East Anglia TWO Offshore Windfarm

Chapter 15

Civil and Military Aviation and Radar

Environmental Statement
Volume 1

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Glossary of Acronyms

AARA	Air to Air Refuelling Area
ACT	Air Combat Training
AD	Air Defence
agl	Above Ground Level
AIC	Aeronautical Information Circulars
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Services
ALARP	As low as reasonably practicable
amsl	Above Mean Sea Level
ANO	Air Navigation Order
ANSP	Air Navigation Service Provider
ATA	Aerial Tactics Area
ATC	Air Traffic Control
ATS	Air Traffic Services
ATSOCAS	Air Traffic Services outside Controlled Airspace
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CAS	Controlled Air Space
CNS	Communication Navigation & Surveillance
CTA	Control Area
DECC	Department of Energy and Climate Change
DCO	Development Consent Order
EIA	Environmental Impact Assessment
ERCoP	Emergency Response and Cooperation Plan
FIR	Flight Information Region
FL	Flight Level
GASIL	General Aviation Safety Information Leaflet
HAT	Highest Astronomical Tide
HMRs	Helicopter Main Route(s)
ICAO	International Civil Aviation Organisation
ILT	Inspectie Leefomgeving en Transport – the NL CAA
ITAR	International Traffic in Arms Regulations
LAT	Lowest Astronomical Tide
LoS	Line of Sight
LVNL	Luchtverkeersleiding Nederland – the NL equivalent of NATS
MAA	Military Aviation Authority
MCA	Maritime and Coastguard Agency
MGN	Maritime Guidance Note
MoD	Ministry of Defence
MSD	Minimum Separation Distance
NAIZ	Non-Auto Initiation Zone
NATMAC	National Air Traffic Management Advisory Committee
NATS	NATS Holdings Limited (formerly National Air Traffic Services)
NERL	NATS (En Route) plc
NM	Nautical Mile
NL	Netherlands
NOTAMs	Notices to Airmen
NPS	National Policy Statement
NSL	NATS (Services) Limited

OLS	Obstacle Limitation Surfaces
OREI	Offshore Renewable Energy Installation
Pd	Probability of Detection
PEI	Preliminary Environmental Information
PEIR	Preliminary Environmental Information Report
PID	Public Information Day
PSRs	Primary Surveillance Radars
RAF	Royal Air Force
RLoS	Radar Line of Sight
RNAV	Area Navigation
RRH	Remote Radar Head
SAR	Search and Rescue
SARG	UK CAA Safety and Airspace Regulation Group
SARPs	Standards and Recommended Practices
SMS	Safety Management System
SPR	ScottishPower Renewables
SSRs	Secondary Surveillance Radars
TMZ	Transponder Mandatory Zone
UARs	Upper Air Routes
VFR	Visual Flight Rules

Glossary of Terminology

East Anglia TWO project	The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia TWO windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
Offshore infrastructure	All of the offshore infrastructure including wind turbines, platforms, and cables.
Air to Air Refuelling Area (AARA)	Defined airspace in which the transfer of aviation fuel from a tanker aircraft to a receiving aircraft takes place.
Air Navigation Service Provider (ANSP)	A public or private legal entity managing air traffic on behalf of a company, region or country. NATS is the main ANSP in the UK.
Controlled Airspace (CAS)	Defined airspace in 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.
Highest Astronomical Tide (HAT)	The highest tidal level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.
Lowest Astronomical Tide (LAT)	The lowest tidal level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.
Mean Sea Level (msl)	The average level of the sea surface over a long period or the average level which would exist in the absence of tides.
Obstacle Limitation Surfaces (OLS)	A series of complex 3D surfaces described around an airport runway where the control of obstacles is necessary to protect aircraft.
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.
Uncontrolled Airspace	Defined airspace in which Air Traffic Control does not exercise executive authority but may provide basic information services to aircraft in radio contact. In the UK, class G is uncontrolled airspace.

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15 Civil and Military Aviation and Radar

15.1 Introduction

1. This Environmental Statement (ES) chapter addresses the potential impact that the proposed East Anglia TWO project could have on aviation interests, including those of the United Kingdom (UK) Civil Aviation Authority (CAA), Ministry of Defence (MoD), regional airports, local aerodromes and NATS (that currently comprises NATS (En-Route) plc [NERL] and NATS (Services) Limited [NSL]), other UK aviation stakeholders and, where necessary, overseas authorities. The chapter includes a description of the potential effects on aviation activities with respect to effects on radar and physical effects in both UK and overseas airspace predicted because of the construction, operation and decommissioning phases of the proposed East Anglia TWO project. An assessment of these effects is undertaken and, where applicable, details are provided of proposed mitigation measures.

2. This chapter is supported by a Technical Appendix (***Appendix 15.2***) which identifies the radars liable to detect the East Anglia TWO windfarm site and details of the Radar Line of Sight (RLoS) analyses, including a technical analysis of those radars subject to assessment and consideration of radar mitigation options. ***Appendix 15.2*** also sets out a detailed assessment of the airspace occupied by the East Anglia TWO windfarm site. The chapter then goes on to outline the modus operandi of Air Navigation Service Providers (ANSPs) in the area and summarises the effects that the proposed East Anglia TWO project is likely to have on aviation activities in the vicinity.

3. This chapter has been prepared by Cyrrus Limited, a leading independent international consultancy providing a range of specialist aviation support services.

4. Guidance on the issues to be assessed for potential effects on aviation interests from offshore renewable energy developments in general has been obtained through reference to the National Policy Statements (NPS) NPS EN-1 and EN-3.

15.2 Consultation

5. Consultation is a key feature of the Environmental Impact Assessment (EIA) process, and continues throughout the lifecycle of a project, from its initial stages through to consent and post-consent.

6. The main issue identified is associated with potential wind turbine interference of Primary Surveillance Radars (PSRs). There is also potential for the wind turbines to become aviation obstacles or obstructions, particularly to helicopters engaged in offshore operations. This is considered within the impact assessment.

7. CAP 764 – CAA Policy and Guidelines on Wind Turbines, 6th Edition, February 2016 (CAP 764) advises that wind turbine effects on Secondary Surveillance Radars (SSRs) can be caused due to the physical blanking and diffracting effects of the turbine towers depending on the size of the turbines and the windfarm. However, CAP 764 goes on to say that these effects are only a consideration when the turbines are located close to the SSR i.e. less than 10km. As all known SSRs are outside the stipulated parameters by a significant margin they would not be affected by the wind turbines and are therefore not considered further.

8. Similarly, there would be no measurable effects upon terrestrial based aviation Communication, Navigation and (other) Surveillance (CNS) systems as the East Anglia TWO windfarm site is considerably outside applicable safeguarding limits pertaining to such CNS infrastructure. Therefore, terrestrial CNS infrastructure (other than PSR) is also not considered further, as no sites would be affected.

9. The infringement of coastal airports' Obstacle Limitation Surfaces (OLS) by, for example, the transportation of wind turbine towers from onshore facilities to the East Anglia TWO windfarm site, could render operations at those affected airports unsafe. The OLS routinely extend to only 15km from a licenced airport. Due to the considerable distance from nearby airports to the nearby ports, and to the proposed East Anglia TWO project, there would be no impact on any OLS. Therefore, impacts upon airports' OLS are not considered further.

10. To date, consultation with regards to Civil and Military Aviation and Radar has been undertaken through the East Anglia TWO Scoping Report (SPR, 2017) and the Preliminary Environmental Information Report (2019). Feedback received through this process has been considered in preparing the ES where appropriate and this chapter has been updated for the final assessment submitted within the Development Consent Order (DCO) application.

11. The responses received from stakeholders with regards to the Scoping Report (SPR, 2017), PEIR (SPR, 2019), are summarised in ***Appendix 15.1***, including details of how these have been taken account of within this chapter.

12. Ongoing public consultation has been conducted through a series of Public Information Days (PIDs) and Public Meetings. PIDs have been held throughout Suffolk in November 2017, March to July 2018 and February / March 2019. A

series of stakeholder engagement events were also undertaken in October 2018 as part of phase 3.5 consultation.

13. Details of the consultation phases are discussed further in ***Chapter 5 EIA Methodology.***

14. No public consultation feedback specific to civil and military aviation and radar has been raised during any of the public consultation undertaken to date. Full details of the proposed East Anglia TWO project consultation process are presented in the Consultation Report (document reference 5.1), which has been submitted as part of this DCO application.

15.3 Scope

15.3.1 Study Area

15. The East Anglia TWO windfarm site is located within the former East Anglia Zone, which is itself located in the southern North Sea.

