

Norfolk Boreas Offshore Wind Farm

Consultation Report

Appendix 24.1 Section 42 Responses

Applicant: Norfolk Boreas Limited
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Photo: Ormonde Offshore Wind Farm

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Glossary of Acronyms

ADD	Acoustic Deterrent Devices
AEZ	Archaeological Exclusion Zones
ANOSIM	Analysis of Similarities
ATC	Air Traffic Control
BEIS	Business Energy and Industrial Strategy
CIA	Cumulative Impact Assessment
CoCP	Code of Construction Practice
CfD	Contract for Difference
CRM	Collision Risk Modelling
DCO	Development Consent Order
DEPONS	Disturbance Effects of Noise on the Harbour Porpoise Population in the North Sea
DWR	Deep Water Routes
EDR	Effective Disturbance Radius
EEZ	European Economic Zone
EIA	Environmental Impact Assessment
EIFCA	Eastern Inshore Fisheries Conservation Authority
EMF	Electromagnetic Fields
ERCoP	Emergency Response Cooperation Plan
ES	Environmental Statement
ESCA	European Subsea Cables Association
ETG	Expert Topic Group
EU	European Union
FID	Final Investment Decision
FLCP	Fisheries Liaison and Co-existence Plan
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
FRA	Flood Risk Assessment
FSA	Formal Safety Assessment
FTU	Formazin Turbidity Unit
FCS	Favourable Conservation Status
HE	Historic England
HES	Historic Environment Services
HDD	Horizontal Directional Drilling
HRA	Habitat Regulations Assessment
HVDC	High Voltage Direct Current
IBTS	International Beam Trawl Survey
ICES	International Council for the Exploration of the Seas
IDB	Internal Drainage Board
IMO	International Maritime Organisation
IPMP	In Principle Monitoring Plan
JNCC	Joint Nature Conservation Committee
LCA	Landscape Character Assessment
LLFA	Lead Local Flood Authority

LSA	Landscape Sensitivity Assessment
MCA	Maritime and Coastguard Agency
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
MoD	Ministry of Defence
MPA	Marine Protected Areas
MU	Management Unit
NCC	Norfolk County Council
NRA	Navigational Risk Assessment
NTM	Notice to Mariners
NV	Norfolk Vanguard
OSL	Optically Stimulated Luminescence
OTMP	Outline Traffic Management Plan
OWF	Offshore Wind Farm
PEIR	Preliminary Environmental Information report
PRoW	Public Right of Way
PSA	Particle Size Analysis
PTS	Permanent Threshold Shift
RoC	Review of Consents
RMS	Root Mean Square
SAC	Special Area of Conservation
SAR	Search and Rescue
SCI	Site of Conservation Importance
SEL	Sound Exposure Level
SIP	Site Integrity Plan
SNCB	Statutory Nature Conservation Body
SNS	Southern North Sea
SPA	Special Protection Area
SPZ	Source Protection Zone
SSC	Suspended Sediment Concentrations
TH	Trinity House
TTS	Temporary Threshold Shift
UXO	Unexploded Ordnance
VMS	Vessel Monitoring System
WCS	Worst Case Scenario
WDS	Whale and Dolphin Conservation
WSI	Written Scheme of Investigation

Glossary of Terminology

Array cables	Cables which link wind turbine to wind turbine, and wind turbine to offshore electrical platforms.
Cable logistics area	Existing hardstanding area to allow the storage of cable drums and associated materials and to accommodate a site office, welfare facilities and associated temporary infrastructure to support the cable pulling works.

