East Anglia ONE North and East Anglia TWO Offshore Windfarms

Applicants' Responses to Examining Authority's Written Questions

Volume 3 – 1.1 Aviation

Applicants: East Anglia ONE North Limited and East Anglia TWO Limited
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Author: Royal HaskoningDHV

Applicable to East Anglia ONE North and East Anglia TWO

Revision Summary				
Rev	**Date**	**Prepared by**	**Checked by**	**Approved by**
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Description of Revisions			
Rev	**Page**	**Section**	**Description**
001	n/a	n/a	Final for Deadline 1

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Glossary of Acronyms

AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
ADD	Acoustic Deterrent Devices
AEOI	Adverse Effect on Integrity
AIL	Abnormal Indivisible Load
AIS	Air Insulated Switchgear
ALC	Agricultural Land Classification
ALO	Agricultural Liaison Officer
ANO	Air and Navigation Order
AONB	Area of Outstanding Natural Beauty
APP	Application Document
AST	Assured Shorthold Tenancies
ATC	Automatic Traffic Counts
BCT	Bat Conservation Trust
BEIS	Department of Business Energy and Industrial Strategy
BMV	Best and Most Versatile
BoR	Book of Reference
BT	British Telecom
CA	Compulsory Acquisition
CCS	Construction Consolidation Sites
Cd	Candela
CfD	Contract for Difference
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CION	Connection and Infrastructure Options Note
COCP	Code of Construction Practice
dB	Decibels
DCO	Development Consent Order
DML	Deemed Marine Licence
DMO	Destination Management Organisation
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EIA	Environmental Impact Assessment
EM	Explanatory Memorandum
EMP	Ecological Management Plan
ES	Environmental Statement
ESC	East Suffolk Council
ESCA	European Subsea Cables Association
ESDAL	Electronic Service Delivery for Abnormal Loads
ETG	Expert Topic Group
ExA	Examining Authority
ExQs	Examining Authorities First Written Questions
FID	Final Investment Decision
FRA	Flood Risk Assessment
GEART	Guidelines for the Environmental Assessment of Road Traffic
GIS	Gas Insulated Switchgear
GLVIA	Guidelines for Landscape and Visual Impact Assessment
Ha	Hectares
HDD	Horizontal Directional Drilling
HE	Historic England
HGV	Heavy Goods Vehicle

HRA	Habitats Regulations Assessment
ICPC	International Cable Protection Committee
IPSIP	In Principle Site Integrity Plan
Km	Kilometres
kV	Kilovolt
LAT	Lowest Astronomical Tide
LCA	Landscape Character Assessment
LCT	Landscape Character Type
LiDAR	Light Detection and Ranging
LIQ	Land Interest Questionnaire
LLFA	Lead Local Flood Authority
LMP	Landscape Management Plan
LPA	Local Planning Authority
LSE	Likely Significant Effects
LVIA	Landscape and Visual Impact Assessment
M	Metres
MCA	Marine Coastguard Agency
MCTC	Manual Classified Turning Counts
MHWS	Mean High Water Sprints
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
MoD	Ministry of Defence
MoU	Memorandum of Understanding
MW	Megawatt
MWh	Megawatt Hours
NALEP	The New Anglia Local Enterprise Partnership
NATS	National Air Traffic Service
NCTA	National Coastal Tourism Academy
NE	Natural England
NGET	National Grid Electricity Transmission
Nm	Nautical Miles
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
OAMP	Outline Access Management Plan
OCTMP	Outline Construction Traffic Management Plan
OFTO	Offshore Transmission Owner
OLEMS	Outline Landscape and Ecological Management Strategy
OMLP	Outline Management and Landscape Plan
ORJIP	Offshore Renewables Joint Industry Programme
OTP	Outline Travel Plan
PD	Procedural Decision
PEIR	Preliminary Environmental Impact Report
PEMP	Project Environmental Management Plan
PIL	Persons with an interest in Land
PPG	Planning Practice Guidance
PRoW	Public Right of Way
PS	Policy Statements
PTP	Port Travel plan
PVA	Population Viability Analysis
RAG	Red Amber Green
RLoS	Radar Line of Sight
RR	Relevant Representation

RSPB	Royal Society for the Protection of Birds
RTD	Red Throated Diver
RWS	Rijkswaterstaat
SAC	Special Area of Conservation
SCC	Suffolk County Council
SCCAS	Suffolk County Council Archaeology Service
SCHAONB	Suffolk Coats and Heaths Area of Outstanding Natural Beauty
SLVIA	Seascape, Landscape and Visual Impact Assessment
SMP	Shoreline Management Plan
SNS	Southern North Sea
SoCG	Statement of Common Ground
SoS	Secretary of State
SPA	Special protected Area
SPR	ScottishPower Renewables
SSSI	Site of Special Scientific Interest
STEM	Science, Technology and Engineering and Mathematics
SuDS	Sustainable Urban Drainage System
SZC	Sizewell C
TCE	The Crown Estate
TH	Trinity House
TMZ	Transponder Mandatory Zone
TP	Temporary Purchase
TPO	Tree Purchase Order
TWT	The Wildlife Trust
UK	United Kingdom
UKCP	United Kingdom Climate Projections
UXO	Unexploded Ordinance
VP	Viewpoint
WQ	Written Question
WR	Written Representation
WSI	Written Scheme of Investigation
ZTV	Zone of Theoretical Visibility