15.3.1.1 Civil Aviation

16. The nearest airport to the East Anglia TWO windfarm site is Norwich International Airport, which is approximately 76km at its nearest point. The second nearest UK airport is Southend, which is 112km away, followed by London Stansted, which is 131km away. The nearest European airport is Ostend-Bruges Airport, which is 102km from the East Anglia TWO windfarm site. Schiphol Airport is approximately 168km away.

17. The East Anglia TWO windfarm site is within the London Flight Information Region (FIR) for air traffic control (ATC), the air space regulated by the UK Civil Aviation Authority (CAA) (***Figure 15.1***). The boundary of the London FIR and Amsterdam FIR is 7km to the east of the East Anglia TWO windfarm site boundary (at its nearest point). The southern three quarters of the East Anglia TWO windfarm site are located under part of the Clacton Control Area (CTA). Civilian air routes transect this southern section of the East Anglia TWO windfarm site; however, the base of these are no lower than Flight Level (FL) 85 (approximately 8,500ft above mean sea level [amsl]). The airspace immediately above the East Anglia TWO windfarm site, and below the Clacton CTA in the southern section, is uncontrolled Class G airspace (see ***section 15.2.5*** in ***Appendix 15.2***).

18. NERL provides en-route civil air traffic services within the London FIR. NERL's closest radar is based at Cromer (92km to the north-west of the East Anglia TWO windfarm site) which provides en-route information to both civil and military aircraft. Preliminary analysis undertaken for the East Anglia TWO windfarm site indicates that the northern section of the windfarm site is within RLoS of NERL's Cromer radar. Cromer is the only NERL radar identified as

being potentially impacted by the East Anglia TWO windfarm site. Preliminary analysis indicates that the base of cover of NERL's Debden radar over the East Anglia TWO windfarm site is 3,000ft amsl (see ***section 15.2.8.5*** and ***Plate 15.2.38*** in ***Appendix 15.2***).

19. The windfarm site is situated well clear of all Helicopter Main Routes (HMRs) and significantly south of the Anglia Radar Area of Responsibility (***Plate 15.2.5*** and ***Plate 15.2.6*** in ***Appendix 15.2***).

15.3.1.2 Military Aviation

20. The nearest military radar for aviation is the MoD's air defence radar at Trimingham which is approximately 89km to the north-west of the East Anglia TWO windfarm site. Preliminary analysis undertaken for the proposed East Anglia TWO project indicates that the northern section of the windfarm site is within RLoS of the Trimingham radar. The following military radars have been identified as being potentially impacted by the East Anglia TWO windfarm site:

- RAF Marham;
- RAF (USAF) Lakenheath;
- RAF Mildenhall; and
- RAF Wattisham.

21. RAF Marham, Lakenheath and Mildenhall are over 100km from the East Anglia TWO windfarm site. RAF Wattisham is approximately 80km from the East Anglia TWO windfarm site. Based on preliminary studies, no impacts upon radar from these sites are expected.

22. The north of the East Anglia TWO windfarm site marginally overlaps with the Lakenheath South Aerial Tactics Area (ATA). The Lakenheath South ATA extends from approximately 6,000ft amsl to approximately 19,500ft amsl (***Plate 15.2.1***). ATAs are areas of intense military activity, including Air Combat Training, and civilian pilots are advised to avoid these areas.

23. The aviation stakeholders' assessment is based on a desktop study of the available information and its impact on international and national aviation Standards and Recommended Practices (SARPs) followed by subsequent consultation with the relevant statutory bodies and interested organisations. A logical and proven methodology detailed in ***Appendix 15.2*****,** and based on the requirements of CAP 764, was used to assess the potential effects of the establishment of the East Anglia TWO windfarm site in respect of the Cromer and Trimingham PSRs. This chapter then addresses the consequences of any radar impacts on the airspace in the vicinity of the East Anglia TWO windfarm site.

15.3.2 Worst Case

24. Radar modelling has been undertaken based on two indicative turbine layouts prepared to assist stakeholders to visualise the windfarm – one comprising a maximum of 60 wind turbines with a maximum tip height of 300m above the lowest astronomical tide (LAT), the other comprising a maximum of 75 wind turbines with a maximum tip height of 250m LAT. Worst case scenarios based on these layouts are presented by impact in ***Table 15.1***.

25. The definitions of the worst case assumptions take into consideration content from ***Chapter 6 Project Description***.

Table 15.1 Worst Case Scenario

Impact	Parameter	Notes
Construction		
Impact 1: Creation of aviation obstacle environment.	60 wind turbines with a maximum blade tip height of 300m LAT, or 75 wind turbines with a maximum blade tip height of 250m LAT. Maximum of four offshore electrical platforms, topside height 50m. Maximum of one construction, operation and maintenance platform, topside height 50m. Maximum of one meteorological mast with a maximum height of 175m LAT. High crane vessels.	Maximum number of the tallest wind turbines, or Maximum number of wind turbines in the East Anglia TWO windfarm site. (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 East Anglia TWO windfarm site. Impact starting from a point of zero infrastructure present to full presence over an approximate 27 month period.
Impact 2: Wind turbines causing permanent interference on civil and military radars.	60 wind turbines with a maximum blade tip height of 300m LAT, or 75 wind turbines with a maximum blade tip height of 250m LAT.	Maximum number of the tallest wind turbines, or Maximum number of wind turbines in the East Anglia TWO windfarm site. (Either of the above scenarios could be worst case and both have been assessed for all impacts)

Impact	Parameter	Notes
		ATC may be unable to provide an effective surveillance service due to interference on radar displays. UK Air Defence (AD) detection capability and therefore national security could be compromised. Impact starting from a point of zero infrastructure present to full presence over an approximate 27 month period.
Impact 3: Increased air traffic in the area related to windfarm activities.	Helicopter visits during construction – up to 1,005 annual round trips required for routine operational and planned maintenance activities.	Helicopter visits as a result of being engaged on works in the East Anglia TWO windfarm site causing increased likelihood of aircraft to aircraft collision.
Operation		
Impact 1: Creation of aviation obstacle environment.	60 wind turbines with a maximum blade tip height of 300m LAT, or 75 wind turbines with a maximum blade tip height of 250m LAT. Maximum of four offshore electrical platforms, topside height 50m. Maximum of one construction, operation and maintenance platform, topside height 50m. Maximum of one meteorological mast with a maximum height of 175m LAT.	Maximum number of the tallest wind turbines, or Maximum number of wind turbines in the East Anglia TWO windfarm site. (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 East Anglia TWO windfarm site.
Impact 2: Wind turbines causing permanent interference on civil and military radars.	60 wind turbines with a maximum blade tip height of 300m LAT, or 75 wind turbines with a maximum blade tip height of 250m LAT.	Maximum number of the tallest wind turbines, or Maximum number of wind turbines in the East Anglia TWO windfarm site. (Either of the above scenarios could be worst case and both

Impact	Parameter	Notes
		have been assessed for all impacts) ATC may be unable to provide an effective surveillance service due to interference on radar displays. UK AD detection capability and therefore national security could be compromised.
Impact 3: Increased air traffic in the area related to windfarm activities.	Helicopter visits for scheduled and unscheduled maintenance. 1,005 annual round trips required for routine operational and planned maintenance activities.	Helicopter visits as a result of being engaged on works in the East Anglia TWO windfarm site causing increased likelihood of aircraft to aircraft collision.
Decommissioning		
Impact 1: Creation of aviation obstacle environment.	60 wind turbines with a maximum blade tip height of 300m LAT, or 75 wind turbines with a maximum blade tip height of 250m LAT. Maximum of four offshore electrical platforms, topside height 50m. Maximum of one construction, operation and maintenance platform, topside height 50m. Maximum of one meteorological mast at height of 175m LAT. High crane vessels.	Maximum number of the tallest wind turbines, or Maximum number of wind turbines in the East Anglia TWO windfarm site. (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 East Anglia TWO windfarm site. Impact starting from a point of full presence of infrastructure to zero presence over the decommissioning period.
Impact 2: Wind turbines causing permanent interference on civil and military radars.	60 wind turbines with a maximum blade tip height of 300m LAT, or 75 wind turbines with a maximum blade tip height of 250m LAT.	Maximum number of the tallest wind turbines, or Maximum number of wind turbines in the East Anglia TWO windfarm site.