Cable pulling	Installation of cables within pre-installed ducts from jointing pits located along the onshore cable route.
Ducts	A duct is a length of underground piping, which is used to house electrical and communications cables.
Evidence Plan Process	A voluntary consultation process with specialist stakeholders to agree the approach to the EIA and information to support the HRA.
Interconnector cables	Offshore cables which link offshore electrical platforms within the Norfolk Boreas site.
Jointing pit	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	Where the offshore cables come ashore at Happisburgh South.
Landfall compound	Compound at landfall within which HDD drilling would take place.
Landfall compound zone	Area within which the landfall compounds would be located.
Link boxes	Underground chambers or above ground cabinets next to the cable trench housing low voltage electrical earthing links.
Mobilisation area	Areas approx. 100 x 100m used as access points to the running track for duct installation. Required to store equipment and provide welfare facilities. Located adjacent to the onshore cable route, accessible from local highways network suitable for the delivery of heavy and oversized materials and equipment.
Mobilisation zone	Area within which a mobilisation area would be located.
National Grid new / replacement overhead line tower	New overhead line towers to be installed at the National Grid substation.
National Grid overhead line modifications	The works to be undertaken to complete the necessary modification to the existing 400kV overhead lines.
National Grid overhead line temporary works	Area within which the work will be undertaken to complete the necessary modification to the existing 400kV overhead lines.
National Grid substation extension	The permanent footprint of the National Grid substation extension.
National Grid temporary works area	Land adjacent to the Necton National Grid substation which would be temporarily required during construction of the National Grid substation extension.
Necton National Grid substation	The grid connection location for Norfolk Boreas and Norfolk Vanguard.
Norfolk Boreas site	The Norfolk Boreas wind farm boundary. Located offshore, this will contain all the wind farm array.
Norfolk Vanguard	Norfolk Vanguard offshore wind farm, sister project of Norfolk Boreas.
Offshore service platform	A platform to house workers offshore and/or provide helicopter refuelling facilities. An accommodation vessel may be used as an alternative for housing workers.
Offshore cable corridor	The corridor of seabed from the Norfolk Boreas site to the landfall site within which the offshore export cables will be located.
Offshore electrical platform	A fixed structure located within the Norfolk Boreas site, containing electrical equipment to aggregate the power from the wind turbines and convert it into a suitable form for export to shore.
Offshore export cables	The cables which transmit power from the offshore electrical platform to the landfall.
Offshore project area	The area including the Norfolk Boreas site, project interconnector search area and offshore cable corridor.

Onshore cable route	The up to 35m working width within a 45m wide corridor which will contain the buried export cables as well as the temporary running track, topsoil storage and excavated material during construction.
Onshore 400kV cable route	Buried high-voltage cables linking the onshore project substation to the Necton National Grid substation.
Onshore cables	The cables which take power and communications from landfall to the onshore project substation.
Onshore infrastructure	The combined name for all onshore infrastructure associated with the project from landfall to grid connection.
Onshore project area	The area of the onshore infrastructure (landfall, onshore cable route, accesses, trenchless crossing zones and mobilisation areas; onshore project substation and extension to the Necton National Grid substation and overhead line modifications).
Onshore project substation	A compound containing electrical equipment to enable connection to the National Grid. The substation will convert the exported power from HVDC to HVAC, to 400kV (grid voltage). This also contains equipment to help maintain stable grid voltage.
Onshore project substation temporary construction compound	Land adjacent to the onshore project substation which would be temporarily required during construction of the onshore project substation.
Overhead Line	An existing 400kV power line suspended by towers.
Pre sweeping	The practice of dredging the seabed to prepare it for foundation or cable installation. It is either used to provide a level surface on which to place foundations or to allow cables to be installed at a sufficient depth to minimise the chance of them becoming exposed.
Project interconnector cable	Offshore cables which would link either turbines or an offshore electrical platform in the Norfolk Boreas site with an offshore electrical platform in one of the Norfolk Vanguard sites.
Project interconnector search area	The area within which the project interconnector cables would be installed.
Running track	The track along the onshore cable route which the construction traffic would use to access workfronts.
Safety zones	An area around a vessel which should be avoided during offshore construction.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the foundations as a result of the flow of water.
The Applicant	Norfolk Boreas Limited
The Norfolk Vanguard OWF sites	Term used exclusively to refer to the two distinct offshore wind farm areas, Norfolk Vanguard East and Norfolk Vanguard West (also termed NV East and NV West) which will contain the Norfolk Vanguard arrays.
The project	Norfolk Boreas Wind Farm including the onshore and offshore infrastructure.
Transition pit	Underground structures that house the joints between the offshore export cables and the onshore cables
Trenchless crossing compound	Pairs of compounds at each trenchless crossing zone to allow boring to take place from either side of the crossing.
Trenchless crossing zone	Areas within the onshore cable route which will house trenchless crossing entry and exit points.
Workfront	A length of onshore cable route within which duct installation works will occur, approximately 150m.

