aviation stakeholders is undertaken, and appropriate mitigation schemes developed.	Noted. Modelling of radar impacts is presented in ES Appendix 17.1 (Document Reference: 3.3.18). NATS has confirmed there is no impact expected on its radars. Southend Airport has confirmed there is no impact anticipated on their radar operation. Consultation with MoD is ongoing regarding potential impact on Neatishead ADR.
CAA	23 May 2023 PEIR consultation response	Helicopter Operations: This covers two aspects: (1) potential helicopter support for operations and maintenance of the wind farm itself; and (2) impact on offshore helicopter operations to existing platforms and installations. Requirements for winching operations should be discussed with appropriate helicopter operators well in advance. Where such operations are undertaken, additional platform design criteria, lighting on the wind turbines, obstacle clearance and marking of the blades may be required. This is detailed in CAA Publication (CAP) 437 – Standards for Offshore Helicopter Landing areas. All offshore helicopters operate with limited icing clearances which means that they must be able to descend to warmer air near the sea surface at any point on the route. Operation through a wind farm corridor is highly unlikely and it might be that they would have to route around the wind farm. This may impact fuel burn and load capacity. In addition, where wind turbines are located in the vicinity of existing platforms and installations that offshore helicopters operate to/from, consideration must be given to approach and take off, including in	Helicopter operations are discussed in Section 17.5.4 and assessed in Sections 17.6.1.2, 17.6.1.3, 17.6.2.2, 17.6.2.3, 17.6.3.2 and 17.6.3.3.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		abnormal situations (e.g. one engine inoperative). Engagement with operators and duty holders as appropriate should be undertaken.	
Ministry of Defence	12 September 2023 PEIR consultation response	Air Traffic Control: Section 17.5.3 of Chapter 17 Aviation and Radar covers Military Aviation. Paragraphs 60 – 62 references the MOD's Air Traffic Control (ATC) Radars. These paragraphs identify the closest military aerodromes and identifies that the turbines will be detectable to the Primary Surveillance Radar (PSR) at Wattisham Station. Paragraph 62 also identifies that the turbines will not be detectable to the PSR at RAF Honington. The MOD has undertaken an assessment based on 72 wind turbines at 397m to tip height using the Rochdale Envelope boundary co-ordinates. This assessment identified that part of the northern array area will be detectable to the PSR at RAF Honington and turbines within both the northern and southern array areas will be detectable to the Wattisham Station PSR. An operational assessment has also been carried out by the MOD which has confirmed that turbines within both the northern and southern array areas will not affect either RAF Honington's or Wattisham Stations operations. The development will therefore have no impact on Air Traffic Control radars deployed at these military aerodromes. This is based on the information available at this stage. Any variations to the number or height of the turbines proposed may change this position.	The northern array area has been removed from the Project; therefore WTGs would no longer be detectable by Honington PSR., Modelling in ES Appendix 17.1 (Document Reference: 3.3.18) confirms that WTGs within the remining array area would be in RLoS and detected by Wattisham radar. The MoD operational assessment showing no impact on operations at Wattisham Station is acknowledged and noted in Section 17.6.2.1.2.
Ministry of Defence	12 September 2023 PEIR consultation response	Air Defence Radar: Section 17.5.3 of Chapter 17 Aviation and Radar covers Military Aviation. Paragraphs 63 – 67 references the MOD's Air Defence (AD) Radars. Wind turbines have been shown to have detrimental effects on the operation of AD radar. These include the desensitisation of the radar in the vicinity of wind turbines, and the creation of "false" aircraft returns. The probability of the radar detecting aircraft flying over or in the locality of the turbines would be reduced, hence turbine proliferation within a specific locality can result in unacceptable degradation of the radar's operational integrity. This would reduce the RAF's ability to detect and manage aircraft in United Kingdom sovereign airspace, thereby preventing it from effectively	The northern array area has been removed from the Project. The relocation of the AD radar from Trimingham to Neatishead is acknowledged and noted in Section 17.5.3.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		performing its primary function of Air Defence of the United Kingdom. Within paragraphs 63 - 67 of section 17.5.3, it is claimed that only turbines within the northern array area would be visible and detected by the AD radars at RRH (Remote Radar Head) Trimingham and RRH Neatishead. Due to the relocation of the AD radar based at RRH Trimingham to RRH Neatishead, there is no requirement for the RRH Trimingham AD radar to be taken into account or mitigation provided.	
Ministry of Defence	12 September 2023 PEIR consultation response	The MOD has undertaken an assessment based on 72 wind turbines at 397m to tip height using the Rochdale Envelope boundary co-ordinates. Turbines within both the southern and northern array areas will be detectable to the AD Radar at RRH Neatishead. The impact of the turbines on the AD radar at RRH Neatishead will therefore need to be addressed through a suitable technical mitigation solution. It is the applicant's responsibility to provide a suitable technical mitigation solution to the MOD. Mitigation to address the impact of the development on the two AD Radars is considered at 17.6.2.1.5. It is stated that engagement with the MOD will continue throughout the application process, this is welcomed.	Modelling in ES Appendix 17.1 (Document Reference: 3.3.18) shows that WTGs within the array area would not be in RLoS of Neatishead. MoD modelling was based on WTGs with a higher tip height, therefore the reduction in WTG size (to 379m amsl) may alter their conclusion. Consultation with MoD is ongoing to confirm the potential for any remaining radar detection. The impact of WTGs on radars is discussed in Section 17.6.2.1 together with possible mitigations.
Ministry of Defence	12 September 2023 PEIR consultation response	Danger Areas: Sections 68 – 71 of 17.5.3 of Chapter 17 Aviation and Radar identifies nearby danger areas and airspace, and states that the North Falls Wind Farm is well away from these, the MOD agrees with this conclusion.	Noted.
Ministry of Defence	12 September 2023 PEIR consultation response	Military Low Flying: The potential for the development to create physical obstructions to military low flying activities is acknowledged within Section 17.6.2.2 of Chapter 17 Aviation and Radar and the requirement for military aviation charts to be updated is recognised at paragraph 22 of Section 17.3.3.1. The MOD will request that a Requirement is added to any DCO that might be issued requiring the submission of information such as commencement dates, maximum turbine heights and the longitude and latitude of each wind turbine. This information is required to allow accurate charting of the development.	Embedded mitigation is described in Section 17.3.3 and is secured via the draft DCO (document reference 6.1)
Ministry of Defence	12 September 2023	Paragraph 28 of Section 17.3.3.2 includes the MOD's lighting requirements for the development. It is	Noted.

Consultee	Date / Document	Comment	Response / where addressed in the ES
	PEIR consultation response	welcomed that the turbines will be fitted with infra-red lighting in combination with the ANO's lighting requirement. The MOD will request that the aviation warning lighting requirements is added as a Requirement to any DCO that might be issued.	
Ministry of Defence	12 September 2023 PEIR consultation response	Practice and Exercise Areas (PEXA): Practice and Exercise Areas also known as PEXA, are designated areas of the sea where military exercises can be undertaken. Section 18.5.6 of Chapter 18 Infrastructure and Other Activities, lists the relevant PEXA which either overlap with the development area or are nearby. It is stated within Section 18.6.1.5 that the development will have no impact on MOD activities. The MOD agrees with this statement in relation to PEXA.	Noted.
Ministry of Defence	12 September 2023 PEIR consultation response	Unexploded Ordnance (UXO): The potential for UXO to be present within the development area and the necessity for clearance is acknowledged within Chapter 5 Project Description at Section 5.6.4.1.2. The potential presence of UXO and disposal sites should be a consideration during the installation and decommissioning of turbines, cables, and any other infrastructure, or where other intrusive works are necessary. In addition to UXO, the presence of a designated explosives dumping ground within the eastern part of the Gunfleet PEXA (X5118), should also be taken account of.	The disused UXO dumping ground in the eastern part of Gunfleet PEXA X5118 has been avoided through the route selection of the offshore cable corridor. Locations of any UXO would be determined post-consent and clearance would be subject to an additional Marine Licence. An estimated 15 UXO clearance operations are included in the ES, where applicable (e.g. ES Chapters 5 Project Description (Document Reference: 3.1.7), ES Chapter 10 Benthic and Intertidal Ecology (Document Reference: 3.1.12), ES Chapter 11 Benthic and Intertidal Ecology (Document Reference: 3.1.13), ES Chapter 12 Marine Mammals (Document Reference: 3.1.14) and ES Chapter 18 Infrastructure and Other Users (Document Reference: 3.3.18)).
Ministry of Defence	12 September 2023 PEIR consultation response	Highly Surveyed Routes: The MOD has highly surveyed routes within the locality of the development area which may be relevant to the installation of wind turbines, export cables & associated infrastructure. These routes are retained by the MOD to support national defence requirements and are not defined in the public domain. Highly surveyed routes must not be obstructed or impeded by offshore developments such as wind turbines. At this time, we are unable to advise if the development will impede any highly surveyed routes in the area. An assessment to determine any impact has been requested and we will share the results with you as soon as we are able to.	Noted.

17.3 Scope

17.3.1 Study area

10. The study area for aviation and radar has been defined on the basis of the potential for WTGs within the North Falls array area to have an impact on civil and military radars, taking into account required radar operational ranges. The study area includes the North Falls array area and the airspace between the array area and the UK mainland, extending from the NERL radar facility at Cromer to the north, to Southend Airport to the south and Stansted Airport to the west (ES Figures 17.1 and 17.2, (Document Reference: 3.2.13)).

11. The following receptors within the study area have been identified:

17.3.1.1 Civil aerodromes

12. Civil Aviation Publication (CAP) 764: Policy and Guidelines on Wind Turbines (CAA, 2016) states the distances between wind turbine developments and various types of aerodromes where consultation should take place. These distances include:

- Aerodromes with a surveillance radar – 30km;
- Non-radar equipped licensed aerodromes with a runway of 1,100m or more – 17km;
- Non-radar equipped licensed aerodromes with a runway of less than 1,100m – 5km;
- Licensed aerodromes where the WTGs will lie within airspace coincidental with any published IFP;
- Unlicensed aerodromes with runways of more than 800m – 4km;
- Unlicensed aerodromes with runways of less than 800m – 3km;
- Gliding sites – 10km; and
- Other aviation activity such as parachute sites and microlight sites within 3km.

13. CAP 764 goes on to state that these distances are for guidance purposes only and do not represent ranges beyond which all WTG developments will be approved or within which they will always be objected to. For example, aerodromes may utilise their radars at ranges considerably in excess of 30km.