Impact	Parameter	Notes
		(Either of the above scenarios could be worst case and both have been assessed for all impacts) ATC may be unable to provide an effective surveillance service due to interference on radar displays. UK AD detection capability and therefore national security could be compromised. Impact starting from a point of full presence of infrastructure to zero presence over the decommissioning period.
Impact 3: Increased air traffic in the area related to windfarm activities	Helicopter visits for decommissioning - 1,005 annual round trips required for routine operational and planned maintenance activities.	Helicopter visits as a result of being engaged on works in the East Anglia TWO windfarm site causing increased likelihood of aircraft to aircraft collision.

15.3.3 Embedded Mitigation

15.3.3.1 Information, Notifications and Charting

26. The East Anglia TWO windfarm site would create an obstacle environment which could be effectively 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.

27. Measures would be adopted at the commencement of works at the East Anglia TWO windfarm site to ensure that the aviation sector is made aware of the creation of a further aviation obstacle environment in the former East Anglia Zone, namely the East Anglia TWO windfarm site. These measures would include issuing Notices to Airmen (NOTAMs) and Aeronautical Information Circulars (AICs), warning of the establishment of obstacles within the East Anglia TWO windfarm site and publicity in such aviation publications as Safety Sense and General Aviation Safety Information Leaflet (GASIL).

28. At various points during the project, details of the position, height (amsl) and lighting of each of the completed permanent structures in the project would be forwarded to the CAA Aeronautical Information Service (AIS) for inclusion in Aeronautical Information Publications (AIPs) and on relevant 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.

29. En-route navigation charts would be updated as the site construction proceeds. All obstacles over 300ft amsl must be notified to the CAA for inclusion in the UK AIP (section ENR5.4) and on aeronautical maps and to Defence Geographic Centre for inclusion in MoD databases.

15.3.3.2 Marking and Lighting

30. The mandated requirements for the lighting of wind turbines in UK territorial waters are set out (in order of primacy) in the following documentation and also detailed in ***Chapter 6 Project Description***:

- International Civil Aviation Organisation (ICAO) Annex 14 – Aerodrome Design and Operations, Chapter 6, paragraph 6.2.4;
- CAA CAP 393 – The Air Navigation Order 2016 and Regulations, 5th edition Amendment March 2019 (CAP 393), Section 1: Air Navigation Order (ANO) Articles 222 and 223. Article 223 requires that offshore wind turbine obstacles have to be lit when they exceed 60m above the highest astronomical tide (HAT);
- CAA CAP 764 – CAA Policy and Guidelines on Wind Turbines, 6th edition, February 2016, Chapter 3, paragraphs 3.14 to 3.29;
- Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 543 – Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response, August 2016;
- MCA guidance document – Offshore Renewable Energy Installations: Requirements, Guidance and Operational Considerations for Search and Rescue and Emergency Response, version 2, November 2018;
- MoD Obstruction Lighting Guidance, issued by Low Flying Operations Squadron, 21 November 2014; and
- CAA CAP 437 – Standards for offshore helicopter landing areas, Edition 8.1, September 2018.

31. The international marking and lighting requirement, set out in ICAO Annex 14, specifies that (emphasis added):

*"a wind turbine **shall** be marked and / or lighted if it is determined to be an obstacle";* and that

*"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"*.

32. UK regulations adopt ICAO Annex 14's requirements as to lighting of wind turbines but do not require that wind turbines 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 wind turbines, in keeping with recent practice for offshore windfarms, 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 wind turbines would be painted submarine grey (colour code RAL 7035).

33. The Applicant would light the East Anglia TWO windfarm site in accordance with CAP 393. 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 (agl) and requires these to be lit. Article 223 modifies the Article 222 requirement with respect to offshore wind turbines, requiring these to be lit where they exceed 60m above HAT with a medium intensity (2000 candela) 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 wind turbines are so lit. The CAA would require that all wind turbines on the periphery of any windfarm need to be equipped with aviation warning lighting and such lighting, where achievable, shall be spaced at longitudinal intervals not exceeding 900 metres. There is no current routine requirement for offshore obstacles to be fitted with intermediate vertically spaced aviation lighting.

34. 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.

35. The MCA is seeking that wind turbine blade tips are marked in red, together with markings down the blade, to provide a Search and Rescue (SAR) helicopter pilot with a hover reference point as set out in the OREI SAR Requirements document. The MCA also seeks a lighting scheme comprising 200cd red / infra-red lights on the nacelles of non-Article 223 wind turbines, to be operated on demand during SAR operations and a wind turbine 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 proposed project, based upon the MCA's standard template. The Applicant anticipates that appropriate lighting would be utilised to facilitate heli-hoisting if undertaken within the East Anglia TWO windfarm site, as outlined in CAP 437.

36. To satisfy MoD requirements, the wind turbines 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 wind turbines required to be lit under ANO Article 223, this would satisfy the MoD operational requirement.

15.3.3.3 Regulatory Requirements

37. When construction is complete, given that the East Anglia TWO windfarm site occupies uncontrolled (Class G) airspace (below 19,500ft amsl), the responsibility for avoiding other traffic and obstacles rests with captains of civilian and military aircraft. Thus, logically a pilot would avoid the charted areas, and individually lit wind turbines, meteorological masts and any other obstacles, laterally or vertically, by the legislated standard minimum separation distance. This is outlined in CAA Official Record Series 4 No.1174: Standardised European Rules of the Air – Exceptions to the Minimum Height Requirements, 6 June 2016, which sets out that to avoid persons, vessels, vehicles and structures, pilots must give clearance of a minimum distance of 500ft; this applies equally to the avoidance of wind turbines and any other structure.

38. 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 (MSD) of 250ft from any person, vessel, vehicle or structure existed whilst operating in the vicinity of the East Anglia TWO windfarm site. The charting and lighting of the East Anglia TWO windfarm site should also be taken into account by MoD low flying units and SAR operators.

39. The Applicant assumes that the 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 the East Anglia TWO windfarm site.

15.4 Assessment Methodology

15.4.1 Guidance

40. The assessment of potential impacts on aviation and MoD has been undertaken with specific reference to the relevant NPS. Those relevant to the proposed East Anglia TWO project are as follows:

- Department of Energy and Climate Change (DECC) – Overarching National Policy Statement for Energy (EN-1), July 2011; and
- DECC – National Policy Statement for Renewable Energy Infrastructure (EN-3), July 2011.

41. ***Table 15.2*** provides a summary of the relevant guidance for the decision maker from NPS EN-1 and NPS EN-3 which the Applicant would give due consideration during the development of the proposed East Anglia TWO project.

Table 15.2NPS Assessment Requirements

NPS Requirements	NPS Reference	Section Reference
If the proposed development could have an effect on civil and military aviation, then the assessment should: • Consult the MOD, CAA, NATS and any aerodrome – licensed or otherwise – likely to be affected by the proposed project in preparing an assessment of the proposal on aviation or other defence interests; • Include potential impacts of the project upon the operation of CNS [Communications, Navigation & Surveillance] infrastructure, flight patterns (both civil and military), other defence assets and aerodrome operational procedures; and • Assess the cumulative effects of the project with other relevant projects in relation to aviation and defence.	NPS EN-1 Paragraphs 5.4.10-13	***Section 15.6***
If there are conflicts between the Government's energy and transport policies and military interests in relation to the application, the decision maker 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.	NPS EN-1 Paragraph 5.4.15	***Section 15.6***
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 decision maker should satisfy itself of the necessity of such lighting taking into account the case put forward by the consultees. The effect of such lighting on the landscape and ecology may be a relevant consideration.	NPS EN-1 Paragraph 5.4.16	***Section 15.3.3.2***
Where, after reasonable mitigation, operational changes, obligations and requirements have been proposed, the decision maker considers that: • A development would prevent a licensed aerodrome from maintaining its licence; • The benefits of the proposed development are outweighed by the harm to aerodromes serving business, training or emergency service needs,	NPS EN-1 Paragraph 5.4.17	***Section 15.6***

NPS Requirements	NPS Reference	Section Reference
taking into account the relevant importance and need for such aviation infrastructure; or • The development would significantly impede or compromise the safe and effective use of defence assets or significantly limit military training; • The development would have an impact on the safe and efficient provision of en route air traffic control services for civil aviation, in particular through an adverse effect on the infrastructure required to support communications, navigation or surveillance systems; consent should not be granted.		
Where a windfarm potentially affects other infrastructure or activity, a pragmatic approach should be employed by the decision maker. The decision maker should expect the applicant to minimise negative impacts and reduce risks to as low as reasonably practicable (ALARP).	NPS EN-3 Paragraph 2.6.183	***Section 15.6***
The decision maker should be satisfied that the site selection and design of the windfarm has avoided or minimised disruption or economic loss or any adverse effects on safety to other offshore industries. The decision maker should not consent applications which pose unacceptable risks to safety after mitigation measures have been considered.	NPS EN-3 Paragraph 2.6.184	***Section 15.3.3***
Where schemes have been carefully designed and the necessary consultation has been undertaken at an early stage, mitigation measures may be possible to negate or reduce effects on other offshore infrastructure to a level sufficient to enable the decision maker to grant consent.	NPS EN-3 Paragraph 2.6.186	***Sections 15.3.3*** and ***15.6***
Detailed discussions between the applicant 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 decision maker may wish to consider the potential to use conditions involving arbitration as a means of resolving how adverse impacts on other commercial activities will be addressed.	NPS EN-3 Paragraphs 2.6.187,188	***Sections 15.3.3*** and ***15.6*** It is the intention of the Applicant to engage further with all affected aviation stakeholders in the region through the Section 42 process, using this chapter as a basis for those discussions.