1 SECTION 42 – TABLES OF FEEDBACK FROM CONSULTEES, AND REGARD HAD BY THE APPLICANT

Table 1.1 Feedback related to Project Description (Chapter 5 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 5, Project Description	Natural England	November 2018	<p>"Outline Operations and Maintenance Plan</p> <p>In respect of J-Tube and Ladder cleaning, this activity typically involves either jet washing marine growth and bird guano off turbine foundation pieces, or cutting the growth from around the j tube. The ES project description does not detail the number of occasions this would occur or the volumes of material being deposited in the marine environment. This does not seem to have been considered at all within the ES. Therefore, either information needs to be provided or this should not be considered as part of the works consented."</p>	A description of these type of activities has been included within section 5.4.18 of this chapter. The impacts of such activities have been assessed in section 9.7.4.2 of Chapter 9 Marine Water and Sediment Quality.
Chapter 5, Project Description	Natural England	November 2018	The type, number and length of cable repairs assessed with the ES is inconsistent and is different to those outlined in the O&M. As above this will need to be addressed or should not be considered as part of the works to be consented.	The number of anticipated cables repairs is defined in section 5.4.18.3. Assessments of impacts associated with these cable repairs are included within Chapters 8 to 18 of the Environmental Statement (ES).
Chapter 5, Project Description	Marine Management Organisation (MMO)	November 2018	The MMO seeks clarification on the programme duration outlined in Chapter 5 Table 5.25. For example, the approximate duration for foundation installation is stated as 20 months; however, the construction phase blocked in blue colouring on the timeline suggests foundation installation is scheduled to occur over a 27 month period. The MMO requests that this is clarified and assessed accordingly in the EIA.	Indicative construction programmes for the project has been further refined from that which was presented within the (Preliminary Environmental Information Report (PEIR) (section 5.4.15), however it is not possible at this stage of the project to define exactly when each element of work will be undertaken therefore the time period presented in the "Approximate duration" column is the anticipated duration of the works i.e. how long the work would take, and the time blocked