14. As well as examining the technical impact of WTGs on ATC facilities, it is also necessary to consider the physical safeguarding of ATC operations using the criteria laid down in CAP 168: Licensing of Aerodromes (CAA, 2022a) to determine whether the project will breach obstacle clearance criteria.

17.3.1.2 Ministry of Defence

15. It is necessary to take into account the aviation and air defence activities of the MoD. This includes:

- MoD airfields, both radar and non-radar equipped;
- MoD Air Defence (AD) radars; and
- MoD Danger Areas.

17.3.1.3 NERL facilities

16. It is necessary to take into account the possible effects of WTGs upon NERL radar systems – a network of primary and secondary radars and navigation facilities around the country.

17.3.1.4 Other aviation activities

- General military low-flying training operations; and
- Military and civilian 'off-route' fixed-wing and helicopter operations, including SAR missions.

17.3.1.5 Meteorological radio facilities

17. WTGs have the potential to adversely impact meteorological radio facilities such as weather radar. The Met Office must be consulted when wind turbine proposals are within a 20km radius zone of any of their UK weather radar sites.

17.3.2 Realistic worst case scenario

18. The final design of North Falls will be confirmed through detailed engineering design studies that will be undertaken post-consent. In order to provide a precautionary but robust impact assessment at this stage of the development process, realistic worst case scenarios have been defined in terms of the likely significant effect that may arise. This approach to EIA, referred to as the Rochdale Envelope, is common practice for developments of this nature, as set out in Planning Inspectorate Advice Note Nine (2018). The Rochdale Envelope for a project outlines the realistic worst case scenario for each individual impact, so that it can be safely assumed that all other scenarios within the design envelope will have less impact. Further details are provided in ES Chapter 6 EIA Methodology (Document Reference: 3.1.8).

19. One area of optionality is in relation to the national grid connection point (discussed further in ES Chapter 5 Project Description (Document Reference: 3.1.7)). The following grid connection options are included in the Project design envelope:

- Option 1: Onshore electrical connection at a national grid connection point within the Tendring peninsula of Essex, with a project alone onshore cable route and onshore substation infrastructure;
- Option 2: Onshore electrical connection at a national grid connection point within the Tendring peninsula of Essex, sharing an onshore cable route and onshore cable duct installation (but with separate onshore export cables) and co-locating separate project onshore substation infrastructure with Five Estuaries; or
- Option 3: Offshore electrical connection, supplied by a third party.

20. With regards to aviation and radar, there is no change to the likely significant effects, as a result of this optionality. Options 1 and 2 require the same offshore infrastructure. For option 3 there would be no project offshore cable corridor to shore, however this subsea infrastructure is not relevant to the aviation and radar assessment. In addition, up to two offshore substation platforms (OSPs) are required for options 1 and 2, whereas option 3 would require up to one offshore converter platform (OCP) and one OSP. The realistic worst case scenarios for the likely significant effects scoped into the EIA for the aviation

and radar assessment are summarised in Table 17.2. These are based on North Falls parameters described in ES Chapter 5 Project Description (Document Reference: 3.1.7), which provides further details regarding specific activities and their durations.

21. The IFP assessment presented in ES Appendix 17.2 (Document Reference: 3.3.19) was based on the previous worst case scenario assessed at PEIR. Since PEIR the WTG heights and array area have been reduced and therefore this provides a highly conservative assessment.

Table 17.2 Realistic worst case scenarios

Impact	Parameter	Notes
Construction		
Impacts on civil and military radar systems due to high construction vessels / cranes and partially complete structures.	34 WTGs with a maximum blade tip height of 377m above Highest Astronomical Tide (HAT), or 57 WTGs with a maximum blade tip height of 276m above HAT. The final scenario is likely to be between 34 and 57 WTGs with tip heights between 276m and 377m above HAT. 2 OSPs with maximum height of 42m above HAT (excluding crane and helideck) and 62m above HAT including crane and helideck; or 1 OSP (parameters as above) + 1 OCP with maximum height of 62m above HAT (excluding crane and helideck) and 112m above HAT including crane and helideck. The assessment of impacts is robust for any combination of WTG and OSP/OCP parameters within these ranges. High crane installation vessels.	Maximum number of the tallest WTGs, or Maximum number of WTGs for North Falls. (Either of the above scenarios could be worst case and both have been assessed for all impacts). Impact starting from a point of zero infrastructure present to full presence over a 21-month period.
Creation of aviation obstacle environment.		Maximum number of the tallest WTGs, or Maximum number of WTGs for North Falls. (Either of the above scenarios could be worst case and both have been assessed for all impacts). Maximum physical obstruction to aviation operations due to size and number of above sea level infrastructure within the North Falls array area. Impact starting from a point of zero infrastructure present to full presence over a 21-month period.
Increased air traffic in the area related to wind farm activities.	Maximum number of 100 helicopter return trips per year during WTG installation.	Helicopter trips as a result of being engaged in works on North Falls causing increased likelihood of aircraft to aircraft collision.
Operation		
WTGs causing permanent interference on civil and military radars.	34 WTGs with a maximum blade tip height of 377m above HAT, or 57 WTGs with a maximum blade tip height of 276m above HAT. The final scenario is likely to be between 34 and 57 WTGs with tip heights between 276m and 377m above HAT. The assessment of impacts is robust for any combination of WTG parameters within these ranges.	Maximum number of the tallest WTGs, or Maximum number of WTGs for North Falls. (Either of the above scenarios could be worst case and both have been assessed for all impacts). Impact present for operational lifetime of 40 years.
Creation of aviation obstacle environment.	34 WTGs with a maximum blade tip height of 377m above HAT, or 57 WTGs with a maximum blade tip height of 276m above HAT.	Maximum number of the tallest WTGs, or Maximum number of WTGs for North Falls.

Impact	Parameter	Notes
	The final scenario is likely to be between 34 and 57 WTGs with tip heights between 276m and 377m above HAT. The assessment of impacts is robust for any combination of WTG parameters within these ranges. Maximum of two offshore substation platforms.	(Either of the above scenarios could be worst case and both have been assessed for all impacts). Maximum physical obstruction to aviation operations due to size and number of above sea level infrastructure within the North Falls array area. Impact present for operational lifetime of 40 years.
Increased air traffic in the area related to wind farm activities.	Maximum number of 100 helicopter return trips required for offshore operation and maintenance activities.	Helicopter trips as a result of being engaged in works on North Falls causing increased likelihood of aircraft to aircraft collision.
Decommissioning		
Impacts on civil and military radar systems due to high construction vessels / cranes and partially dismantled structures.	No decision has yet been made regarding the final decommissioning arrangements for the infrastructure in the offshore project area, described above. It is also recognised that legislation and industry good practice change over time. However, the following infrastructure is likely to be removed, reused or recycled where practicable: WTGs including monopile, steel jacket and GBS foundations; OSPs/OCP including topsides and steel jacket foundations; The following infrastructure is likely to be decommissioned in situ depending on available information at the time of decommissioning: Scour protection; Offshore cables likely to be left in situ; and Crossings and cable protection. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and would be agreed with the regulator. For the purposes of the worst case scenario, it is anticipated that the impacts would be no greater than those identified for the construction phase.	Impact starting from a point of full presence of infrastructure described above to zero presence over the decommissioning period. Decommissioning arrangements would be detailed in a Decommissioning Programme, which would be drawn up and agreed with the Secretary of State in accordance with the Energy Act 2004 provisions prior to decommissioning.
Removal of aviation obstacle environment.		
Increased air traffic in the area related to wind farm activities.		

17.3.3 Summary of mitigation embedded in the design

22. As part of the North Falls design process a number of mitigation measures are proposed to reduce the potential for impacts on civil and military aviation. These measures include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

17.3.3.1 Information, notifications and charting

23. North Falls would create an obstacle environment which can effectively be mitigated by compliance with appropriate international and national requirements for the promulgation of the obstacle locations on charts and in aeronautical documentation, together with the permanent marking and lighting of obstacles.

24. Measures will be adopted at the commencement of works on North Falls to ensure that the aviation sector is made aware of the creation of a further aviation obstacle environment in the southern North Sea, namely North Falls. These measures would include issuing Notices to Airmen (NOTAMs) and Aeronautical Information Circulars (AICs), warning of the establishment of obstacles within the North Falls array area and publicity in such aviation publications as the General Aviation Safety Council (GASCo) Flight Safety magazine. Obstacle considerations could include temporary cranes and WTG components being towed from shore to the array area.

25. In accordance with The Air Navigation Order (ANO) 2016/765 (CAA, 2022b) Article 225A, at least eight weeks before construction commences, details of the type, position, height above mean sea level (amsl) and lighting of each of the completed permanent structures that are 100m or more amsl, together with scheduled dates of commencement and completion of the works, would be notified in writing to the CAA who would forward the relevant information to NATS Aeronautical Information Services (AIS) and the MoD Defence Geographic Centre (DGC) for inclusion in the UK Aeronautical Information Publication (AIP) and on relevant civil and military aeronautical charts, as notifiable permanent obstructions. This permanent information would replace the short-term NOTAMs that would continue to be issued to cover the Project until construction has been completed.

26. This mitigation is secured via the draft DCO (document reference 6.1)

17.3.3.2 Marking and lighting

27. The international marking and lighting requirement, set out in the International Civil Aviation Organisation (ICAO) document Annex 14: Aerodrome Design and Operations (ICAO, 2022), specifies that:

- “a wind turbine shall be marked and / or lighted if it is determined to be an obstacle.”; and
- “the rotor blades, nacelle and upper 2/3 of the supporting mast of wind turbines should be painted white, unless otherwise indicated by an aeronautical study.”

28. UK regulations adopt ICAO Annex 14’s requirements as to lighting of WTGs but do not require that WTGs follow the ICAO recommendation as to paint colour,

although CAP 764 does set out the ICAO recommendation by way of guidance. In terms of marking the WTGs, in keeping with recent practice for offshore wind farms, it is anticipated that Trinity House would require all structures to be painted yellow from the level of HAT to a height directed by Trinity House, and above the yellow section all WTGs would be painted submarine grey.

29. North Falls will be lit in accordance with the ANO. ANO Article 222 defines an 'en route obstacle' as any building, structure or erection, the height of which is 150m or more above ground level and requires these to be lit. Article 223 modifies the Article 222 requirement with respect to offshore WTGs, requiring these to be lit where they exceed 60m above HAT with a medium intensity (2000 candela (cd)) steady red light mounted on the top of each nacelle and requires for limited downward spillage of light. Article 223 allows for the CAA to permit that not all WTGs are so lit. CAP 764 states that the CAA will require that all WTGs on the periphery of any wind farm need to be equipped with aviation warning lighting and such lighting, where achievable, shall be spaced at longitudinal intervals not exceeding 900m. There is no current routine requirement for offshore obstacles to be fitted with intermediate vertically spaced aviation lighting.