NPS Requirements	NPS Reference	Section Reference
Aviation and navigation lighting should be minimised to avoid attracting birds, taking into account impacts on safety.	NPS EN-3 Paragraph 2.6.107	***Section 15.3.3.2*** for proposed lighting.

42. As well as the NPS guidance, and in addition to the guidance outlined in the embedded mitigation section, the requirements and recommendations in the following documentation have also been considered in the completion of the assessment:

- CAA CAP 032 – UK Aeronautical Information Publication (AIP), 2019;
- CAA CAP 168 – Licensing of Aerodromes, Edition 11, March 2019;
- CAA CAP 670 – Air Traffic Services Safety Requirements, 3rd Issue, Amendment 1/2014, 23 May 2014;
- CAA CAP 724 – Airspace Charter, 4th Issue, 30 August 2012;
- CAA CAP 1616 – Airspace Design: Guidance on the regulatory process for changing airspace design including community engagement requirements, Version 2, November 2018;
- MoD – UK Military AIP, 2019;
- MoD – Military Low Flying in the United Kingdom: The Essential Facts, Updated 16 February 2017.

15.4.2 Data Sources

43. As part of the consultation process, the Applicant submitted the supporting Technical Appendix (***Appendix 15.2***) to NERL and the MoD to facilitate discussion with each of these stakeholders of potential impacts on and mitigation strategies for NERL and MoD radar infrastructure and airspace usage arising from the East Anglia TWO windfarm site.

44. In addition to the specific guidance documents referred to in ***sections 15.3.3*** and ***15.4.1***, the following data sources used in the undertaking of the desk based assessment, and for the remainder of the chapter, are presented in ***Table 15.3***.

Table 15.3Data Sources Features

Data	Year	Coverage	Confidence	Notes
Raytheon ASR-10SS PSR	2007	Raytheon Equipment Brochure	High	
Lockheed Martin TPS-77 PSR	2014	Lockheed Martin Equipment Brochure	Medium	Detailed performance data covered by International Traffic in Arms Regulations

Data	Year	Coverage	Confidence	Notes
				(ITAR) restrictions and therefore not available.
AIP	2019	UK	High	

15.4.3 Impact Assessment Methodology

45. In assessing the significance of the effects from the proposed East Anglia TWO project, it was necessary to identify whether or not there would be an impact on aviation operations. The aviation industry is highly regulated and subject to numerous mandatory standards, checks and safety requirements (e.g. CAP 670), many international in nature and requiring the issue of operating licenses. 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. 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 (MAA), 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 15.4***. This represents a deviation from the standard methodology presented within ***Chapter 5 EIA Methodology***.

Table 15.4Impact Significance Definitions

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

15.4.4 Cumulative Impact Assessment

46. Cumulative impacts in relation to the operation of other offshore and onshore windfarms have been considered for aviation and radar receptors within this chapter. Cumulative impacts have been considered with respect to obstacles and increase in air traffic, and with regards to the extent of radar visibility at wind turbine heights.

15.4.5 Transboundary Impact Assessment

47. Similar to the cumulative impacts, this chapter considers transboundary offshore wind developments with regards to obstacles to flight, increase in air traffic, radar visibility and airspace management.

15.5 Existing Environment

48. An initial desktop study was undertaken to determine those aviation stakeholders that were likely to be affected by the proposed East Anglia TWO project. This exercise was to establish the scope of any areas that could fundamentally preclude the development going ahead, prior to undertaking any consultation.

49. The Applicant and Cyrrus identified the following major aviation stakeholders as key organisations that would have a particular interest in the East Anglia TWO windfarm site:

- CAA Safety and Airspace Regulation Group (SARG);
- NATS – specifically the NATS Raytheon ASR-10SS ATC PSR facility at Cromer and the air traffic services provided utilising the Cromer PSR by NERL (by both civil en-route and embedded MoD off-route controllers) and NSL's Anglia Radar unit;
- UK MoD – specifically the MoD TPS-77 AD PSR at Trimingham;
- Offshore helicopter operators (including SAR operators) in the immediate vicinity of the proposed East Anglia TWO project would be consulted via NATMAC.

50. The conclusion reached was that none of the above stakeholders would have fundamental issues that were incapable of resolution, as is summarised in the remainder of this chapter.

15.5.1 Radar Modelling

51. An aviation stakeholders' assessment was undertaken based on a desktop review of the available information and data listed in ***Table 15.3***, together with consultations with relevant organisations.

52. Computer modelling using a contemporary software modelling tool (ICS telecom EV™) has been undertaken to predict if radar LoS exists between PSRs in the region of the East Anglia TWO windfarm site and the likely Probability of Detection (Pd) of the rotating wind turbine blades. This exercise identifies those PSRs that could detect the wind turbines and has been based on wind turbines with a maximum tip height of up to and including 300m amsl. 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 the East Anglia TWO windfarm site could be affected and what additional mitigation processes could be employed.

53. The RLoS / Pd modelling conducted for the Raytheon ASR-10SS ATC PSR had to be based on generic data as the specific and detailed characteristics for this PSR are considered commercially sensitive by NERL. Therefore, Cyrrus has used contemporary ATC PSR performance characteristics and publicly available ASR-10SS data in lieu. It must be acknowledged that modelling by NERL sources with detailed configuration data may reveal marginally different Pd results for the ASR-10SS PSR. However, confidence is very high that the PSR performance characteristics used have a high level of compatibility with the ATC PSR performance.

54. The RLoS / Pd modelling conducted for the MoD TPS-77 AD PSR also had to be based on generic data as the specific characteristics for this PSR are considered security sensitive by the MoD. Therefore, Cyrrus has used contemporary ATC PSR performance characteristics and publicly available TPS-77 data in lieu. It must be acknowledged that modelling by MoD sources with detailed configuration data may reveal differing Pd results for the TPS-77 PSR. However, confidence is high that the PSR performance characteristics used have a high level of compatibility with the AD PSR performance.

55. ***Appendix 15.2*** details the modelling undertaken and uses the outputs of the modelling to determine potential mitigation strategies for inclusion in this document, where appropriate. As necessitated, final mitigations would be agreed and implemented with aviation and radar stakeholders. Ongoing consultation with stakeholders would continue as part of the design process for the East Anglia TWO windfarm site.

56. Only PSRs potentially in RLoS of the East Anglia TWO windfarm site were subjected to detailed impact assessment.

15.5.2 Airspace

15.5.2.1 Civil Airspace Designations

57. Information on airspace classifications can be found at UK AIP: ENR 1.4 ATS (Air Traffic Services) Airspace Classification.

58. The airspace above the northern portion of the East Anglia TWO windfarm site from sea level to FL195 (approximately 19,500ft amsl) is uncontrolled and classified as Class G airspace. The airspace above the central portion of the East Anglia TWO windfarm site is Class G to FL135 (approximately 13,500ft amsl), and above the southern portion is Class G to FL85 (approximately 8,500ft amsl). The uncontrolled airspace immediately above the East Anglia TWO windfarm site is transited by most types of civilian aircraft operating, quite legitimately, 'off-route' and is also used by military aircraft for general training and exercise purposes. Additionally, the broad area is crossed by a number of HMRs that serve the offshore oil and gas industry platforms in the southern North Sea. NSL's Anglia Radar unit provides an ATS within its area of responsibility (between the surface and FL65 (circa 6,500ft amsl)) to the north of the East Anglia TWO windfarm site (see ***Plate 15.2.6*** in ***Appendix 15.2***).

59. To the north-west and south-west, Class D Controlled Airspace (CAS) is established around the airports at Norwich and Southend respectively. Class D CAS is established in order to provide protection to aircraft arriving and departing from aerodromes and from other aircraft operations. Norwich Airport, Southend Airport and the nearest military airfields, together with the associated PSRs located at them, are too far to the west of the East Anglia TWO windfarm site to be impacted by it and need not be considered further.