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				out in blue/ orange is the period of time within which the duration of works would be undertaken. This has been made clearer in section 5.4.15.
Chapter 5, Project Description	MMO	November 2018	In respect of J-Tube and Ladder cleaning, this activity typically involves either jet washing marine growth and bird guano off turbine foundation pieces, or cutting the growth from around the j tube. The ES project description does not detail the number of occasions this would occur or the volumes of material being deposited in the marine environment. This does not seem to have been considered at all within the ES. Therefore, either information needs to be provided or this should not be considered as part of the works consented.	Information regarding the cleaning activities which would be required is presented within section 5.4.18.1.1. It has been assessed in chapter 9 Marine Water and Sediment Quality.
Chapter 5, Project Description	Network Rail	November 2018	Consideration should be given to ensure that the construction and subsequent maintenance can be carried out without adversely affecting the safety of, or encroaching upon Network Rail's adjacent land. In addition, security of the railway boundary will require to be maintained at all times	Where the onshore cable route crosses the Network Rail line, cable ducts will be installed using a suitable trenchless method, avoiding any need to access the Network Rail land (scenario 2 only – see section 5.7.2.4). Installation and maintenance of cables (scenario 1 and 2) can also be carried out without access to or impact on the Network Rail land (see section 5.6.2.1)
Chapter 5, Project Description	Environment Agency	November 2018	Climate Change Where energy infrastructure has safety critical elements (e.g. electricity substations), the applicant should apply the high emissions scenario (high impact, low likelihood) to those elements. The applicant should define those elements of the development that are 'safety critical'. But as an indicator, where an element of the design must remain operational during a high impact low-likelihood scenario, to ensure that	Section 5.9 considers the potential threat of natural disasters which includes the potential effects due to climate change on project infrastructure.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			occupants/staff and the environment remain safe from the potential impacts (e.g. flooding), then the particular element should be considered safety critical.	
Chapter 5, Project Description	Maritime and Coastguard Agency (MCA)	November 2018	Construction scenarios MCA would like to see continuous construction which is progressive across the wind farm with no opportunity for two separate areas to be constructed with a gap in the middle.	Norfolk Boreas Limited considers that the effects of disparate construction sites are mitigated, notably through the use of aids to navigation during the entire construction phase. Embedded mitigation is listed in section 15.7.1 of Chapter 15 Shipping and Navigation.
Chapter 5, Project Description	MCA	November 2018	MCA Supports safety zones during construction, maintenance and decommissioning phases. Should be noted that operational safety zones may have maximum 50m radius from individual turbines. Justification and evidence for 50m operational safety zone would be required.	A safety zone application would be produced and agreed with the MCA post consent, noting that the application for safety zones is assumed as embedded mitigation in section 15.7.1. of Chapter 15 Shipping and Navigation. This may include provision for operational safety zones around manned platforms.
Chapter 5, Project Description	MCA	November 2018	Turbine layout design will require MCA approval prior to construction to minimise risk to surface vessels, including rescue boats and SAR aircraft. Structures must be aligned in straight rows and columns, including any platforms with a minimum of two lines orientation. Any additional navigation safety and / or SAR requirements as per MGN 543 Annex 5 (v2) will be agreed at the approval stage.	The layout and any additional navigational safety and / or Search and rescue (SAR) requirements would be agreed with the MCA post consent in line with the Design Rules (Chapter 15 Shipping and Navigation).
Chapter 5, Project Description	North Norfolk District Council	November 2018	The comparison summary within PEIR Appendix 5.1 is a welcome addition in helping identify the different elements of the project under the two different scenarios.	An updated version of Appendix 5.1 is included within this ES.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 5, Project Description	North Norfolk District Council	November 2018	North Norfolk District Council welcomes the statement from Vattenfall of the intention to seek to ‘minimise impacts associated with onshore construction works’ for the Boreas and Vanguard projects and, if both projects secure consent, the installation of ducts to house Norfolk Boreas cables along the entirety of the onshore cable route from the landfall zone to the onshore project substation and strategic landscape and planting schemes designed to mitigate the impacts of both projects where possible would be provided for within the Norfolk Vanguard DCO.	Norfolk Boreas Limited acknowledges this support.
Chapter 5, Project Description	North Norfolk District Council	November 2018	In North Norfolk, many local communities are dependent on the agricultural and tourism economy. Whilst it is recognised that the commitment by Vattenfall to complete both projects together will be dependent on securing the appropriate contracts for difference payments for both schemes, there are considerable public benefits in reducing the maximum construction envelope including shortening the timeframe for ground disturbance which will help lessen construction impacts over a prolonged period of time on these economic sectors.	Norfolk Boreas’ clear intention is to try to minimise disturbance through the installation of the ducts for both projects at the same.
Chapter 5, Project Description	North Norfolk District Council	November 2018	NNDC welcomes the commitment from Vattenfall to bring the offshore cables onshore via the use of the horizontal directional drill (HDD) method. The commitment in particular to use the ‘long drill’ option for Norfolk Vanguard and Norfolk Boreas schemes is something the Council were seeking following the Vanguard PEIR stage, primarily to reduce the potential significant adverse impacts from open trench construction on the stability of cliffs in the Happisburgh area. Based on the evidence seen to date, NNDC remains firmly of the view that HDD techniques (long HDD drill) are the most appropriate techniques to be used to bring the offshore cables onshore as this will have the least damaging impact on the nearshore, will result in fewer adverse impacts on coastal	The Commitment to use a “long Horizontal Directional Drilling (HDD)” remains and is assessed within this ES.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			processes and will reduce the potential to destabilise the cliffs at Happisburgh compared to open trenching techniques.	
Chapter 5, Project Description	Eastern Inshore Fisheries Conservation Authority (EIFCA)	November 2018	Eastern IFCA is keen to promote parity by encouraging regulators of non-fishing activities that could damage or disturb sensitive features (e.g. cable laying, remedial works and cable protection) to prevent or at least minimise such activities in areas closed to fishing for the protection of these features.	Norfolk Boreas Limited's preferred method of cable installation is to bury cables within the seabed to a target depth of between 1m and 3m.
Chapter 5, Project Description	EIFCA	November 2018	Policy CAB1 of the East Marine Plans states, "preference should be given to proposals for cable installation where the method of installation is burial." (HM Government, 2014). The PEIR documentation states Vattenfall's commitment to burying cable throughout the cable corridor except for cable crossing locations, however it also states that there could be unexpected hard substrate which could result in the protection of up to 10 km per cable pair (20 km in total) for the offshore cable corridor, of which 4 km per pair (8 km in total) could be within the SAC. Alternatives to burial, including rock placement, concrete mattresses, use of ground or sand bags, frond mattresses and/or the use of uradact or similar shells are not in keeping with the East Marine Plans. Every effort should be made to maximise the length of cables that are buried and maintain burial over time. Using cable armouring instead of burial increases the likelihood of adverse environmental and fisheries impacts. It is anticipated that 20 km per export cable pair will become unburied over the life of the project (including 10 km in the Haisborough, Hammond and Winterton SAC and 10 km outside of it). Reburial will most likely be required in relatively short sections (e.g. 1 km) at a time, with a temporary seabed disturbance width of ~3 m. If these are left unburied, the presence of exposed export cable can result in snagging of fishing gear. Aside from damage to cables, this poses a significant safety risk, particularly for small vessels	It is Norfolk Boreas Limited's intention that all cables will be buried to the target depth and that cables will remain buried for the operational life of the project. Further work would be completed post consent to determine exactly where and how the cables would be buried. In order to determine the exact locations of cable burial an assessment will be completed