30. CAA guidance has been subject to coordination with maritime agencies to avoid confusion with maritime lighting. To that end, the CAA has indicated that the use of a flashing red Morse Code letter ‘W’ is likely to be approved to resolve potential issues for the maritime community. A Lighting Management Plan (LMP) must be agreed and implemented in consultation with the CAA.

31. The Maritime and Coastguard Agency (MCA) requires that WTG blade tips are marked in red, together with markings down the blade, to provide a SAR helicopter pilot with a hover reference point as set out in Marine Guidance Note (MGN) 654 Annex 5 (MCA, 2021). The MCA also requires a lighting scheme comprising 200cd red / infra-red lights on the nacelles of non-Article 223 WTGs, to be operated on demand during SAR operations and a WTG shutdown protocol to be applied during rescue situations. An Emergency Response and Cooperation Plan (ERCoP) would be developed and implemented for all phases of the Project, based upon the MCA’s standard template. Appropriate lighting would be utilised to facilitate heli-hoisting if undertaken within the North Falls array area, as outlined in CAP 437: Standards for Offshore Helicopter Landing Areas (CAA, 2023a).

32. To satisfy MoD requirements, the WTGs would also be required to be fitted with infra-red lighting in combination with the ANO Article 223 lights. MoD lighting guidance indicates that provided combination infra-red / 2000cd visible red lights are used to light the WTGs required to be lit under ANO Article 223, this satisfies the MoD operational requirement.

33. This mitigation is secured via the draft DCO (document reference 6.1).

17.3.3.3 Regulatory requirements

34. When construction is complete, given that the North Falls array area would occupy uncontrolled (Class G) airspace (below approximately 6,500ft / 2000m amsl), the responsibility for avoiding other traffic and obstacles would rest with captains of civilian and military aircraft. Thus, logically a pilot would avoid the charted areas, and individually lit WTGs and any other obstacles, laterally or vertically, by the legislated standard minimum separation distance. This is

outlined in CAA Official Record Series 4 No. 1496: (UK) Standardised European Rules of the Air – Exceptions to the Minimum Height Requirements (CAA, 2021), which sets out that to avoid persons, vessels, vehicles and structures, pilots must give clearance of a minimum distance of 500ft (152m). This applies equally to the avoidance of WTGs and any other structure.

35. Military operations are subject to separate rules sponsored by the MoD. Pilots of military aircraft would be required to ensure that a Minimum Separation Distance of 250ft (76m) from any person, vessel, vehicle, or structure exists whilst operating in the vicinity of the North Falls array area. The charting and lighting of North Falls should also be taken into account by MoD low flying units and SAR operators.

36. It is assumed that aviation stakeholders would adhere to all relevant CAA and MoD safety guidance in the conduct of their specific operations to ensure safe operations for all users of the airspace above North Falls.

17.4 Assessment methodology

17.4.1 Legislation, guidance and policy

17.4.1.1 National Policy Statements

37. The assessment of likely significant effects upon aviation and radar has been made with specific reference to the relevant National Policy Statements (NPS). These are the principal decision making policy documents for Nationally Significant Infrastructure Projects (NSIPs). Those relevant to aviation and radar, and the Project are:

- Overarching NPS for Energy (EN-1) (DESNZ 2023a); and
- NPS for Renewable Energy Infrastructure (EN-3) (DESNZ 2023b).

38. The specific assessment requirements for aviation and radar, as detailed in the NPS, are summarised in Table 17.3 together with an indication of the section of the ES chapter where each is addressed.

Table 17.3 NPS assessment requirements

NPS Requirement	NPS Reference	ES Reference
Overarching NPS for Energy (EN-1)		
Where the proposed development may affect the performance of civil or military aviation CNS (Communications, Navigation and Surveillance), meteorological radars and/or other defence assets an assessment of potential effects should be set out in the ES.	Paragraph 5.5.37	Effects are assessed and presented in Section 17.6. Impacts on meteorological radars are considered unlikely, as stated in Section 17.5.7.
The applicant should consult the MOD, Met Office, Civil Aviation Authority (CAA), NATS and any aerodrome – licensed or otherwise – likely to be affected by the proposed development in preparing an assessment of the proposal on aviation, meteorological or other defence interests.	Paragraph 5.5.39	Consultation undertaken with relevant civil and military aviation stakeholders is detailed in Table 17.1.
Any assessment of effects on aviation, meteorological or other defence interests should include potential impacts of the project upon the operation of CNS infrastructure, flight patterns (both civil and military),	Paragraph 5.5.40	Effects on civil and military aviation during the phases of the Project are assessed in Section 17.6.

NPS Requirement	NPS Reference	ES Reference
generation of weather warnings and forecasts, other defence assets (including radar) and aerodrome operational procedures. It should also assess the demonstratable cumulative effects of the project with other relevant projects in relation to aviation, meteorological and defence.		Impacts on meteorological radars are considered unlikely, as stated in Section 17.5.7. Cumulative effects are assessed in Section 17.8.
If there are conflicts between the government's energy and transport policies and military interests in relation to the application, the Secretary of State should expect the relevant parties to have made appropriate efforts to work together to identify realistic and pragmatic solutions to the conflicts. In so doing, the parties should seek to protect the aims and interests of the other parties as far as possible, recognising simultaneously the evolving landscape in terms of the UK's energy security and the need to tackle climate change, which necessitates the installation of wind turbines and the need to maintain air safety and national defence and the national weather warning service.	Paragraph 5.5.53	Potential mitigation for impacts on military radars is discussed in Section 113. Engagement with the MoD will continue throughout the application phase and post-consent if required.
There are statutory requirements concerning lighting to tall structures. Where lighting is requested on structures that goes beyond statutory requirements by any of the relevant aviation and defence consultees, the Secretary of State should be satisfied of the necessity of such lighting taking into account the case put forward by the consultees. The effect of such lighting on the landscape and ecology may be a relevant consideration. Lighting must also be designed in such a way as to ensure that there is no glare or dazzle to pilots and/or ATC, aerodrome ground lighting is not obscured and that any lighting does not diminish the effectiveness of aeronautical ground lighting and cannot be confused with aeronautical lighting. Lighting may also need to be compatible with night vision devices for military low flying purposes.	Paragraphs 5.5.54 and 5.5.55	Marking and lighting requirements are discussed in Section 17.3.3.2. In accordance with ANO Article 223, lighting intensity would be reduced at and below the horizontal and further reduced when visibility in all directions from every WTG is more than 5km.
Where, after reasonable mitigation, operational changes, obligations and requirements have been proposed, the Secretary of State should consider whether: A development would prevent a licensed aerodrome from maintaining its licence and the operational loss of the said aerodrome would have impacts on national security and defence, or result in substantial local/national economic loss, or emergency service needs; It would cause harm to aerodromes' training or emergency service needs; The development would impede or compromise the safe and effective use of defence assets or unacceptably limit military training; The development would have a negative impact on the safe and efficient provision of en route air traffic control services for civil aviation, in particular through an adverse effect on CNS infrastructure; The development would compromise the effective provision of weather warnings by the NSWWS	Paragraphs 5.5.59 and 5.5.60	The Project has the potential to generate clutter on radar displays and thus could give rise to likely significant effects relating to the safe and efficient provision of air traffic control services for civil aviation and to the safe and effective use of defence assets. However, mitigation options are available, as discussed in Sections 17.6.2.1.1 and 17.6.2.1.4. Once any required mitigation has been implemented there would be no significant effects on any of the stated infrastructure or services.

NPS Requirement	NPS Reference	ES Reference
(National Severe Weather Warning Service), or flood warnings by the UK's flood agencies. Provided that the Secretary of State is satisfied that the impacts of proposed energy developments do not present risks to national security and physical safety, and where they do, provided that the Secretary of State is satisfied that the appropriate mitigation can be achieved, or appropriate requirements can be attached to any DCO to secure those mitigations, consent may be granted.		
NPS for Renewable Energy Infrastructure (EN-3)		
Aviation and navigation lighting should be minimised and/or on demand to avoid attracting birds, taking into account impacts on safety.	Paragraph 2.8.230	Proposed lighting is discussed in Section 17.3.3.2. In accordance with ANO Article 223, lighting intensity would be reduced at and below the horizontal and further reduced when visibility in all directions from every WTG is more than 5km.
Detailed discussions between the applicant for the offshore wind farm and the relevant consultees should have progressed as far as reasonably possible prior to the submission of an application. As such, appropriate mitigation should be included in any application, and ideally agreed between relevant parties. In some circumstances, the Secretary of State may wish to consider the potential to use requirements involving arbitration as a means of resolving how adverse impacts on other commercial activities will be addressed.	Paragraphs 2.8.251 to 2.8.252	Further engagement with NATS, the MoD and other relevant aviation stakeholders will continue throughout the consenting process. Consultation to date is summarised in Section 17.2.
Where a proposed offshore wind farm potentially affects other offshore infrastructure or activity, a pragmatic approach should be employed by the Secretary of State. Much of this infrastructure is important to other offshore industries as is its contribution to the UK economy. In such circumstances, the Secretary of State should expect the applicant to work with the impacted sector to minimise negative impacts and reduce risks to as low as reasonably practicable.	Paragraphs 2.8.332 to 2.8.334	Likely significant effects during the various phases are assessed in Sections 17.6.1 to 17.6.3. Negative impacts would be minimised, and risks reduced through the embedded mitigation measures outlined in Section 17.3.3 and by continuing engagement with relevant stakeholders to agree any appropriate additional mitigation measures.
As such, the Secretary of State should be satisfied that the site selection and site design of a proposed offshore wind farm and offshore transmission has been made with a view to avoiding or minimising disruption or economic loss or any adverse effect on safety to other offshore industries. Applicants will be required to demonstrate that risks to safety will be reduced to as low as reasonably practicable. The Secretary of State should not consent applications which pose intolerable risks to safety after mitigation measures have been considered.	Paragraphs 2.8.335 to 2.8.336	Mitigation measures proposed as part of the North Falls design process to reduce the potential impacts on aviation are detailed in Section 17.3.3 and possible mitigation measures for radar impacts are outlined in Sections 17.6.2.1.1 and 17.6.2.1.4.
Providing proposed schemes have been carefully designed, and that the necessary consultation has been undertaken at an early stage, mitigation measures may be possible to negate or reduce effects on other offshore infrastructure or operations	Paragraph 2.8.338	Mitigation measures proposed as part of the North Falls design process to reduce the potential impacts on aviation are detailed in Section 17.3.3 and possible mitigation measures for

NPS Requirement	NPS Reference	ES Reference
to a level sufficient to enable the Secretary of State to grant consent.		radar impacts are outlined in Sections 17.6.2.1.1 and 17.6.2.1.3.