Glossary of Terminology

Applicants	East Anglia TWO Limited / East Anglia ONE North Limited
Cable sealing end compound	A compound which allows the safe transition of cables between the overhead lines and underground cables which connect to the National Grid substation.
Cable sealing end (with circuit breaker) compound	A compound (which includes a circuit breaker) which allows the safe transition of cables between the overhead lines and underground cables which connect to the National Grid substation.
Construction consolidation sites	Compounds associated with the onshore works which may include elements such as hard standings, lay down and storage areas for construction materials and equipment, areas for vehicular parking, welfare facilities, wheel washing facilities, workshop facilities and temporary fencing or other means of enclosure.
Construction operation and maintenance platform	A fixed offshore structure required for construction, operation, and maintenance personnel and activities.
The Councils	East Suffolk Council and Suffolk County Council
Development area	The area comprising the onshore development area and the offshore development area (described as the 'order limits' within the Development Consent Order).
East Anglia ONE North project	The proposed project consisting of up to 67 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 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.
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Generation Deemed Marine Licence (DML)	The deemed marine licence in respect of the generation assets set out within Schedule 13 of the draft DCO.
Horizontal directional drilling (HDD)	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
HDD temporary working area	Temporary compounds which will contain laydown, storage and work areas for HDD drilling works.

Inter-array cables	Offshore cables which link the wind turbines to each other and the offshore electrical platforms, these cables will include fibre optic cables.
Jointing bay	Underground structures constructed at intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables.
Link boxes	Underground chambers within the onshore cable route housing electrical earthing links.
Meteorological mast	An offshore structure which contains metrological instruments used for wind data acquisition.
Mitigation areas	Areas captured within the onshore development area specifically for mitigating expected or anticipated impacts.
Marking buoys	Buoys to delineate spatial features / restrictions within the offshore development area.
Monitoring buoys	Buoys to monitor *in situ* condition within the windfarm, for example wave and metocean conditions.
National electricity grid	The high voltage electricity transmission network in England and Wales owned and maintained by National Grid Electricity Transmission
National Grid infrastructure	A National Grid substation, cable sealing end compounds, cable sealing end (with circuit breaker) compound, underground cabling and National Grid overhead line realignment works to facilitate connection to the national electricity grid, all of which will be consented as part of the proposed East Anglia TWO / East Anglia ONE North project Development Consent Order but will be National Grid owned assets.
National Grid overhead line realignment works	Works required to upgrade the existing electricity pylons and overhead lines (including cable sealing end compounds and cable sealing end (with circuit breaker) compound) to transport electricity from the National Grid substation to the national electricity grid.
National Grid overhead line realignment works area	The proposed area for National Grid overhead line realignment works.
National Grid substation	The substation (including all of the electrical equipment within it) necessary to connect the electricity generated by the proposed East Anglia TWO / East Anglia ONE North project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia TWO / East Anglia ONE North project Development Consent Order.
National Grid substation location	The proposed location of the National Grid substation.
Natura 2000 site	A site forming part of the network of sites made up of Special Areas of Conservation and Special Protection Areas designated respectively under the Habitats Directive and Birds Directive.
Offshore cable corridor	This is the area which will contain the offshore export cables between offshore electrical platforms and landfall.
Offshore development area	The East Anglia TWO / East Anglia ONE North windfarm site and offshore cable corridor (up to Mean High Water Springs).