60. Class A CAS is established above the central portion of the East Anglia TWO windfarm site from FL135 to FL195 (Clacton CTA 6), and above the southern portion from FL85 to FL195 (Clacton CTA 5) (as detailed in ***section 15.5.3.4*** and ***Plate 15.2.7*** in ***Appendix 15.2***). Above FL195 all airspace is either Class C or A CAS. Within this airspace there exist Upper Air Routes (UARs) and the Clacton CTA Class A airspace protects lower airspace airways / Area Navigation (RNAV) routes such as L620, M183, M197, P7, P137, P44, Q295 and Y4 (see ***Plate A15.1.4*** in ***Appendix 15.2***) which transect the East Anglia TWO windfarm site.

61. The most easterly point of the East Anglia TWO windfarm site boundary is 7km west of the London / Amsterdam FIR airspace boundary.

62. Certain areas of UK airspace are delegated to the Netherlands ATC Authorities for operational convenience. The closest area of delegated airspace to the East Anglia TWO windfarm site is MOLIX CTAIII, the airspace from FL175 (circa 17,500ft amsl) to FL245 (circa 24,500ft amsl), which lies approximately 27NM to the north-east. Procedures and communications are as if this airspace was an integral part of the Amsterdam FIR.

63. The FIR boundary and Netherlands delegated airspace do not overlay the East Anglia TWO windfarm site, thus transboundary impacts on Netherlands aviation operations in the region are not considered to be an issue.

15.5.2.2 Military Airspace Designations

64. The north-eastern corner of the East Anglia TWO windfarm site is also marginally overlaid by the RAF Lakenheath ATA South (***Plate A15.1.1*** in ***Appendix 15.2***) in which, inter alia, Air Combat Training (ACT) takes place between FL60 (circa 6,000ft amsl) and FL195 (circa 19,500ft amsl).

65. To the north of the East Anglia TWO windfarm site is an Air to Air Refuelling Area (AARA Area 9, see ***Plate A15.1.5*** in ***Appendix 15.2***). These activities take place between 2,000ft amsl and FL50 (circa 5,000ft amsl). Military aircraft utilising these areas would ordinarily be receiving ATS from military controllers working alongside their civilian counterparts stationed at NERL Swanwick (using NERL radar facilities, including the Cromer PSR).

15.5.2.3 Helicopter Main Routes

66. HMRs 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. HMR promulgation does not predicate the flow of helicopter traffic. Whilst HMRs have no airspace status and assume the background airspace classification within which they lie (in the case of the southern North Sea, Class G), they are used by the ANSP and helicopter operators for flight planning and management purposes. In summary, HMRs are simply recognised routes to assist in regularising routeings and effectively managing traffic safely and do not comprise CAS.

67. HMRs have no promulgated lateral dimensions although CAA Policy (CAP 764) states that there should be no obstacles within 2NM either side of HMRs. The 2NM distance is based upon: operational experience; the accuracy of navigation systems; and, importantly, practicality. Such a distance would provide time and space for helicopter pilots to descend safely to an operating altitude below the icing level.

68. The ability of a helicopter to fly higher would be dependent upon the 0°C isotherm (icing level); this might preclude the aircraft from operating on days of low cloud base if the 0°C isotherm was at 2,000ft amsl or below as the aircraft must be able to descend to a clear area below cloud and with a positive temperature to safely de-ice if necessary.

69. Vertically, the HMRs over the southern North Sea extend from 1,500ft amsl to FL60 (circa 6,000ft amsl) inclusive. However, where helicopter icing conditions or other flight safety considerations dictate, helicopters could be forced to

operate below 1,500ft amsl. In these circumstances, where possible, pilots should endeavour to follow HMRs and advise the ATS provider of the new altitude giving the reason for operating below 1,500ft amsl. Consequently, a large number of wind turbines beneath an HMR could result in significant difficulties by forcing the aircraft to fly higher in order to maintain a safe vertical separation from wind turbines. CAP 764 suggests that, for the purpose of transiting wind turbine developments under Visual Flight Rules (VFR) and facilitating construction or maintenance flights within the boundaries of the windfarm, 'flight corridors' may be introduced within the design of the site. An HMR has been promulgated through the area of the Greater Gabbard Offshore Wind Farm and the Galloper Wind Farm, presumably to allow helicopter traffic to access those sites. This suggests that in following CAP 764, windfarms and traffic using HMRs are expected to co-exist.

70. Compliance with the HMR structure is not compulsory. In the general interests of flight safety, however, civil helicopter pilots are strongly encouraged to plan their flights using HMRs wherever possible. No HMRs transit the East Anglia TWO windfarm site. The closest HMR to the East Anglia TWO windfarm site is HMR 20, a south / north route that lies 8.3NM (15.4km) from the western boundary of the East Anglia TWO windfarm site at the closest point (***Plate 15.2.5***). Unlike other HMRs within the Southern North Sea HMR Structure, HMR 20 extends vertically from 500ft amsl to 2,000ft amsl inclusive. The East Anglia TWO windfarm site complies with the requirements of CAP 764 because all HMRs are more than 2NM from the East Anglia TWO windfarm site boundary.

15.5.3 Flight Procedures and ATS provided

71. In Class G (uncontrolled) airspace, aircraft are not obliged to be in receipt of an ATS, although it is open to pilots to seek Air Traffic Services 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 (e.g. transponders). All aircraft above FL100 (circa 10,000ft amsl) in the London FIR are required to carry and operate transponders in accordance with national regulations.

72. To gain access to CAS, 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 has to 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 minima are maintained between all known aircraft by using various techniques that may or may not include the use of PSR.

73. The ATS providers in the vicinity of the East Anglia TWO windfarm site are:

- Civil controllers at NERL's Swanwick Control Centre who provide en-route ATS to aircraft within CAS following promulgated routes along airways and UARs; and
- MoD controllers embedded at NERL's Swanwick Control Centre who provide:
  - ATSOCAS to military and civil aircraft outside of CAS below FL195 (circa 19,500ft amsl) – this would include any ATSOCAS provided to aircraft operating in the Lakenheath ATAs and AARA9; and
  - ATS within CAS to aircraft flying diverse profiles not following the en-route structure, e.g. aircraft wishing to cross CAS or conducting special tasks, such as flight inspections or trials.

74. Flight procedures in the study area are conducted in accordance with National UK CAA and MoD SARPs as promulgated in the UK AIP.

75. Given that all aircraft operating above FL100 (circa 10,000ft 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 CAS, and is especially relevant to helicopter operators.

15.5.4 Anticipated Trends in Baseline Conditions

76. There is no expected change to airspace or airspace users.

15.6 Potential Impacts

77. The potential impacts that could occur during construction, operation and decommissioning of the proposed project are listed in ***Table 15.1.***

78. The receptors for each impact are described within the text of each assessment and are identified in ***section 15.5***. Those receptors which are not considered to have any potential to be impacted by the proposed East Anglia TWO project have not been presented within the baseline.

15.6.1 Potential Impacts during Construction

15.6.1.1 Impact 1: Creation of an aviation obstacle environment

79. Construction of the windfarm 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 East Anglia TWO windfarm site.

80. From a starting point of no infrastructure within the East Anglia TWO windfarm site boundary, the infrastructure outlined in ***Table 15.1*** would gradually be installed over a period of 27 months.

81. Specifically, for the East Anglia TWO windfarm site, permanent or temporary obstacles can also increase risk to:

- General military low-flying training and operations; and
- Military and civilian 'off-route' fixed-wing and helicopter operations – including those undertaking Search and Rescue missions – over the southern North Sea.

82. In compliance with International and National SARPs with respect to notification, marking and lighting, as outlined in ***section 15.3.3.2***, to make pilots aware of the addition of infrastructure to the site, the impact on the aviation sector during the construction of the East Anglia TWO windfarm site could be reduced to an acceptable level. The impact has been assessed to be **not significant**.

15.6.1.2 Impact 2: Wind turbines causing permanent interference on civil and military radars

83. Wind turbines 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 wind turbines 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.

84. Despite the potential for RLoS with PSR systems, the PSR would not detect the wind turbines comprising the East Anglia TWO windfarm site until such time as turbine blades are allowed to rotate at operational speeds.

85. As a result of non-detection during the construction phase, the impact is considered to be **no change**.

15.6.1.3 Impact 3: Increased air traffic in the area related to windfarm activities

86. The use of helicopters to support construction activities within the East Anglia TWO windfarm site could impact on existing air traffic in the area, and operations associated with HMRs. It is possible that helicopters could be used for transferring people and / or equipment to the East Anglia TWO windfarm site on a daily basis for the construction period.