17.4.1.2 Other legislation, policy and guidance

39. In addition to the NPS, there are a number of pieces of legislation, policy and guidance applicable to the assessment of aviation and radar. These include:

- CAP 168: Licensing of Aerodromes sets out the standards required at UK licensed aerodromes relating to management systems, operational procedures, physical characteristics, assessment and treatment of obstacles and visual aids. (CAA, 2022a);
- ANO 2016/765 sets out the Rules of the Air and includes the application of lighting to WTGs in UK territorial waters (Articles 222 and 223) and details the requirements for notifying the CAA of any changes to en route obstacles that are 100m or more above sea level. (CAA, 2022b);
- CAP 764: Policy and Guidelines on Wind Turbines details the CAA policy and guidelines associated with wind turbine impacts on aviation that aviation stakeholders and wind energy developers need to consider when assessing a development's viability. (CAA, 2016);
- CAP 670: Air Traffic Services (ATSs) Safety Requirements sets out the safety regulatory framework and highlights the requirements to be met by providers of civil ATSs and other services in the UK in order to ensure that those services are safe for use by aircraft. (CAA, 2019);
- CAP 1616: Airspace Change explains the CAA's regulatory process for changes to airspace. (CAA, 2021);
- CAP 437: Standards for Offshore Helicopter Landing Areas provides the criteria applied by the CAA in assessing offshore helicopter landing areas for worldwide use by helicopters registered in the UK and includes winching area 'best practice' design criteria for wind turbine platforms (CAA, 2023a);
- CAP 032: UK AIP is the main resource for information on facilities, services and flight procedures at all licensed UK airports, as well as UK airspace rules, regulations and restrictions, en route procedures, charts and other air navigation information. (CAA, 2023b);
- UK Military AIP is the main resource for information and flight procedures at all military aerodromes. (MoD, 2023);
- Military low flying in the United Kingdom: the essential facts. (MoD, 2017);
- MoD Obstruction Lighting Guidance details MoD requirements for the lighting of offshore developments. (Low Flying Operations Flight, 2020);
- MCA Marine Guidance Note (MGN) 654 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response highlights issues to consider when assessing navigational safety and emergency response, caused by OREI developments. (MCA, 2021a);

- MCA document: Offshore Renewable Energy Installations: Requirements, Guidance and Operational Considerations for SAR and Emergency Response forms part of MGN 654 Annex 5. (MCA, 2021b); and
- ICAO Annex 14: Aerodrome Design and Operations includes recommendations for marking and lighting of wind turbines. (ICAO, 2022).

40. Further detail is provided in ES Chapter 3 Policy and Legislative Context (Document Reference: 3.1.5).

17.4.2 Data sources

41. The data and information sources listed in Table 17.4 have been used in undertaking the aviation and radar assessments.

Table 17.4 Other available data and information sources

Data Set	Spatial Coverage	Year	Notes
CAP 032: UK AIP (CAA, 2023b)	Full coverage across the North Falls aviation study area.	2023	The main resource for information and flight procedures at all licensed UK airports as well as airspace, en route procedures, charts and other air navigation information.
UK Military AIP (MoD, 2023)	Full coverage across the North Falls aviation study area.	2023	The main resource for information and flight procedures at all military aerodromes.
Raytheon equipment brochure	NERL Cromer Primary Surveillance Radar (PSR)	2007	Data on the Raytheon ASR-10SS PSR.
Raytheon equipment brochure	NERL Debden PSR	2007	Data on the Raytheon ASR-23SS PSR.
Lockheed Martin brochure	RRH Neatishead PSR	2013	Limited data on the TPS-77 PSR. Detailed performance data is covered by International Traffic in Arms Regulations restrictions and therefore not available.

17.4.3 Impact assessment methodology

42. ES Chapter 6 EIA Methodology (Document Reference: 3.1.8) explains the general impact assessment methodology applied to North Falls. The following sections describe the methods used to assess the likely significant effects on aviation and radar.

17.4.3.1 Significance of effect

43. In assessing the significance of the effects from North Falls it was necessary to identify whether or not there could be an impact on aviation operations. The aviation industry is highly regulated and subject to numerous mandatory standards, checks and safety requirements (for example CAP 670), many international in nature and requiring the issue of operating licences. In all cases, the sensitivity or magnitude of the impact on operations can only be identified by the appropriate aviation organisation conforming to the Risk Classification Scheme used to quantify and qualify the severity and likelihood of a hazard occurring.

44. The Risk Classification Scheme is a fundamental element of an aviation organisation's Safety Management System (SMS), which must be acceptable to, and approved by, the UK CAA or the Military Aviation Authority, as

appropriate. As such, for the purposes of this assessment, no detailed grading has been made of the magnitude of the impact or sensitivity of the receptor on the basis that any potential reduction in aviation safety cannot be tolerated. Instead, the following definitions of basic significance have been used as defined in Table 17.5. This represents a deviation from the standard methodology presented within ES Chapter 6 (Document Reference: 3.1.8). The same definitions of effect significance are also used for the CEA.

Table 17.5 Definition of effect significance

Significance	Definition
Major Significant	Receptor would be unable to continue safe operations or safe provision of air navigation services (radar) or effective air defence surveillance in the presence of the WTGs. Technical or operational mitigation of the impact would be required.
Moderate Significant	Receptor would be able to continue safe operations but with some restrictions or non-standard mitigation measures in place.
Not Significant	The Project would have little impact on the aviation receptor, or the level of effect would be acceptable to the aviation receptor.
No Change	The Project would have no impact on the aviation receptor and would be acceptable to the aviation receptor.

17.4.4 Cumulative effects assessment methodology

45. The CEA considers other plans, projects and activities that may result in cumulation with North Falls. ES Chapter 6 EIA Methodology (Document Reference: 3.3.8) provides further details of the general framework and approach to the CEA.

46. For aviation and radar, these activities include other offshore and onshore wind farms. Cumulative effects have been considered with respect to obstacles and increase in air traffic, and with regards to the extent of radar visibility at WTG heights.

17.4.5 Transboundary effect assessment methodology

47. The transboundary assessment considers the potential for transboundary effects to occur on aviation and radar receptors as a result of North Falls; either those that might arise within the Exclusive Economic Zone (EEZ) of European Economic Area (EEA) states or arising from the interests of EEA states e.g. a non UK fishing vessel. ES Chapter 6 EIA Methodology (Document Reference: 3.1.8) provides further details of the general framework and approach to the assessment of transboundary effects.

48. For aviation and radar, the potential for transboundary effects has been assessed in relation to obstacles to flight, increase in air traffic, radar visibility and airspace management.

17.4.6 Assumptions and limitations

49. No overarching assumptions or limitations have been identified that apply to the assessment for aviation and radar. Where routine assumptions have been made in the course of undertaking the assessment, these are noted in Sections 17.6 to 17.8.

17.5 Existing environment

50. An initial desktop study was undertaken to determine those aviation stakeholders that were likely to be affected by North Falls, including all radar systems within operational range.

51. The main issue identified is associated with potential WTG interference of PSRs. Due to the physical size of the WTGs proposed, there is also potential for the WTGs to become aviation obstacles or obstructions, particularly to helicopters engaged in offshore operations. This is considered within the impact assessment.

52. CAP 764 advises that WTG effects on Secondary Surveillance Radars (SSRs) can be caused due to the physical blanking and diffracting effects of the WTG towers, depending on the size of the WTGs and the wind farm. However, CAP 764 goes on to say that these effects are typically only a consideration when the WTGs are located close to the SSR, i.e. less than 10km. NATS recommend a safeguarded zone of radius 28km around their SSR facilities. As all known SSRs are beyond these ranges by a significant margin they would not be affected by the WTGs and are therefore not considered further.

53. Similarly, there would be no measurable effects upon other terrestrial based aviation CNS systems as North Falls is considerably outside applicable safeguarding limits pertaining to such CNS infrastructure. Therefore, terrestrial CNS infrastructure (other than PSR) is not considered further, as no sites would be affected.

17.5.1 Radar modelling

54. Computer modelling using a contemporary software modelling tool (HTZ communications) has been undertaken to predict if RLoS exists between PSRs and WTGs within the North Falls array area, and the likely Probability of Detection (Pd) of the rotating WTG blades. This exercise identifies those PSRs that could detect the WTGs and has been based on WTGs with a maximum tip height of 379m amsl[1]. The data obtained from the modelling has been analysed and provides a key input into establishing the degree to which aviation and operations in the area of North Falls could be affected and what additional mitigation processes could be employed.

55. The RLoS and Pd modelling undertaken is based on generic data as the specific and detailed characteristics of the modelled PSRs are considered commercially sensitive. Therefore, contemporary PSR performance characteristics and publicly available PSR data has been used in lieu. Modelling by radar operators with detailed configuration data may reveal marginally different Pd results however, confidence is high that PSR performance characteristics used have a high level of compatibility with actual PSR performance.

[1] Radar modelling was based on tip heights amsl as opposed to above HAT. Within the North Falls array area HAT is 1.93m amsl, therefore a tip height of 379m amsl incorporates an additional precautionary height buffer above the maximum tip height of 377m above HAT.

56. ES Appendix 17.1 (Document Reference: 3.3.18) details the computer modelling undertaken and uses the outputs of the modelling to determine potential mitigation strategies for inclusion in this document. Where appropriate, final mitigations would be agreed and implemented with aviation and radar stakeholders. Ongoing consultation with stakeholders will continue as part of the design process for North Falls. ES Appendix 17.1 also provides further details of the airspace analysis undertaken.

17.5.2 Civil aviation

57. North Falls is within the London Flight Information Region (FIR) for ATC, the airspace regulated by the UK CAA. The boundary between the London FIR and the adjacent Amsterdam FIR is approximately 9km south-east of the array area at its closest point. Airspace within the Amsterdam FIR is regulated by the Netherlands Inspective Leefomgeving en Transport (ILT).

58. Airspace is classified as either controlled or uncontrolled and is divided into a number of classes depending on what kind of ATS is provided and under what conditions. In the UK there are five classes of airspace, A, C, D, E and G. (Classes B and F are not used in the UK). The first four are controlled airspace classes while Class G is uncontrolled. Within controlled airspace aircraft are monitored and instructed by ATC, whereas in uncontrolled airspace aircraft are not subject to ATC instruction but rather operate according to a simple set of regulations. ATC may still provide information, if requested, to ensure flight safety.