Offshore electrical infrastructure	The transmission assets required to export generated electricity to shore. This includes inter-array cables from the wind turbines to the offshore electrical platforms, offshore electrical platforms, platform link cables and export cables from the offshore electrical platforms to the landfall.
Offshore electrical platform	A fixed structure located within the windfarm area, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore.
Offshore export cables	The cables which would bring electricity from the offshore electrical platforms to the landfall. These cables will include fibre optic cables.
Offshore infrastructure	All of the offshore infrastructure including wind turbines, platforms, and cables.
Offshore platform	A collective term for the construction, operation and maintenance platform and the offshore electrical platforms.
Onshore cable corridor	The corridor within which the onshore cable route will be located.
Onshore cable route	This is the construction swathe within the onshore cable corridor which would contain onshore cables as well as temporary ground required for construction which includes cable trenches, haul road and spoil storage areas.
Onshore cables	The cables which would bring electricity from landfall to the onshore substation. The onshore cable is comprised of up to six power cables (which may be laid directly within a trench, or laid in cable ducts or protective covers), up to two fibre optic cables and up to two distributed temperature sensing cables.
Onshore development area	The area in which the landfall, onshore cable corridor, onshore substation, landscaping and ecological mitigation areas, temporary construction facilities (such as access roads and construction consolidation sites), and the National Grid Infrastructure will be located.
Onshore infrastructure	The combined name for all of the onshore infrastructure associated with the proposed East Anglia TWO / East Anglia ONE North project from landfall to the connection to the national electricity grid.
Onshore preparation works	Activities to be undertaken prior to formal commencement of onshore construction such as pre–planting of landscaping works, archaeological investigations, environmental and engineering surveys, diversion and laying of services, and highway alterations.
Onshore substation	The East Anglia TWO / East Anglia ONE North substation and all of the electrical equipment within the onshore substation and connecting to the National Grid infrastructure.
Onshore substation location	The proposed location of the onshore substation for the proposed East Anglia TWO / East Anglia ONE North project.
Platform link cable	Electrical cable which links one or more offshore platforms. These cables will include fibre optic cables.
Safety zones	A marine area declared for the purposes of safety around a renewable energy installation or works / construction area under the Energy Act 2004.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the foundations as a result of the flow of water.
Transition bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.
Transmission DML	The deemed marine licence in respect of the transmission assets set out within Schedule 14 of the draft DCO.

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
1.1 Aviation					
1.1.1	The Applicant, National Air Traffic Service (NATS)	1	2	**Civil Aviation** ES Chapter 15 [APP-063] confirm that preliminary analysis undertaken for the proposed offshore windfarm arrays indicates that EA1N would be within the Radar Line of Sight (RLoS) of the National Air Traffic Services' Cromer radar and that the northern section of EA2 would also be within this RLoS. It is explained that next generation radars aim to provide the functionality of distinguishing wind turbine returns from aircraft returns, but that an interim mitigation could address this issue by blanking the relevant impacted areas either at the radar head or in the radar display system so as to remove the data containing the wind turbine returns from the radar data presented to air traffic controller. Alternative solutions could include introducing a Transponder Mandatory Zone (TMZ) or using alternative radars to infill the Cromer radar. The ExA note that NATS objects to the proposals at the present time and that the applicants are committed to ongoing engagement with NATS to identify a suitable mitigation scheme. a) Will next generation radars be able to distinguish between wind turbine returns from aircraft returns? b) If so, when is a next generation radar programmed to be installed at Cromer (if at all?) c) How large would the area be required to be blanked	The Applicants have committed to implementation of both radar blanking and a Transponder Mandatory Zone (TMZ) for both the East Anglia ONE North and East Anglia TWO applications. This commitment was made in the Statement of Common ground (SoCG) (AS-057) and updated SoCG (ExA.SoCG-5.D1.V2) submitted at Deadline 1. The Applicants defer to National Air Traffic Service (NATS) with regard to providing answers to questions 'a)' and 'b)'. c) The parties have agreed that the radar blanking mitigation will be applied to the entirety of the area(s) of the works within which the wind turbine structures are placed, whilst the TMZ will extend over the blanked area plus a buffer with a width of 2 nautical miles (nm), which is the established practice. For East Anglia ONE North, the area to be blanked will comprise Work No 1,2, 3 and 4 in ***Works Plan (Offshore)*** (APP-010). For East Anglia TWO, the area to be blanked will comprise Work No 1,2,3, and 4 in **Works Plan (Offshore)** (APP-010).

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
				on the radar, under current assessments? (Please describe this with reference to a plan or plans.) d) Would radar blanking ensure that the safety of UK airspace is maintained? e) Is there sufficient confidence that the identified mitigation techniques would work in this situation to ensure that the safety of UK aircraft and airspace is not adversely affected? f) Outline previous and ongoing discussions/negotiations between the Applicant and NATS (you may do this by reference to an updated Statement of Common Ground (SoCG).)	d) Yes, radar blanking and the use of a TMZ is an established mitigation practice that has been successfully used to address impacts on civil aviation and radar at operating offshore wind farms in the UK. For example, London Array (and Thanet Offshore Windfarm while Manston Airport was operational), the Greater Wash windfarms (Triton Knoll, Sheringham Shoal and Race Bank), Humber Gateway and Westermost Rough, Irish Sea windfarms (Walney Extension and Burbo Bank Extensions), Tay windfarms (Neart na Gaoithe, Inch Cape and SeaGreen 1), Moray windfarms (Beatrice and Moray East). e) Yes, there is sufficient confidence. Radar blanking and the use of a TMZ is an established mitigation practice that has been successfully used to address impacts on civil aviation and radar at operating offshore wind farms in the UK. f) The Applicants' refer the Examining Authority to the updated SoCG (ExA.SoCG-5.D1.V2).
1.1.2	The Applicant	1	2	**Military Aviation** ES Chapter 15 [APP-063] confirms that preliminary analysis undertaken for the proposed sites of the offshore windfarm arrays indicates that the EA1N site is within the RLoS of the	(a) The Applicants understand that the Trimingham radar will be due for replacement during the 2030s; however,