87. The possible increase in air traffic associated with construction support activities brings with it a potential increased risk of aircraft collision in the area of the proposed East Anglia TWO project.

88. No HMRs are currently established within the East Anglia TWO windfarm site. Therefore, offshore helicopter operations using HMRs should be unaffected by the obstacle environment.

89. The airspace surrounding the proposed East Anglia TWO project is already well served by existing HMRs, procedures and ATC units providing the appropriate level of ATS, as well as Search and Rescue services in times of emergency, to support the existing offshore oil and gas industries. Therefore, the infrastructure is already extant to reduce the risk of collision to ALARP.

90. Due to the predicted low number of movements caused by the construction of the East Anglia TWO windfarm site, the absence of HMRs within the East Anglia TWO windfarm site, the availability of existing ATS and by complying with CAP 764 as outlined in ***section 15.3.3***, the impact to aircraft operators in the vicinity of the East Anglia TWO windfarm site, including those using the HMRs, is considered to be **not significant**.

91. CAP 764 suggests that, for the purpose of transiting windfarm developments under VFR and facilitating construction or maintenance flights within the boundaries of the windfarm, 'flight corridors' may be introduced within the design of the site. As the embedded mitigation set out in ***section 15.3.3*** is deemed sufficient to reduce the potential impact to **not significant**, this additional mitigation set out in CAP 764 is not considered necessary.

15.6.2 Potential Impacts during Operation

15.6.2.1 Impact 1: Creation of an aviation obstacle environment

92. During the operation of the proposed East Anglia TWO project, the infrastructure included within ***Table 15.1*** would be present within the East Anglia TWO windfarm site. This could pose a physical obstruction to aircraft utilising the airspace in the vicinity of the East Anglia TWO windfarm site.

93. Specifically, for the East Anglia TWO windfarm site, permanent or temporary obstacles can also increase risk to:

- General military low-flying training and operations; and
- Military and civilian 'off-route' fixed-wing and helicopter operations – including those undertaking Search and Rescue missions – over the southern North Sea.

94. In compliance with International and National SARPs with respect to notification, marking and lighting, as outlined in ***section 15.3.3.2***, the impact on the aviation sector during the operation of the East Anglia TWO windfarm site could be reduced to an acceptable level. The impact has been assessed to be **not significant**.

15.6.2.2 Impact 2: Wind turbines causing permanent interference on civil and military radars

95. The East Anglia TWO windfarm site would be within the operational range of radar systems serving both civil and military agencies and they are likely to detect wind turbines located within the East Anglia TWO windfarm site, as detailed in ***Appendix 15.2***. The number of wind turbines within RLoS of the Cromer ATC and Trimingham AD PSRs would depend on the maximum tip height of the individual wind turbines and the detailed windfarm configuration selected.

96. When operational (i.e. with blades fitted and rotating), wind turbines have the potential to generate 'clutter' (or false targets) upon radar displays, as current generation PSRs are unable to differentiate between the moving blades of wind turbines and aircraft. As a consequence, radar operators can be unable to distinguish between primary radar returns generated by wind turbines or by aircraft. This may produce an adverse impact on the provision of safe and effective ATS by those ANSPs that utilise the Cromer ATC PSR and could compromise the ability of the MoD to undertake its Air Defence role utilising the Trimingham AD PSR.

97. Mitigation would be required if the windfarm design, based upon parameters outlined in ***Table 15.1***, shows a Pd of the wind turbines above the system threshold levels that would allow the wind turbine blades to be presented on PSR displays. Mitigation should only be required for so long as PSRs do not have the inherent capability to distinguish wind turbine returns from aircraft returns: increasingly, "next generation" PSRs are looking to provide this functionality. This interim additional mitigation, as secured through the draft DCO could involve one or more of the following:

- In respect of the Cromer ATC PSR:
  - Blanking the relevant impacted areas of the East Anglia TWO windfarm site (either at the radar head or in the radar display system) so as to remove the PSR data containing the wind turbine returns from the radar data presented to controllers;
  - In addition to radar blanking where the blanked area exceeds a certain size (to be determined in consultation with NATS), introducing a Transponder Mandatory Zone (TMZ). A TMZ requires all aircraft that wish to transit the TMZ to be equipped with SSR transponders to enable controllers to track aircraft through what would otherwise be a 'black hole' in primary surveillance cover;
  - Using alternative PSRs (e.g. Debden and Claxby or the Aveillant Theia infill radar proposed to mitigate the impact on the Trimingham AD PSR)

to provide coverage for the provision of ATS in the area of the East Anglia TWO windfarm site;

- In respect of the Trimingham AD PSR:
  - The application of a Non-Auto Initiation Zone (NAIZ) in the TPS-77's lowest beam over the footprint of any wind turbines that would be detected by the PSR (cross refer to ***Appendix 15.2*** for more details). A NAIZ has been the most common wind turbine mitigation technique applied to the TPS-77 to date. However, on 24 August 2018, the MoD issued a statement indicating that the TPS-77 NAIZ mitigation had not performed to expectation at flight trials over two offshore windfarms and it is looking to undertake further investigation of TPS-77 mitigation options. Through discussion relating to other SPR projects, the MoD expressed concern if it were to lose AD detection at the edge of RRH Trimingham's cover and the Applicant anticipates that the MoD will have the same sensitivity for East Anglia TWO;
  - Installation of a long range Aveillant Theia Holographic Radar™ on the Norfolk coast to provide infill radar cover for inclusion in the MoD AD air picture over the impacted areas of the East Anglia TWO windfarm site, if the application of a NAIZ is not feasible.

98. 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 would continue as a development might emerge that proves to be more suitable for adoption and implementation while the proposed East Anglia TWO project advances and matures.

99. ***Appendix 15.2*** sets out the radar modelling findings in respect of both Cromer and Trimingham PSRs (based on the indicative visualisation turbine layouts used in the radar modelling), identifying the areas in which wind turbines of specified heights should not be detected. ***Appendix 15.2*** concludes that:

- In respect of the Cromer ATC PSR:
  - If 250m max tip height turbines were used across the entire East Anglia TWO windfarm site, then it is unlikely that the turbines would be detected, as indicated in ***Plate 15.2.35,*** and no mitigation would be required;
  - If 300m max tip height turbines were used across the entire East Anglia TWO windfarm site, the turbines indicated in ***Plate 15.2.36*** could require additional mitigation measures to be applied, although further radar

modelling and consultation with NATS may obviate the need for mitigation beyond radar blanking;

- In respect of the Trimingham AD PSR:
  - If 250m max tip height turbines were used across the entire East Anglia TWO windfarm site, the area shown in ***Plate 15.2.12*** would require additional mitigation measures to be applied, possibly infill cover from an Aveillant Theia radar;
  - If 300m max tip height turbines were used across the entire East Anglia TWO windfarm site, the area shown in ***Plate 15.2.13*** would require additional mitigation measures to be applied, possibly infill cover from an Aveillant Theia radar.

100. Without additional mitigation, as secured through the draft DCO, the impacts to these 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 could be wholly and successfully mitigated through various technical solutions applied to current generation PSRs. It is anticipated that during the operational life of East Anglia TWO, the MoD and NATS 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 wind turbines. Following the application of additional mitigation, the residual impact is considered to be **not significant**.

15.6.2.3 Impact 3: Increased air traffic in the area related to windfarm activities

101. The operational phase of the East Anglia TWO windfarm site is likely to see increased helicopter air traffic over the current baseline levels engaged on support operations in the area of the East Anglia TWO windfarm site.

102. The effect of this is to create a greater potential risk of a mid-air collision between aircraft engaged in such operations and / or aircraft in transit across the study area. The potential for such risks occurring is reduced through the embedded mitigation (see ***section 15.3.3***). The safety of aircraft operating in uncontrolled airspace ultimately resides with the aircrew, who may request the provision of an ATS that would be provided in accordance with national procedures. The infrastructure and provision of an appropriate level of ATS, as well as Search and Rescue services in times of emergency, are already in place to support the existing offshore oil and gas industries. In light of the measures to be adopted, potential impacts are considered **not significant**.

103. The use of helicopters during the operational phase of the proposed East Anglia TWO project could impact on operations associated with HMRs. It is possible that helicopters could be used for transferring people and / or equipment to the

East Anglia TWO windfarm site on a daily basis for the lifetime of the development.