59. Aircraft operate under one of two flight rules: Visual Flight Rules (VFR) or Instrument Flight Rules (IFR). VFR flight is permitted when the weather satisfies Visual Meteorological Conditions (VMC) and is conducted with visual reference to the natural horizon. Aircraft must be flown under IFR when weather restricts visibility, known as Instrument Meteorological Conditions (IMC). IFR flight requires reference solely to aircraft instrumentation.

60. The North Falls array area lies within uncontrolled Class G airspace with Class A controlled airspace known as the Clacton Control Area (CTA) above that. Class A controlled airspace is the most strictly regulated of the classes whereby aircraft are positively controlled by ATC. Compliance with ATC clearances are mandatory and aircraft are flown and navigated solely with reference to aircraft instruments. Certain onboard equipment is also a prerequisite. Flight in Class G airspace is generally visual, meaning that pilots fly and navigate with reference to the natural horizon and terrain features they see outside. Pilots are required to maintain minimum distances from notified obstacles, including WTGs, and may only fly within the minimum weather and visibility criteria (VMC).

61. The array area lies beneath Clacton CTA 7 which has a lower vertical limit of Flight Level (FL) 65. A FL is an aircraft altitude expressed in hundreds of feet above a standard sea level pressure datum, so FL65 is approximately 6,500ft (2,000m) amsl.

62. NERL provides en route civil ATSs within the London FIR from the London Area Control Centre at Swanwick, near Southampton. NERL's closest radars are at Cromer, 130km to the north, and Debden, 112km to the west of the array area.

63. RLoS and Pd modelling indicates that it is unlikely that WTGs with a blade tip height of 379m amsl in the array area would be detected by Cromer PSR or Debden PSR.

64. The nearest licensed aerodromes with surveillance radar are Southend Airport, 81km to the west, Norwich Airport, 107km to the north, and Stansted Airport, 113km to the west.

65. RLoS modelling indicates that all North Falls WTGs with a blade tip height of 379m amsl would be visible to and detected by Southend PSR.

17.5.3 Military aviation

66. The closest military stations equipped with ATC radar facilities lie to the north-west and are Army Air Corps Wattisham (74km), Royal Air Force (RAF) Honington (97km), RAF Lakenheath (115km) and RAF Marham (131km).

67. RLoS modelling indicates that WTGs with a blade tip height of 379m amsl in the array area would be visible to and detected by Wattisham PSR.

68. RLoS modelling indicates that no WTGs within the array area would be visible to Honington PSR, Lakenheath PSR or Marham PSR.

69. The MoD safeguards a network of long range high powered AD radars used to provide the UK with airspace surveillance and security and to fulfil national and international obligations. The closest AD radar to North Falls is located at RRH Neatishead, 107km to the north. The Neatishead radar was formerly located at RRH Trimingham and was relocated to its current site in 2023.

70. RLoS modelling indicates that no WTGs with a blade tip height of 379m amsl in the array area would be visible to Neatishead PSR.

71. Although RLoS modelling indicates that WTGs within the array area would not be visible to Neatishead PSR, in their pre-application advice MoD stated that WTGs within the array area would be detected by this radar. The MoD assessment was based on a tip height of 397m and a greater array area, so the reduction in WTG size and array area may alter their conclusion.

72. Approximately 37km west of the array area are the Shoeburyness Danger Areas D136 and D138A to D138D where ordnance, munitions and explosives activities take place.

73. Approximately 62km north of the array area is Area 9, an Air to Air Refuelling Area with a lower limit of 2,000ft (610m) amsl within which it is assumed that refuelling of military helicopters takes place.

74. The Aerial Tactics Area (ATA) Lakenheath South is approximately 47km north of the array, airspace designated for air combat training.

75. The above areas of Special Use Airspace are all well removed from the North Falls array area.

17.5.4 Helicopter Main Routing Indicators

76. Helicopter Main Routing Indicators (HMRIs) are routes typically and routinely flown by helicopters operating to and from offshore destinations and are promulgated for the purpose of highlighting concentrations of helicopter traffic to other airspace users. 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 southern North Sea, Class G), they are used by the Air Navigation Service Provider (ANSP) and helicopter operators for flight planning and management purposes. In summary, HMRIs are recognised routes to assist in regularising routeings and effectively managing traffic safely and do not comprise controlled airspace.

77. HMRIs have no promulgated lateral dimensions although CAP 764 states that there should be no obstacles within 2 nautical miles (nm) either side of the route centreline. The 2nm (3.7km) distance is based upon operational experience, the accuracy of navigation systems, and practicality. Such a distance provides time and space for helicopter pilots to descend safely to an operating altitude below the icing level.

78. HMRI 20 extends vertically from 500ft (152m) amsl to 2,000ft (610m) amsl inclusive, between Lowestoft and the Greater Gabbard and Galloper offshore wind farms, presumably to allow helicopter traffic to access those sites. HMRI 20 passes within 2nm east of the array area. The planned maximum WTG tip height of 379m amsl is equivalent to 1,300ft amsl rounded up to the nearest 100ft so the North Falls WTGs would be significantly taller obstacles than the existing WTGs in this area. The planned height of the North Falls WTGs means helicopters operating within the vertical limits of HMRI 20 would have less than the required 1,000ft (305m) obstacle clearance when abeam the North Falls array area in IMC.

79. Planned obstacles within 2nm should be consulted upon with the helicopter operators and the ANSP (though it is noted in the AIP that there are no ATS provision arrangements to support operations on this HMRI).

17.5.5 Flight procedures and ATS provided

80. In Class G (uncontrolled) airspace, aircraft are not obliged to be in receipt of an ATS, although it is open to pilots to seek ATSs outside Controlled Airspace (ATSOCAS) from the designated ATS provider. The extent of the ATSOCAS supplied would depend on the CNS capability of the ATS provider, its workload and any regulatory provisions relating to the carriage of CNS equipment by aircraft (for example, transponders). All aircraft above FL100 (circa 10,000ft (3,050m) amsl) in the London FIR are required to carry and operate transponders in accordance with national regulations.

81. To gain access to controlled airspace, a pilot must comply with various mandatory requirements. This includes establishing two-way radio communications with the designated ATC authority for the specified airspace and obtaining permission to enter it. The pilot then must comply with instructions received. In this way, the controllers know of all the air traffic in the defined airspace. The controllers can then take appropriate measures to ensure that standard separation minimums are maintained between all known aircraft by using various techniques that may or may not include the use of PSR.

82. Flight procedures in the vicinity of North Falls are conducted in accordance with national UK CAA and MoD Standards and Recommended Practices (SARPs) as promulgated in the UK AIP.

83. Given that all aircraft operating above FL100 (circa 10,000ft (3,050m) amsl) are required to be equipped with and operate transponders, the significance of primary radar for the provision of an ATS is more acute in the lower airspace outside of controlled airspace and is especially relevant to helicopter operators.

17.5.6 Search and Rescue

84. SAR operations are a highly specialised undertaking involving not only aviation assets, but also small boats, ships and shore-based personnel. SAR operations are generally carried out in extremely challenging conditions and at all times of the day and night. There are 10 helicopter SAR bases, incorporating 22 aircraft, around the UK with Bristow Helicopters providing helicopters and aircrew.

85. The nearest SAR base is at Lydd Airport, approximately 99km south-west of the North Falls array area and its helicopters can provide rescue services up to approximately 460km away from base.

86. The random nature of people, watercraft or aircraft in distress makes it very difficult to determine the routes taken by SAR aircraft. Fixed wing SAR aircraft would tend to stay at higher altitudes in a command-and-control role during major incidents, whilst helicopters would be used in a low-level role, sometimes in support of small rescue boats.

17.5.7 Meteorological Radio Facilities

87. The closest Met Office weather radars to the North Falls array area are located at Old Buckenham in Norfolk, 97km to the north-west, and at Thurnham in Kent, 96km to the south-west. WTGs within the array area would be significantly beyond the 20km safeguarded zones around these facilities.

88. Significant effects on weather radar are considered unlikely due to the distance between the closest weather radars and the array area, and therefore not considered further in this chapter.

17.5.8 Future trends in baseline conditions

89. Although the aviation industry is under long-term pressure to reduce its contribution to climate change, there would be no implications related to climate and natural trends in the absence of North Falls on the aviation and radar baseline parameters discussed above.

90. There is no anticipated increase in manned aviation traffic, however an increase in low-level autonomous drone traffic can be foreseen.

17.6 Assessment of significance

17.6.1 Likely significant effects during construction

17.6.1.1 Impact 1: Impacts on civil and military radar systems due to high construction vessels / cranes and partially complete structures

91. WTGs and other tall obstacles have the potential to affect radar which would in turn affect the effectiveness of surveillance services due to interference on radar displays, as radar operators are unable to distinguish between those primary radar returns generated by the obstacles and aircraft. As a general rule,

controllers are required to provide 5nm lateral separation between traffic receiving an ATS and 'unknown' primary radar returns in class G airspace.

92. To discriminate wanted aircraft targets from unwanted clutter, radars ignore static objects and only display moving targets. The rotating blades of WTGs impart a Doppler frequency shift to the reflected radar pulse, which the radar receiver 'sees' as a moving target; these targets are then presented on the radar display as primary radar returns, indistinguishable from those returns originating from aircraft. This is not a steady effect but has dependency on the axis of rotation of the turbine in relation to the radar. Such unwanted radar returns are known as 'clutter'.

93. Until such time as WTG blades are allowed to rotate at operational speeds, PSRs would not detect the partially completed structures. In the same way, high construction vessels and cranes that are in RLoS would not be moving fast enough to generate PSR clutter.

94. Although some WTGs would be operational during the construction phase, the worst-case scenario is the operation of all WTGs which is assessed in Section 17.6.2.1.

17.6.1.1.1 Significance of effect

95. As a result of non-detection of obstacles during the construction phase, the effect significance is no change.

17.6.1.2 Impact 2: Creation of an aviation obstacle environment

96. Construction of the wind farm would involve the installation of infrastructure above sea level which could pose a physical obstruction to aircraft utilising the airspace in the vicinity of the North Falls array area.

97. From a starting point of no infrastructure within the North Falls array area, the infrastructure outlined in Table 17.2 would gradually be installed over a period of 21 months.

98. Specifically, for North Falls, permanent or temporary obstacles can increase risk to:

- General military low flying training and operations;
- Helicopters utilising HMRI 20 to and from the Greater Gabbard and Galloper offshore wind farms; and
- Other offshore fixed-wing and helicopter operations, including those undertaking SAR missions, over the Southern North Sea.