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			operating in the area, and could result in semi-permanent exclusion of fishing activities from the area. This is therefore a concern for Eastern IFCA.	
Chapter 5, Project Description	National Farmers Union	November 2018	The Land Interest Group (LIG) would like confirmation that the decision to go HVDC can be delivered and that the cables will be installed in ducts as described for the Norfolk Vanguard project. We understand that the easement width under Scenario 2 will be 13m and if under Scenario 1 the full easement width will be 20m. Please could we have a breakdown of why 13 and 20m will be needed permanently? The benefits of HVDC are clear. Our clients feel that every effort should be made to enable an HVDC solution to be adopted to minimise the onshore impacts including environmental, land out of production and the wider social and economic issues. The cost of an HVDC system must not be the deciding factor on the selection of the technology chosen.	Under Scenario 1, Norfolk Boreas will install cables within ducts previously installed by Norfolk Vanguard. Under Scenario 2, Norfolk Boreas will install ducts for the purposes of its own cables and subsequently install cables within those ducts. It is therefore confirmed that Norfolk Boreas cables will be installed within ducts under Scenario 1 or Scenario 2. Full details of the what is required for the cable route easement is provided in sections 5.7.2 and 5.6.2. Norfolk Boreas Limited have committed to a High Voltage Direct Current (HVDC) electrical solution and the Development Consent Order (DCO) application will be made on that basis. Following the consultation Norfolk Boreas Limited replied to this response providing the consultee detailed answers to their questions.
Chapter 5, Project Description	National Farmers Union	November 2018	The PEIR states that the minimum depth of cables would be 1.05 metres. Please be advised that a depth of 1.20 metres is the minimum that can be accepted otherwise the cable will interfere with deep farming operations, the growing of certain crops and interaction with land drains. We note it has	Norfolk Boreas Limited have committed to burying the ducts up to 1.20m in ground which is used for "deep ploughing". Table 5.34 and Table 5.40 makes this commitment

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			been stated that the cables will be laid in accordance to National Grid UK Power Networks ECS 02-0019	which will be taken forward to the DCO application. As outlined in Table 5.34 ducts would be buried to 1.05m in 'normal' agricultural land and 1.2m in areas of 'deep ploughing' to top of duct.
Chapter 5, Project Description	National Farmers Union	November 2018	It is noted that a running track up to 8 metres wide may be required on a scenario 2. Please confirm why this width is required. The construction is noted, however there does not appear to be any provision for drainage. How do Vattenfall propose to deal with run off from the running track?	The running track as described in section 5.7.2.2.3 will be limited to 6m wide, which is the minimum distance required for two construction vehicles to pass. A separation distance of 2m would be maintained from the edge of the running track and the trench for safety, drainage and duct storage.
Chapter 5, Project Description	Oulton Parish Council	December 2018	Vattenfall have said that they are committed to using HVDC for Norfolk Vanguard/Boreas. It has recently come to light that East Anglia One offshore windfarm project had applied for a non-material change to their consented DCO, a change from HVDC to HVAC; this appears to have been due to being awarded 714MW in the Contract for Difference instead of the DCO consented 1200MW. Is there then a point where HVDC is no longer economically or technically viable? What is the lowest output that would be acceptable for the use of HVDC and could this scenario potentially happen to Vattenfall Norfolk Vanguard/Boreas, if awarded a smaller output through CfD?	A strategic decision was taken, following consultation with a range of stakeholders, that both Norfolk Boreas and Norfolk Vanguard projects should commit to the use of HVDC technology. This is reflected in the project description within Chapter 5 of the ES. As a DCO is granted this would commit the Applicant to develop this project, including the construction and operation of HVDC technology. It is not anticipated, at present, that circumstances would arise where the Applicant would not deliver a project including HVDC technology.
Chapter 5, Project Description	Oulton Parish Council	December 2018	It has recently come to light at the Open Floor Hearing for Hornsea Project 3, that there might be significant technical and safety issues about the cable crossover point between	The Applicant recognises the importance of the highest performance levels of health and