104. Due to the low number of movements predicted during the operational period of the proposed East Anglia TWO project, the absence of HMRs within the East Anglia TWO windfarm site, the availability of existing ATS and by complying with CAP 764 as outlined in ***section 15.3.3***, the impact to aircraft operators in the vicinity of the East Anglia TWO windfarm site, including those using the HMRs, is considered to be **not significant**.

15.6.3 Potential Impacts during Decommissioning

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

106. 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.

15.6.3.1 Impact 1: Creation of an aviation obstacle environment

107. During the decommissioning of the proposed East Anglia TWO project, the above sea level infrastructure included within ***Table 15.1*** would be removed gradually over the decommissioning period. This would gradually reduce the physical obstruction to aircraft utilising the airspace in the vicinity of the East Anglia TWO windfarm site.

108. Specifically, for the East Anglia TWO windfarm site, permanent or temporary obstacles can also increase risk to:

- General military low-flying training and operations; and
- Military and civilian ‘off-route’ fixed-wing and helicopter operations – including those undertaking Search and Rescue missions – over the southern North Sea.

109. The embedded mitigation in the form of International and National SARPs with respect to notification, marking and lighting, as outlined in ***section 15.3.3.2***, would be retained until decommissioning has been completed. The impact on the aviation sector during the construction in the East Anglia TWO windfarm site would be reduced to pre-development conditions. The impact has been assessed to be **no change**.

15.6.3.2 Impact 2: Wind turbines causing permanent interference on civil and military radars

110. During the gradual decommissioning of above sea level infrastructure in the East Anglia TWO windfarm site over the decommissioning period, the impact on radar would be removed. Firstly, wind turbines are made inoperative and the blades cease turning, before being removed from the site. In addition, all mitigations applicable to the operational phase (to the extent still required) would remain in place during the decommissioning phase until such time as all wind turbine blades are removed. The impact on radar during decommissioning is therefore considered to be **no change**, as the site is returned to pre-development conditions.

15.6.3.3 Impact 3: Increased air traffic in the area related to windfarm activities

111. The use of helicopters during the decommissioning phase of the proposed East Anglia TWO project could impact on operations associated with HMRs. It is possible that helicopters could be used for transferring people and equipment to the East Anglia TWO windfarm site on a daily basis during the decommissioning of site infrastructure.

112. The possible increase in air traffic associated with decommissioning support activities brings with it a potential risk of aircraft collision in the area of the proposed East Anglia TWO project.

113. The potential for such risks occurring is reduced through the embedded mitigation (see ***section 15.3.3***). The safety of aircraft operating in uncontrolled airspace ultimately resides with the aircrew, who may request the provision of an ATS that would be provided in accordance with national procedures. The infrastructure and provision of an appropriate level of ATS, as well as Search and Rescue services in times of emergency, are already in place to support the existing offshore oil and gas industries.

114. Due to the low number of movements predicted during the decommissioning period of the proposed East Anglia TWO project, the absence of HMRs within the East Anglia TWO windfarm site, the availability of existing ATS and by complying with CAP 764 as outlined in ***section 15.3.3***, the impact to aircraft operators in the vicinity of the East Anglia TWO windfarm site, including those using the HMRs, is considered to be **not significant**.

15.7 Cumulative Impacts

115. This section covers the anticipated cumulative impacts on aviation and MoD interests in the region of the East Anglia TWO windfarm site over the anticipated lifecycle of the proposed East Anglia TWO project.

116. In ATS terms, the establishment of the East Anglia TWO windfarm site in the southern North Sea provides for adequate airspace around the development in which aircraft can be operated to enable the prescribed separation standards to be achieved without incurring adverse impacts from other developments, either onshore or offshore.

117. The other windfarm developments with the potential to act cumulatively with the proposed East Anglia TWO project are:

- Greater Gabbard Offshore Wind Farm;
- Galloper Offshore Wind Farm;
- Scroby Sands Wind Farm;
- East Anglia ONE Offshore Windfarm;
- East Anglia THREE Offshore Windfarm; and
- The proposed East Anglia ONE North project.

118. ***Table 15.5*** sets out a summary of projects considered under the Cumulative Impact Assessment for the proposed East Anglia TWO project.

15.7.1 Impact 1: Creation of an aviation obstacle environment

119. Aircraft captains have the responsibility for the safety of their aircraft and are required to avoid any obstacle by legislated minimum distances. There would be no cumulative effects from the construction of the proposed East Anglia TWO project, inclusive of the installation of wind turbines within the East Anglia TWO windfarm site.

120. 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. Therefore, there should be no cumulative effects associated with the proposed East Anglia TWO project on the impact of surface obstacles on aviation operations as compliant markings and lighting would be provided.

121. Through the use of embedded mitigation such as effective lighting, reliance on pilot competence and consideration of charted obstacles, the cumulative effects from the creation of an obstacle environment is considered to be **not significant**.

15.7.2 Impact 2: Wind turbines causing permanent interference on civil and military radars

122. The Greater Gabbard site is located approximately 12km to the south-west of the East Anglia TWO windfarm site. Therefore, the potential for an adverse cumulative effect accruing between the two projects was considered.

123. The Greater Gabbard ES indicates that no part of the Greater Gabbard site is likely to be detected by any PSRs, and NERL and the MoD did not object to that project. As no radar interference is predicted for Greater Gabbard, this presents no cumulative effect with the proposed East Anglia TWO project, therefore the impact is considered to be **not significant**.

124. The Galloper site is located approximately 7km to the south-west of the East Anglia TWO windfarm site. Therefore, the potential for an adverse cumulative effect accruing between the two projects was considered.

125. The Galloper ES indicates that no part of the Galloper site is likely to be detected by any PSRs, and NERL and the MoD did not object to that project. As no radar interference is predicted for Galloper, this presents no cumulative effect with the proposed East Anglia TWO project, therefore the impact is considered to be **not significant**.

126. The East Anglia ONE site is located approximately 10km to the east of the East Anglia TWO windfarm site. Therefore, the potential for an adverse cumulative effect accruing between the two projects was considered.

127. The East Anglia ONE ES indicates that no part of the East Anglia ONE site is likely to be detected by any PSRs, and NERL and the MoD did not object to that project. As no radar interference is predicted for East Anglia ONE, this presents no cumulative effect with the proposed East Anglia TWO project, therefore the impact is considered to be **not significant**.

128. The East Anglia TWO windfarm site is approximately 49km and 48km from the Scroby Sands and East Anglia THREE projects respectively. These two projects are at a sufficient distance in ATS terms that they would not create cumulative impacts on aviation operations in the area of the East Anglia TWO windfarm site. Therefore, the cumulative impact for these two windfarm sites is considered to be **not significant**.

129. With respect to the East Anglia ONE North windfarm site, the proposed height and location of wind turbines to be utilised is not yet known. Modelling undertaken in the completion of this chapter on the radars likely to be affected by the development of the East Anglia TWO windfarm site suggests that the radar arcs will also extend into the East Anglia ONE North site. Without additional mitigation applied to the East Anglia TWO windfarm site and the East Anglia ONE North windfarm site, the impact is considered to be **major significant**. However, the Applicant is content that technical or design mitigation measures can be put in place that would reduce the impact significance to **not significant**.

130. With respect to onshore windfarm sites, these would all be of a sufficient distance from the East Anglia TWO windfarm site that there would be no cumulative effects on aviation operations. The cumulative impact with onshore windfarm sites is therefore identified to be **no change**.

15.7.3 Impact 3: Increased air traffic in the area related to windfarm activities

131. During the construction, operation and decommissioning phases of the proposed East Anglia TWO project, the area in the vicinity of the site is likely to see increased helicopter air traffic over the current baseline levels due to the use of helicopters in the provision of support at the East Anglia TWO windfarm site.

132. The likely number of daily helicopter movements within the East Anglia TWO windfarm site is considered to be low. The cumulative effect of this activity in consideration of the six windfarm projects assessed would create a greater potential risk of a mid-air collision between aircraft engaged in such operations and / or aircraft in transit across the study area.

133. The potential for such risks occurring is reduced through the distances between the East Anglia TWO windfarm site and the six offshore windfarm projects assessed. The implementation of the embedded mitigation outlined in ***section 15.3.3***, and the reliance on pilots not engaged in works in direct relation to the East Anglia TWO windfarm site to comply with civil aviation regulations, means that the cumulative impact to aircraft operators in the vicinity of the East Anglia TWO windfarm site, including those using the HMRs, is considered to be **not significant**.