99. In compliance with international and national SARPs with respect to notification, marking and lighting, as outlined in Section 17.3.3, to make pilots aware of the addition of infrastructure to the site, the impact on the aviation sector during the construction of North Falls would be reduced to an acceptable level. For SAR missions an ERCoP would be developed and implemented for all phases of the Project.

100. Although HMRI routes in the southern North Sea are rarely used, the planned maximum WTG tip height means that helicopters operating along HMRI 20 would have less than the required 1,000ft (305m) obstacle clearance if in the vicinity of the North Falls array area in IMC. If necessary, helicopters can re-route in order to comply with obstacle clearance requirements. This may

marginally increase journey times but would have no aviation safety implications.

17.6.1.2.1 Significance of effect

101. The effect has been assessed to be not significant.

17.6.1.3 Impact 3: Increased air traffic in the area related to wind farm activities

102. The use of helicopters to support construction activities within the North Falls array area could impact on existing traffic in the area. It is possible that helicopters could be used for transferring people or equipment to the site twice weekly for the construction period.

103. The possible increase in air traffic associated with construction support activities brings with it a potential increased risk of aircraft collision in the airspace around North Falls.

104. The increase in air traffic would be managed by the existing ATS infrastructure, provided in accordance with national procedures, and pilots would be expected to operate in accordance with regulatory requirements.

17.6.1.3.1 Significance of effect

105. Due to the predicted low number of movements caused by the construction of North Falls and assuming compliance with regulatory requirements and national procedures, the effect on aircraft operators in the vicinity of North Falls is considered to be not significant.

17.6.2 Likely significant effects during operation

17.6.2.1 Impact 1: WTGs causing permanent interference on civil and military radars

106. The North Falls array area would be within the operational range of radar systems serving both civil and military agencies. Radar modelling detailed in ES Appendix 17.1 (Document Reference: 3.3.18) shows that at least some WTGs with a tip height of 379m amsl within the North Falls array area would be theoretically detectable by the ATC PSRs at Wattisham and Southend. Although contrary to the ES Appendix 17.1 (Document Reference: 3.3.18) RLoS assessments, the MoD has stated that WTGs within the array area would be detected by the AD PSR at RRH Neatishead. Discussions are ongoing with the MoD to confirm this. The final number of WTGs detected by these radars would depend on the maximum tip heights of individual WTGs and the detailed wind farm configuration selected.

107. When operational (in other words, with blades fitted and rotating), WTGs have the potential to generate ‘clutter’ (or false targets) upon radar displays because current generation PSRs are unable to differentiate between the moving blades of WTGs and aircraft. As a consequence, radar operators can be unable to distinguish between primary radar returns generated by WTGs and those generated by aircraft. As a general rule controllers are required to provide 5nm lateral separation between traffic receiving an ATS and ‘unknown’ primary radar returns in Class G airspace. This may therefore produce an adverse impact on the provision of safe and effective ATS by those ANSPs that utilise the Wattisham and Southend ATC PSRs and could compromise the ability of the MoD to undertake its Air Defence role utilising the Neatishead AD PSR.

108. Mitigation would be required if the wind farm design, based upon parameters outlined in Table 17.2, shows a Pd of the WTGs above the PSR system threshold levels that allows the WTG blades to be presented on PSR displays and the airspace is operationally significant to the PSR operator. Mitigation should only be required for so long as PSRs do not have the inherent capability to distinguish WTG returns from aircraft returns: increasingly, “next generation” PSRs are looking to provide this functionality.

109. The interim additional mitigation that may be required for affected PSRs is discussed below:

17.6.2.1.1 Southend PSR

110. The Designated Operational Coverage for Southend Airport’s ATC radar service is 40nm, while the minimum distance between Southend PSR and the North Falls array area is 44nm. Although Southend PSR is highly likely to detect all WTGs with a blade tip height of 379m amsl within the North Falls array area, it is considered unlikely that Southend ATC would be providing a radar control service for aircraft in this airspace as it is beyond the operating range of its radar. The impact on Southend PSR is therefore not considered to be operationally significant.

111. The Head of ATS at Southend Airport has confirmed that North Falls is not anticipated to have an impact on their radar operation (email 24 January 2024).

17.6.2.1.2 Wattisham PSR

112. The north-western corner of the array area lies within the 40nm radar vectoring range of Wattisham PSR, therefore consultation with the MoD is required to determine the operational significance of the North Falls WTGs’ impact.

113. The MoD has undertaken an operational assessment which has confirmed that the North Falls WTGs would not affect Wattisham Station’s operations.

17.6.2.1.3 Neatishead PSR

114. In respect of the TPS-77 PSR at Neatishead, the most common WTG mitigation technique applied for previous wind farm developments was the application of a Non-Auto Initiation Zone (NAIZ) in the TPS-77’s lowest beam over the footprint of any detectable WTGs. However, on 24 August 2018 the MoD issued a statement indicating that the TPS-77 NAIZ mitigation had not performed to expectations at flight trials over two offshore wind farms and as a result immediately paused the receipt and assessment of any technical mitigation reports or submissions relating to TPS-77 radars and multi-turbine wind farms.

115. An update to this statement was issued in June 2019 in which the MoD stated, “The MoD will continue to work with industry to resolve the current issues and will, on a case by case basis, consider certain developments where impact on operational capability is deemed to be acceptable. TPS-77-based mitigation reports will now be considered where suitable mitigation can be adequately modelled. The MoD will continue to receive and assess TPS-77 based mitigation reports for single turbine developments following the results of a previous trial relating to these developments. The MoD will also consider alternative ADR mitigation proposals should developers wish to submit them.”

116. In August 2019 an Air Defence and Offshore Wind (AD&OW) Windfarm Mitigation Task Force was formed as a collaborative initiative between the MOD, what was then the Department for Business, Energy and Industrial Strategy (BEIS) and is now DESNZ, the Offshore Wind Industry Council and

The Crown Estate. The aim of the Task Force is to enable the co-existence of UK Air Defence and offshore wind by identifying potential mitigations and supporting processes, allowing offshore wind to contribute towards meeting the UK Government's Net Zero target without degrading the nation's AD surveillance capability.

117. The AD&OW Strategy and Implementation Plan (S&IP) sets the direction for this collaboration by identifying, assessing and deploying solutions that will enable the co-existence of AD&OW operations such that neither is unduly nor excessively compromised. The S&IP may lead to significant changes to current AD PSR characteristics and capabilities that in turn affect the potential impact that the Project may have.

118. In support of the S&IP, in March 2020 the MoD Defence and Security Accelerator (DASA) launched an Innovation Challenge to reduce and remove the impact of wind farms on the UK's AD surveillance systems by seeking technological proposals in four areas:

- Alternatives to radar;
- Technologies applied to the WTG or installation;
- Technologies applied to the radar, its transmission or return; and
- Technological mitigations not covered by the above.

119. Phase 1 identified mitigations such as new radar signal processing methods or radar absorbing treatments applied to WTGs and recommended a hybrid approach involving changes to both radar and WTG design to solve the problem in the long term.

120. Phase 2 of the competition was launched in April 2021[2] seeking proposals to address four main subject areas:

- Reduction of clutter or the impact of clutter;
- Ensuring efficient detection and tracking time;
- Technologies to mitigate against larger turbine blades and wider turbine spacing development; and
- Alternate methods of surveillance.

121. Of 20 submitted proposals, contracts for seven proposals were awarded in September 2021 and completed by March 2023.

122. DASA and DESNZ launched Stream 1 of Windfarm Mitigation for UK Air Defence: Phase 3 in February 2023, building upon Phases 1 and 2 to advance innovative technologies in radar signal processing, WTG materials and alternative tracking approaches.

123. In August 2023 funding was awarded for two projects: a project developing passive air defence sensors to address clutter from WTG blades, and another project developing stealth materials for next-generation WTG blades. At the

[2] Windfarm Mitigation for UK Air Defence - GOV.UK (www.gov.uk)

same time, Phase 3 Stream 2 was launched to find solutions for the modelling and testing of different mitigation technologies.

124. The ultimate aim of the S&IP is to have mitigations in place to support offshore wind developments by Q2 2025, and therefore it is expected that such mitigation will be available before the Project offshore construction phase, expected to begin around 2029.

125. The Project continues to monitor the progress of the MoD-led air defence radar mitigation programme (Programme NJORD) through its Aviation Manager (Vice-Chair of the OWIC Aviation Workstream) and in doing so is following the principles contained within the jointly signed (OWIC, MoD and DESNZ) S&IP Issue 1. The Project also continues engage with the MoD as it refines the RLoS modelling parameters to gain a more accurate position on whether these revisions remain an issue to the MoD. The Project remains on standby to (a) discuss these matters further with all stakeholders, (b) enter into bilateral radar mitigation scheme agreement negotiations if needed with the MoD and (c) take the decision to employ and fund any such Programme NJORD-derived mitigation in due course.

126. RLoS modelling indicates that WTGs in the array area would not be visible to Neatishead PSR (ES Appendix 17.1 (Document Reference: 3.3.18)). Engagement with the MoD will continue to agree a suitable mitigation for the impact of North Falls WTGs on Neatishead PSR should mitigation be deemed necessary.

17.6.2.1.4 Significance of effect

127. CAP 764 outlines other mitigation options which could be applied either singly or in combination to optimise the effectiveness of any mutually agreed solution. Due to the promising developments currently being advanced by industry in this area of technology, consultation on technical measures will continue as a development might emerge that proves to be more suitable for adoption and implementation during the development of North Falls.

128. Without additional mitigation, the likely effects on receptors receiving changes to their operational environment have been assessed to be major significant. However, it is anticipated that the potential risk posed to aviation and MoD operations can be wholly and successfully mitigated through various technical solutions applied to current generation PSRs, should mitigation be deemed necessary. It is anticipated that, during the operational life of North Falls, the MoD and NERL will procure “next generation” PSRs which should not require the application of mitigation measures to allow them to provide an appropriate surveillance picture in the presence of WTGs. Following the application of additional mitigation, the residual effect is assessed to be not significant.

17.6.2.2 Impact 2: Creation of an aviation obstacle environment

129. During the operation phase of the Project the infrastructure outlined in Table 17.2 would be present within the North Falls array area. This could pose a physical obstruction to aircraft utilising the airspace in the vicinity of North Falls.