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			the Orsted and Vattenfall projects, near Salle. What comments have Vattenfall to make on this? OPC would welcome a discussion on this important issue with Vattenfall.	safety to be incorporated into the project. There is a commitment to adhere to a high level of process safety, from design to operations and for all staff, contractors and suppliers to have a high level of safety awareness. The buried cables onshore and offshore pose very little risk to the public as the HVDC system is designed to detect faults and 'trip out' the DC circuit automatically should any failure in insulation along the cable be detected.
Chapter 5, Project Description	Atkins on behalf of BBL Pipeline company	PEIR response April 2019	The response contained a number of points that will require consideration during the detailed design stage of the Norfolk Boreas project. These included: Locating cables sufficiently distant from the BBL pipeline, minimising the number of crossings and when crossings are required, grouping multiple cables together at as few a crossing points as possible.	The full response will be used to inform the crossing agreements with BBL at the detailed design phase.

Table 1.2 Feedback related to Marine Geology, Oceanography and Physical Processes (Chapter 8 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 8, Marine Geology, Oceanography and Physical Processes, Chapter	Natural England	November 2018	Other outstanding matters [For Norfolk Vanguard] requiring attention: Coastal Processes: Cliff recession prediction Cable burial depth below beach	Coastal processes are described in section 8.6.11. The predicted rates of cliff recession are provided in Appendix 4.5. Cable burial embedded mitigation is detailed in section 8.7.4. Under the Norfolk Vanguard Examination these matters are resolved and agreement has

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				been reached through the Statement of Common Ground between Norfolk Vanguard and Natural England (Norfolk Vanguard Limited and Natural England, 2019).
Chapter 8, Marine Geology, Oceanography and Physical Processes, Chapter	Norfolk County Council	November 2018	The local member for North Walsham East division has made the following comments: Reiterate the comments made to North Norfolk District Council for the PEIR in relation to Vattenfall's Norfolk Vanguard proposal. Whilst accepting that there is no need to refer to relay stations (no longer a proposal) or concerns about one of the drilling options at the landfall site in Happisburgh as it is now "deep drill". Concerns about cliff erosion at the landfall site still of course remain.	Details regarding coastal erosion at the landfall can be found in section 8.7.4. Section 8.7.7.6 describes potential impacts of the landfall on coastal erosion.
Chapter 8, Marine Geology, Oceanography and Physical Processes, Chapter	The MMO	December 2018	The Marine Process reports reviewed state on multiple occasions that waves are generally unimportant except under major storm conditions. However, Table 7 of the sand wave clearance shows that the seabed sediment threshold for movement is exceeded by the combined wave and tidal flow bed shear stress 80% or more of the time. The MMO considers that this could indicate that minor changes to the wave field could have consequences for the transport of sediment. Therefore, the wording in the EIA should reflect this.	A paragraph has been added to section 8.6.8 to reflect the results described in the study. Possible changes in wave heights due to the presence of foundations and the consequential effects on sediment transport has been assessed as sections 8.7.7.2 and 8.7.7.3. Sections 8.8.3.2 and 8.8.3.3 assess the potential cumulative effects of Norfolk Boreas and other projects on the wave climate and the resultant effects on sediment transport.
Chapter 8, Marine Geology, Oceanography and Physical	The MMO	December 2018	In comparison to the rest of the PEIR, the presentation of the cumulative assessment for coastal processes appears relatively simplistic. In particular, figures 8.15 and 8.16 show large areas of overlap for the effects in wave and tidal currents due to the several adjacent OWFs. The cumulative	The cumulative impacts assessment has been expanded from that presented within the PEIR (section 8.8). This section of the ES includes a cumulative assessment of effects on