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
				Trimingham radar and that the northern section of EA2 would also be within this RLoS. Interim mitigation measures are proposed in the form of the application of a Non-Auto Initiation Zone (NAIZ) or the installation of a long range Aveillant Theia Holographic Radar™ on the Norfolk coast to provide infill radar cover for inclusion in the MoD Air Defence air picture over the impacted areas of the EA1N offshore windfarm arrays, if the application of a NAIZ is not feasible. a) Is a next generation radar programmed to be installed at Trimingham, and if so, when? b) Is there sufficient confidence that the identified mitigation techniques would work in this situation to ensure that the safety of UK aircraft and airspace is not adversely affected and that air defence requirements will be met? c) Are the applicants content and able to provide the necessary funds to install a new Aveillant radar of the type described, if necessary? How would this be secured?	the precise timing and specification of that replacement will be governed by the Ministry of Defence (MOD). (b) Yes, there is sufficient confidence that one or more of the identified mitigation techniques will ensure the safety of UK aircraft and airspace and meet MOD Air Defence requirements. The MOD will only agree to a mitigation scheme that assures aviation safety and meets Air Defence requirements. The Applicants' parent company, ScottishPower Renewables, is a member of the Joint MOD-OWIC Windfarm Mitigation Task Force, which is currently examining a wide range of mitigation concepts applicable to Air Defence radar (including the Aveillant Theia Holographic Radar™) for implementation during the coming years. (c) The Applicants are content to make their pro rata contribution to the reasonable costs of installing and supporting (for so long as mitigation is required) the operation of a new Aveillant radar or such other mitigation concept selected and agreed by the MOD. The Applicant anticipates that any mitigation will apply to both Projects (and potentially other sites including East Anglia THREE).

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					This obligation would be secured through a Radar Mitigation Scheme with the MOD as provided for in draft development Consent Order (dDCO) Requirement 34. The use of Radar Mitigation Schemes is an established MOD practice, both for onshore and offshore windfarms (e.g. the Greater Wash and Humber offshore windfarms, the Tay offshore windfarms, numerous onshore windfarms).
1.1.3	The Applicant	1	2	**Military Aviation** The Ministry of Defence (MoD) [RR-054] does not accept the wording of R 34 in the draft Development Consent Order (dDCO) and proposes an alternative wording in Annex B to their representation. The ExA note the responses of the Applicants in their responses to the RRs [AS-036] and that alternative wording is under consideration. • Confirm your views on the replacement R34 proposed by the MoD	The Applicants have provided alternate wording for Requirement 34 of the dDCO to the MoD for consideration and intend to continue engagement with the MoD in relation to Requirement 34. The Applicants refer the Examining Authority to the updated SoCG (ExA.SoCG-10.D1.V2) which describes the engagement up to Deadline 1.
1.1.4	Ministry of Defence (MoD)	1	2	**Military Aviation** The Applicant proposes interim measures in the form of a NAIZ or the installation of a long range Aveillant Theia Holographic Radar™ if necessary to overcome issues caused by the proposed windfarms on Trimingham radar. Confirm if either of the proposed mitigation solutions would be feasible and acceptable to you.	No response

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
1.1.5	Ministry of Defence (MoD)	1	2	**Cumulative Effects** As well as the effects of the proposed EA1N and EA2 offshore windfarm arrays sites on Cromer and Trimingham radars, Chapter 15 of the ES [APP- 063] acknowledges that there is a potential adverse cumulative effect with the East Anglia THREE site for the Trimingham radar, but that the applicant is content that technical or design mitigation measures can be put in place that would reduce the impact to 'not significant'. Is the MoD content that mitigation measures are available which would suitably mitigate any impact on the Trimingham radar from the three projects?	No response
1.1.6	Ministry of Defence (MoD), NATS	1	2	**Cumulative Effects** ES Chapter 15 [APP-063] states that the distance between EA1N windfarm site is approximately 39km, 43km and 40km from the offshore windfarm sites of Galloper, Greater Gabbard, and Scroby Sands respectively, with EA2 12km, 7km, and 46km from the same sites. The ESs consider that these three operational windfarms are would not have a cumulative impact on aviation operations in the area of the proposed windfarms. a) Do you agree with the above assessment? b) If you do not, please identify any outstanding concerns.	No response