130. Specifically, for North Falls, permanent or temporary obstacles can increase risk to:

- General military low flying training and operations;

- Helicopters utilising HMRI 20 to and from the Greater Gabbard and Galloper offshore wind farms; and
- Other offshore fixed-wing and helicopter operations, including those undertaking SAR missions, over the Southern North Sea.

131. In compliance with international and national SARPs with respect to notification, marking and lighting, as outlined in Section 17.3.3, to make pilots aware of the addition of infrastructure to the site, the impact on the aviation sector during the operation phase of North Falls would be reduced to an acceptable level. For SAR missions an ERCoP would be developed and implemented for all phases of the Project.

132. HMRI routes in the Southern North Sea are rarely used and helicopters can re-route around obstacles as required.

133. An IFP assessment presented in ES Appendix 17.2 (Document Reference: 3.3.19) shows that WTGs would have no impact on Southend Airport's existing published IFPs. This assessment was based on the previous worst case scenario assessed at PEIR. Since PEIR the WTG heights and array area have been reduced. There are two Required Navigation Performance (RNP) IFPs currently with the CAA awaiting approval. The RNP procedures have been designed by NATS, who have confirmed by email (27 January 2023) that the proposed WTGs are laterally well beyond the protected areas of the RNP procedure set and that there would be no impact on the RNP procedures.

17.6.2.2.1 Significance of effect

134. The effect has been assessed to be not significant.

17.6.2.3 Impact 3: Increased air traffic in the area related to wind farm activities

135. The operation phase of North Falls would likely see a small increase in helicopter traffic above the current baseline level engaged in support operations in the area. Up to 100 helicopter return trips for support operations are anticipated across the 30 year operation phase.

136. The possible increase in air traffic associated with support activities brings with it a potential increased risk of aircraft collision in the airspace around North Falls.

137. The safety of aircraft operating in uncontrolled airspace ultimately resides with the aircrew who would be expected to operate in accordance with regulatory requirements and who may request the provision of an ATS that would be provided in accordance with national procedures.

17.6.2.3.1 Significance of effect

138. Due to the predicted low number of movements during the operation phase of North Falls and assuming compliance with regulatory requirements and national procedures, the effect on aircraft operators in the vicinity of North Falls is considered to be not significant.

17.6.3 Likely significant effects during decommissioning

139. Offshore decommissioning would most likely involve removal of all of the WTG components, part of the WTG foundations (down to 1m below the seabed), platforms and associated foundations, and sections of inter-array and export cables.

140. For the decommissioning phase, the implementation of standard aviation safety management processes would be applicable and a risk assessment based on the appropriate aviation requirements pertinent at the time would be required.

17.6.3.1 Impact 1: WTGs causing permanent interference on civil and military radars

141. During the gradual decommissioning of above sea level infrastructure in the North Falls array area the impact on radar would be removed. Firstly, WTGs are made inoperative, and the blades of WTGs would cease rotating, before being removed from the site. In addition, all mitigations applicable during the operation phase (to the extent they are still required) would remain in place during the decommissioning phase until such time as all WTG blades are removed.

17.6.3.1.1 Significance of effect

142. The effect significance on radar during decommissioning is considered to be no change as the site is returned to pre-development conditions.

17.6.3.2 Impact 2: Removal of aviation obstacle environment

143. During the decommissioning of North Falls, the above sea level infrastructure outlined in Table 17.2 would be removed over a period of c. 3 years. This would gradually reduce the physical obstruction to aircraft utilising the airspace in the vicinity of North Falls.

144. Specifically, for North Falls, permanent or temporary obstacles can increase risk to:

- General military low flying training and operations;
- Helicopters utilising HMRI 20 to and from the Greater Gabbard and Galloper offshore wind farms; and
- Other offshore fixed-wing and helicopter operations, including those undertaking SAR missions, over the Southern North Sea.

145. The environmental mitigation in the form of international and national SARPs with respect to notification, marking and lighting, as outlined in Section 17.3.3, would be retained until decommissioning has been completed. Any mitigation plan agreed for HMRI 20 would remain in place during the North Falls decommissioning phase. The impact on the aviation sector during the decommissioning phase of North Falls would be reduced to pre-development conditions.

17.6.3.2.1 Significance of effect

146. The effect significance has been assessed to be no change.

17.6.3.3 Impact 3: Increased air traffic in the area related to wind farm activities

147. The use of helicopters during the decommissioning phase of North Falls could impact on existing traffic in the area. It is possible that helicopters could be used for transferring people and / or equipment to the array area on a twice weekly basis during the decommissioning of site infrastructure.

148. The possible increase in air traffic associated with decommissioning support activities brings with it a potential increased risk of aircraft collision in the airspace around North Falls.

149. The safety of aircraft operating in uncontrolled airspace ultimately resides with the aircrew who would be expected to operate in accordance with regulatory requirements and who may request the provision of an ATS that would be provided in accordance with national procedures.

17.6.3.3.1 Significance of effect

150. Due to the predicted low number of movements during the decommissioning period of North Falls and assuming compliance with regulatory requirements and national procedures, the effect on aircraft operators in the vicinity of North Falls is considered to be not significant.

17.7 Potential monitoring requirements

151. No monitoring relevant to this chapter is anticipated, however any potential requirements would be agreed with stakeholders prior to construction taking into account the final detailed design of North Falls.

17.8 Cumulative effects

17.8.1 Identification of potential cumulative effects

152. The first step in the CEA process is the identification of which residual effects assessed for North Falls on their own have the potential for a cumulative effect with other plans, projects and activities. This information is set out in Table 17.6, together with a consideration of the confidence in the data that is available to inform a detailed assessment and the associated rationale. Only effects assessed in Section 17.6 as not significant or above are included in the CEA (i.e. those assessed as “no change” are not taken forward as there is no potential for them to contribute to a cumulative effect).

Table 17.6 Potential cumulative effects

Impact	Potential for cumulative effect	Rationale
Construction		
Creation of an aviation obstacle environment.	Yes	WTGs associated with other developments create aviation obstacles, restricting the available airspace.
Increased air traffic in the area related to wind farm activities.	Yes	Air traffic activities associated with other developments have the potential to cumulatively increase the risk of aircraft collision.
Operation		
WTGs causing permanent interference on civil and military radars.	Yes	Other wind farm developments could impact radars over a larger area.
Creation of an aviation obstacle environment.	Yes	WTGs associated with other developments create aviation obstacles, restricting the available airspace.
Increased air traffic in the area related to wind farm activities.	Yes	Air traffic activities associated with other developments have the potential to cumulatively increase the risk of aircraft collision.

Impact	Potential for cumulative effect	Rationale
Decommissioning		
Increased air traffic in the area related to wind farm activities.	Yes	Air traffic activities associated with other developments have the potential to cumulatively increase the risk of aircraft collision.

17.8.2 Other plans, projects and activities

153. The second step in the cumulative assessment is the identification of the other plans, projects and activities that may result in cumulative effects for inclusion in the CEA (described as 'project screening'). This information is set out in Table 17.7 below, together with a consideration of the relevant details of each, including current status (e.g. under construction), planned construction period, closest distance to North Falls, status of available data and rationale for including or excluding from the assessment. For aviation and radar, a cutoff range of 100km from the array area has been used to determine the list of projects considered for the CEA. This represents the maximum range at which radar cumulative effects are considered to occur. The potential cumulative effect of radar impacts on ATC operations diminishes as the separation between wind farm sites increases. A separation distance of 100km is considered to be a pragmatic range beyond which cumulative effects will be negligible.

154. The project screening has been informed by the development of a CEA Project List which forms an exhaustive list of plans, projects and activities within the study area (Section 17.3.1) relevant to North Falls. The list has been appraised, based on the confidence in being able to undertake an assessment from the information and data available, enabling individual plans, projects and activities to be screened in or out. Types of projects considered for the aviation and radar CEA include other offshore wind farms and oil and gas platforms. There are no oil and gas platforms in the CEA study area.

Table 17.7 Summary of projects considered for the CEA in relation to Aviation and Radar (project screening)

Project	Status	Construction period	Closest distance from the array area (km)	Confidence in data	Included in the CEA (y/n)	Rationale
Galloper Offshore Wind Farm	Operational	N/A	0	High	Y	Proximity to North Falls.
Greater Gabbard Offshore Wind Farm	Operational	N/A	0	High	Y	Proximity to North Falls.
London Array Offshore Wind Farm	Operational	N/A	21	High	Y	Proximity to North Falls.
Thanet Offshore Wind Farm	Operational	N/A	25	High	Y	Proximity to North Falls.
Gunfleet Sands Offshore Wind Farm	Operational	N/A	39	High	Y	Proximity to North Falls.
East Anglia ONE Offshore Wind Farm	Operational	N/A	53	High	Y	Proximity to North Falls.
East Anglia TWO Offshore Wind Farm	Consented	Construction planned mid 2020s	31	High	Y	Proximity to North Falls.
East Anglia ONE NORTH Offshore Wind Farm	Consented	Construction planned mid 2020s	63	High	Y	Proximity to North Falls.
Five Estuaries Offshore Wind Farm	Pre-Planning	2028 to 2030	0	High	Y	Proximity to North Falls.

17.8.3 Assessment of cumulative effects

155. Having established the residual effects from North Falls with the potential for a cumulative effect (Table 17.6), along with the other relevant plans, projects and activities (Table 17.7), the following sections provide an assessment of the level of effect significance that may arise.

17.8.3.1 WTGs causing permanent interference on civil and military radars

156. There is potential for a cumulative effect where radars detect the rotating blades of WTGs from multiple offshore wind developments that are in their operational phase. (Effects are assessed as arising during the operation phase as a worst-case scenario as that is when all WTGs will be in operation). This could result in a significant increase in clutter being generated on radar displays over a larger area.

157. With no mitigation in place the potential cumulative effect is considered to be major significant.

158. However, all offshore wind farms must have the necessary radar mitigations in place before becoming operational, and any potential radar impacts from North Falls would be similarly mitigated. With such mitigation implemented the potential for cumulative effects on civil and military radars is assessed to be not significant.

17.8.3.2 Creation of an aviation obstacle environment

159. Construction of the Project would involve the installation of infrastructure above sea level which could pose a physical obstruction to military low flying and offshore fixed-wing and helicopter operations, including helicopters utilising HMRI 20. There is potential for cumulative effects when also considering the infrastructure associated with other offshore projects.

160. Similarly, during the operation phase the infrastructure outlined in Table 17.2 would be present within the North Falls array area.

161. During the decommissioning of North Falls, the above sea level infrastructure outlined in Table 17.2 would be removed over a period of c. 3 years.