Table 15.5 Summary of Projects considered for the CIA in Relation to Civil and Military Aviation and Radar

Project	Status	Development period	[1]Distance from East Anglia TWO windfarm site (km)	Distance from East Anglia TWO offshore cable route (km)	Project definition	Included in CIA	Rationale
Greater Gabbard Offshore Wind Farm	Operational	2010-2013	12km south-west	N/A	Built information	Yes	Proximity to proposed East Anglia TWO project
Galloper Offshore Wind Farm	Operational	2016-2018	7km south-west	N/A	Built information	Yes	Proximity to proposed East Anglia TWO project
Scroby Sands Wind Farm	Operational	Fully commissioned Dec 2004	49km north-west	N/A	Built information	Yes	Proximity to proposed East Anglia TWO project
East Anglia ONE	Under construction	2018-2020	10km east	N/A	Consented information available	Yes	Proximity to proposed East Anglia TWO project
East Anglia THREE	Licenced	2022-2025	48km north-east	N/A	Consented information available	Yes	Proximity to proposed East Anglia TWO project

[1] Shortest distance between the considered project and East Anglia TWO– unless specified otherwise

Project	Status	Development period	[1]Distance from East Anglia TWO windfarm site (km)	Distance from East Anglia TWO offshore cable route (km)	Project definition	Included in CIA	Rationale
East Anglia ONE North	Application submitted	2024-2026	10km north-east	N/A	PDS available	Yes	Proximity to proposed East Anglia TWO project

15.8 Transboundary Impacts

134. Other EU member states that could be impacted by the proposed East Anglia TWO project are detailed in ***Table 15.6.***

135. The airspace around the windfarm is used by international civil aviation and is adjacent to the Amsterdam FIR, however, transboundary impacts on civil aviation are not anticipated.

Table 15.6List of Other EU Member States Retained in the Transboundary Impact Assessment in Relation to the Topic

EU member state	Commentary
Netherlands	The East Anglia TWO windfarm site would be situated 7km to the west of the London / Amsterdam FIR boundary.

136. As aviation operations are predominantly regulated by international criteria, there would be little difference in the impacts perceived by receptors in the Netherlands over those experienced in the UK and the same mitigation strategies should be effective in both domains.

137. The nearest offshore windfarm development within Dutch territory lies some 40km from the south-east point of the East Anglia TWO windfarm site and lies under airspace that is the responsibility of the Dutch CAA (ILT). As aviation objections have not been raised on these developments, it is reasonable to assess that there would be limited transboundary concerns with regards to aviation interests during the construction, operation and decommissioning stages of the proposed East Anglia TWO project. Therefore, the transboundary impact on aviation operations in the area of the London / Amsterdam FIR boundary is assessed as **not significant**.

138. Consultation was undertaken in 2012 with relevant bodies as part of the East Anglia ONE and former East Anglia Zone activities. The East Anglia ONE and East Anglia Zone consultation with the ILT indicated that the embedded mitigation proposed (i.e. charting, marking and lighting of all wind turbines consistent with UK regulations) would be acceptable to mitigate any potential impact by the creation of an obstacle environment on low level transboundary flights. The same criteria would therefore be applied to the proposed East Anglia TWO project to achieve the application of a consistent policy. The impact is considered to be **not significant**.

15.9 Inter-relationships

139. The only inter-relationship with this chapter is ***Chapter 14 Shipping and Navigation*****,** as detailed in ***Table 15.7***. Aviation lighting fitted to offshore wind turbines could cause confusion to the maritime community as the specification

for the lighting to be displayed below the horizontal plane of the light fitment itself could cause mariners some confusion. This confusion could result in wind turbines with conflicting warning lighting representing a collision risk to maritime surface vessels.

140. Work has been undertaken to develop an aviation warning lighting standard where, from the nature of the lighting, it would 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' to resolve potential issues for the maritime community. See CAP 764 paragraph 3.16.

Table 15.7Chapter topic inter-relationships

Topic and description	Related Chapter	Where addressed in this Chapter
Aviation lighting fitted to offshore wind turbines could cause confusion to mariners.	Chapter 15 Shipping and Navigation	***Section 15.3.3.2***

15.10 Interactions

141. Impacts identified and assessed in the chapter have the potential to interact with each other, giving rise to more significant impacts. The worst-case impacts assessed within the chapter take these potential interactions into account.

15.11 Summary

142. ***Table 15.8*** presents a summary of the impact assessment undertaken with respect to the proposed East Anglia TWO project in relation to Aviation and MoD, which is discussed in ***section 15.6***. ***Table 15.8*** presents the summarised cumulative impacts, and transboundary impacts with specific reference to the Netherlands as the only anticipated receptor of transboundary impacts.

Table 15.8 Potential Impacts Identified for Aviation and MoD receptors

Potential Impact	Receptor	Significance	Mitigation	Residual Impact
Construction				
Impact 1: Creation of aviation obstacle environment	Aviation – general Military Low flying Helicopter offshore operations Search and Rescue operations	Not significant	Embedded Mitigation sufficient	**N/A**
Impact 2: Wind turbines causing permanent interference on civil and military radar	MoD - TPS-77 at Trimingham NATS - Raytheon ASR-10SS at Cromer ATS	No change	N/A	**N/A**
Impact 3: Increased air traffic in the area related to windfarm activities	Aviation – general Military and civilian 'off-route' fixed-wing and helicopter operations – including those undertaking Search and Rescue missions – over the southern North Sea	Not significant	Embedded Mitigation sufficient	**N/A**
Operation				
Impact 1: Creation of aviation obstacle environment	Aviation – general Military and civilian 'off-route' fixed-wing and helicopter operations – including those undertaking Search and Rescue missions – over the southern North Sea	Not significant	Embedded Mitigation sufficient	**N/A**

Potential Impact	Receptor	Significance	Mitigation	Residual Impact
Impact 2: Wind turbines causing permanent interference on civil and military radar	MoD - TPS-77 at Trimingham NATS - Raytheon ASR-10SS at Cromer ATS	Major significant	Radar technical solution at source	**Not significant**
Impact 3: Increased air traffic in the area related to windfarm activities	Aviation – general Military and civilian 'off-route' fixed-wing and helicopter operations – including those undertaking Search and Rescue missions – over the southern North Sea	Not significant	Embedded Mitigation sufficient	**N/A**
Decommissioning				
Impact 1: Creation of aviation obstacle environment	Aviation – general Military and civilian 'off-route' fixed-wing and helicopter operations – including those undertaking Search and Rescue missions – over the southern North Sea	Not significant	Embedded Mitigation sufficient	**N/A**
Impact 2: Wind turbines causing permanent interference on civil and military radar	MoD - TPS-77 at Trimingham NATS - Raytheon ASR-10SS at Cromer ATS	No change	N/A	**N/A**
Impact 3: Increased air traffic in the area related to windfarm activities	Aviation – general Military and civilian 'off-route' fixed-wing and helicopter operations – including those	Not significant	Embedded Mitigation sufficient	**N/A**

Potential Impact	Receptor	Significance	Mitigation	Residual Impact
	undertaking Search and Rescue missions – over the southern North Sea			
Cumulative				
Greater Gabbard Offshore Wind Farm, Galloper Offshore Wind Farm, Scroby Sands Wind Farm, East Anglia ONE, East Anglia THREE, East Anglia ONE North - creation of aviation obstacle environment	Aviation stakeholders in the vicinity of East Anglia TWO	Not significant	Embedded Mitigation sufficient	**N/A**
Greater Gabbard Offshore Wind Farm, Galloper Offshore Wind Farm, Scroby Sands Wind Farm, East Anglia ONE, East Anglia THREE, East Anglia ONE North - wind turbines causing permanent interference on military radar	MoD - TPS-77 at Trimingham NATS - Raytheon ASR-10SS at Cromer ATS	Not significant	Radar technical solution at source	**Not significant**
Onshore windfarms in the vicinity of radar stations - wind turbines causing permanent interference on military radar	MoD - TPS-77 at Trimingham NATS - Raytheon ASR-10SS at Cromer ATS	No change	N/A	**N/A**

Potential Impact	Receptor	Significance	Mitigation	Residual Impact
Greater Gabbard Offshore Wind Farm, Galloper Offshore Wind Farm, Scroby Sands Wind Farm, East Anglia ONE, East Anglia THREE, East Anglia ONE North - increased air traffic in the area related to windfarm activities	Aviation stakeholders in the vicinity of East Anglia TWO	Not significant	Embedded Mitigation sufficient	**N/A**
Transboundary				
Impact on aviation operations in the area of the London / Amsterdam FIR boundary	Aircraft in transit from / to Netherlands airspace	Not significant	N/A	**N/A**
Obstacle environment on low level transboundary flights	Aircraft in transit from / to Netherlands airspace	Not significant	Embedded mitigation sufficient	**N/A**

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