162. The potential cumulative effect of maritime and aviation obstacle lighting creating confusing lighting configurations to both sectors has been addressed and CAA guidance has been subject to coordination with maritime agencies. There should be no cumulative effects on the impact of surface obstacles on aviation operations as compliant markings and lighting would be provided.

163. Through the use of embedded environmental measures such as effective lighting, reliance on pilots who are required to avoid any obstacle by legislated minimum distances, and consideration of charted obstacles, the cumulative effect from the creation of an obstacle environment in all phases is considered to be not significant.

17.8.3.3 Increased air traffic in the area related to wind farm activities.

164. During the construction, operation and decommissioning phases of North Falls there would likely be an increase in helicopter air traffic over the current baseline levels due to the use of helicopters in the provision of support in the airspace around North Falls.

165. The predicted number of daily helicopter movements is considered to be low, however the cumulative effect of this activity and similar activities associated with the projects included in the CEA would create a greater potential risk of mid-air collision between aircraft engaged in such operations and / or aircraft in transit across the study area.

166. The increase in air traffic would be managed by the existing ATS infrastructure, provided in accordance with national procedures, and pilots would be expected to operate in accordance with civil and military regulatory requirements. The cumulative effect is therefore considered to be not significant in EIA terms.

17.9 Transboundary effects

167. The potential impacts of WTGs on aviation are localised and the North Falls array area is completely within UK airspace, with the nearest Dutch operated airspace approximately 9km south-east of the array area at its closest point.

168. Due to the localised nature of the potential impacts, significant transboundary effects on aviation and radar are unlikely to occur and for this reason are not discussed any further.

17.10 Interactions

169. Potential interactions exist with this chapter and ES Chapter 13 Offshore ornithology (Document Reference: 3.1.15) , ES Chapter 15 Shipping and navigation (Document Reference: 3.1.17), ES Chapter 18 Infrastructure and Other Users (Document Reference: 3.1.20), and ES Chapter 29 Seascape, Landscape and Visual (Document Reference: 3.1.31), as detailed in Table 17.8.

170. Aviation lighting fitted to offshore WTGs could cause confusion to the maritime community as the specification for the lighting to be displayed below the horizontal plane of the light filament itself could cause mariners some confusion. This confusion could result in WTGs with conflicting warning lighting representing a collision risk to maritime surface vessels.

171. Work has been undertaken to develop an aviation warning lighting standard where, from the nature of the lighting, it will be apparent to mariners that the aviation lighting is clearly distinguishable from maritime lighting. Where it is evident that the default aviation warning lighting standard may generate issues for the maritime community a developer can make a case, that is likely to receive CAA approval, for the use of a flashing red Morse Code Letter 'W' instead. See CAP 764 paragraph 3.16.

Table 17.8 Aviation and Radar interactions

Topic and description	Related chapter (Volume 3.1)	Where addressed in this chapter	Rationale
Operation			
Aviation lighting fitted to offshore WTGs.	Chapter 13 Offshore ornithology Chapter 15 Shipping and navigation Chapter 29 Seascape, landscape and visual	Section 17.3.3.2	Lighting impact on birds. Potential confusion to the maritime community. Visual effects associated with lighting.

Topic and description	Related chapter (Volume 3.1)	Where addressed in this chapter	Rationale
Creation of an aviation obstacle environment. Increased air traffic in the area related to wind farm activities.	Chapter 15 Shipping and navigation Chapter 18 Infrastructure and other users	Sections 17.6.2.2 and 17.6.2.3.	Impacts on helicopter traffic associated with SAR operations and impacts on military low flying.

17.11 Inter-relationships

172. The impacts identified and assessed in this chapter have the potential to interrelate with each other. For example, the effects of the creation of an obstacle environment and increased air traffic due to wind farm activities interacting on helicopter / SAR traffic or military low flying. The worst-case impacts assessed within the aviation and radar chapter take these potential inter-relationships into account, therefore the assessments are considered conservative and the levels of significance appropriate.

17.12 Summary

173. This chapter has provided a characterisation of the existing aviation and radar environment likely to be affected by North Falls. Desk-based data with full coverage across the North Falls aviation and radar study area was used to inform the assessments and full details are provided in Section 17.4.2.

174. A summary of the potential impacts on aviation and radar, mitigation measures and conclusion of likely significant effects in EIA terms are presented in Table 17.9. The impacts assessed include: Impacts on civil and military radar systems, due to the height of construction vessels (i.e. cranes and partially complete structures); creation of an aviation obstacle environment; and Increased air traffic in areas related to wind farm activity and wind turbine generators causing permanent interference on civil and military radars.

175. Considering the implementation of the mitigation measures proposed, the impacts on aviation and radar during the construction, operation and decommissioning phases of North Falls have been assessed as not significant or to cause no change. The assessment also considered potential cumulative effects also assessed as not significant (Section 17.8).

176. Transboundary effects on aviation and radar are unlikely to occur as the North Falls array area is completely within UK airspace and any effect would be localised.

177. Effects on aviation and radar also have the potential to affect other receptors and these effects are fully considered in the topic-specific chapters. These receptors are outlined in Table 17.8, and in the topic-specific chapters below:

- Chapter 13 Offshore ornithology
- Chapter 15 Shipping and navigation
- Chapter 18 Infrastructure and other users
- Chapter 29 Seascape, landscape and visual.

Table 17.9 Summary of likely significant effects on aviation and radar

Impact	Receptor	Significance of effect	Mitigation measures proposed	Residual effect
Construction				
Impact 1: Impacts on civil and military radar systems due to high construction vessels / cranes and partially complete structures.	MoD	No Change	N/A	No Change
Impact 2: Creation of an aviation obstacle environment.	Military low flying Helicopters utilising HMRI 20 Other offshore fixed-wing and helicopter operations, including SAR	Not Significant	As outlined in Section 17.3.3	Not Significant
Impact 3: Increased air traffic in the area related to wind farm activities.	Military low flying Other offshore fixed-wing and helicopter operations, including SAR	Not Significant	N/A	Not Significant
Operation				
Impact 1: WTGs causing permanent interference on civil and military radars.	MoD	Major Significant	Technical mitigation solution applied to impacted radars where significant effects are identified to be agreed with operators	Not Significant
Impact 2: Creation of an aviation obstacle environment.	Military low flying Helicopters utilising HMRI 20 Other offshore fixed-wing and helicopter operations, including SAR	Not Significant	As outlined in Section 17.3.3	Not Significant
Impact 3: Increased air traffic in the area related to wind farm activities.	Military low flying Other offshore fixed-wing and helicopter operations, including SAR	Not Significant	Managed by existing ATS infrastructure Pilot compliance with regulatory requirements	Not Significant

Impact	Receptor	Significance of effect	Mitigation measures proposed	Residual effect
Decommissioning				
Impact 1: WTGs causing permanent interference on civil and military radars.	MoD	No Change	Mitigations applicable from operation phase to remain in place until all WTG blades are removed	No Change
Impact 2: Removal of aviation obstacle environment.	Military low flying Helicopters utilising HMRI 20 Other offshore fixed-wing and helicopter operations, including SAR	No Change	As outlined in Section 17.3.3	No Change
Impact 3: Increased air traffic in the area related to wind farm activities.	Military low flying Other offshore fixed-wing and helicopter operations, including SAR	Not Significant	Managed by existing ATS infrastructure Pilot compliance with regulatory requirements	Not Significant
Cumulative				
Impact 1: WTGs causing permanent interference on civil and military radars.	MoD	Major Significant	Technical mitigation solution applied to impacted radars where significant effects are identified to be agreed with operators	Not Significant
Impact 2: Creation of an aviation obstacle environment.	Military low flying Helicopters utilising HMRI 20 Other offshore fixed-wing and helicopter operations, including SAR	Not Significant	As outlined in Section 17.3.3	Not Significant
Impact 3: Increased air traffic in the area related to wind farm activities.	Military low flying Other offshore fixed-wing and helicopter operations, including SAR	Not Significant	Managed by existing ATS infrastructure Pilot compliance with regulatory requirements	Not Significant

17.13 References

CAA (February 2023a), 'CAP 437: Standards for offshore helicopter landing areas'. [redacted] [Accessed: November 2023].

CAA (November 2023b), 'CAP032: UK Aeronautical Information Publication'. [redacted] [Accessed: November 2023].

CAA (January 2022a), 'CAP 168: Licensing of Aerodromes'. [redacted] [Accessed: November 2023].

CAA (April 2022b), 'Air Navigation Order 2016'. [redacted] [Accessed: November 2023].

CAA (March 2021), 'CAP1616: Airspace change'. [redacted] [Accessed: November 2023].

CAA (June 2019), 'CAP 670: Air Traffic Services Safety Requirements'. [redacted] [Accessed: November 2023].

CAA (February 2016), 'CAP 764: Policy and Guidelines on Wind Turbines'. [redacted] [Accessed: November 2023].

DESNZ (November 2023a). Overarching National Policy Statement for Energy (EN-1). Available at: https://assets.publishing.service.gov.uk/media/655dc190d03a8d001207fe33/overarching-nps-for-energy-en1.pdf [Accessed: November 2023].

DESNZ (November 2023b). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available at: https://assets.publishing.service.gov.uk/media/655dc352d03a8d001207fe37/nps-renewable-energy-infrastructure-en3.pdf [Accessed: November 2023].

MoD (November 2023), 'UK Military AIP'. [redacted] [Accessed: November 2023].

MoD (January 2020), 'MoD Obstruction Lighting Guidance'. [redacted] [Accessed: November 2023].

MCA (April 2021a), 'MGN 654 Safety of navigation: OREIs – Guidance on UK navigational practice, safety and emergency response'. https://www.gov.uk/government/publications/mgn-654-mf-offshore-renewable-energy-installations-orei-safety-response [Accessed: November 2023].

MCA (November 2021b), 'Offshore Renewable Energy Installations: Requirements, guidance and operational considerations for SAR and Emergency Response'.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1034158/OREI_SAR_Requirements_v3.pdf [Accessed: November 2023].

ICAO (July 2022), 'Annex 14 – Aerodromes – Volume 1 – Aerodrome Design and Operations '[redacted] [Accessed: November 2023].

NORTH FALLS

Offshore Wind Farm

sse Renewables | RWE

HARNESSING THE POWER OF NORTH SEA WIND

North Falls Offshore Wind Farm Limited

A joint venture company owned equally by SSE Renewables and RWE.

To contact please email contact@northfallsoffshore.com

North Falls Offshore Wind Farm Limited Registered Address: Windmill Hill Business Park, Whitehill Way, Swindon, Wiltshire, SN5 6PB, United Kingdom

Registered in England and Wales Company Number: 12435947