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Processes, Chapter			<p>assessment within the PEIR describes this as simply an extension of the area of impact, applying the negligible impact assessment for each area individually to the whole. However, the Norfolk Boreas OWF contains the overlapping zones of influence of two other windfarms along the south-south east / north-north west wave propagation axis, suggesting that magnitude of effects may be increased in this area.</p> <p>The MMO requests the EIA acknowledges this and further justification is provided to demonstrate why this is of no concern to the maintenance of marine processes in the southern North Sea. This should acknowledge (i) the observation that the majority of sediments are potentially mobilised 60-80% of the time under measured wave and current conditions (Table 7, sand wave clearance report) and (ii) that the dynamics of sandbank systems are poorly understood and the complex sediment transport patterns could mean that apparently slight changes in some areas could contribute to unexpected wider consequences.</p>	the tidal and wave climates and their combined effects on sediment transport (section 8.8.3) and a cumulative assessment of changes to seabed level as a result of multiple projects being present (section 8.8.3.3).
Chapter 8, Marine Geology, Oceanography and Physical Processes, Chapter	The MMO	December 2018	The MMO notes the uncertainty due to the absence of strong evidence for the scale of impacts, and the low certainty around the seabed recovery post-installation. Assessment methods are principally based on the expected outcomes following expert assessment of generic evidence and verification via monitoring is a necessary means of validating the assumptions made. PEIR section 5.4.18.3 Paragraph 260 notes that the assessments are 'deemed' conservative. The MMO would welcome further discussion on any monitoring to be included in the DML to validate the predictions made within the EIA.	Details of monitoring to validate the predictions made in this ES are explained in the In Principle Monitoring Plan (Document reference 8.12). At a minimum a pre and post construction bathymetric survey is proposed and further survey requirements would be agreed with regulators following results of the initial post construction survey.
Chapter 8, Marine Geology, Oceanography	The MMO	December 2018	Repeated works in the same seabed area and cable protection requirements should be monitored against the projections, as prevention of repeated disturbance is a	Norfolk Boreas Limited are advocating that seabed levelling to the "bed reference level" occurs

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
and Physical Processes, Chapter			principal means of mitigating the impacts of disruption to the designated environment. This may require a prior agreement as to the acceptable duration of environmental perturbation e.g., based on anticipated sand wave recovery rates.	<p>prior to cable installation to minimise the possibility of any cables becoming exposed and therefore the need for repeated work. Further detail is provided in Appendix 5.2 and the worst case parameters for achieving this have been assessed within the ES (8.7.6.5 and 8.7.6.6). Appendix 7.1 of the Information to Support Habitat Regulations Assessment (HRA) (document reference 5.3) assesses the impacts of multiple cable installations on sand waves and predicts their recovery rates.</p> <p>An estimation of the frequency of cable reburial and repair has been made (sections 8.7.5.7.2 and 8.7.5.7.3) and assessed in section 8.7.7.7.</p> <p>Details of proposed monitoring to validate the predictions made in this ES are explained in the In Principle Monitoring Plan (Document Reference 8.12)</p>
Chapter 8, Marine Geology, Oceanography and Physical Processes, Chapter	The MMO	December 2018	Available sediment transport data (section 8.6.8, Figure 8.10) indicates complex patterns over the SAC sandbanks and Norfolk banks in general, but is sparse over the OWF itself. In the area over the OWF, transport is generally assumed to be aligned North-South with the tidal flow, based on broad observations of the bedforms. Further information on	Norfolk Boreas limited are in the process of undertaking seabed mobility studies within the Norfolk Boreas site. The preliminary findings from these studies are provided in section 8.6.8.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			sediment transport within the red line boundary should be provided in the EIA	
Chapter 8, Marine Geology, Oceanography and Physical Processes, Chapter	The MMO	December 2018	The MMO notes that Chapter 8 considered the effect of deposition to be insignificant. However, this should be considered 'in-combination' with the repeated clearance campaigns under the worst-case, multi-phase development scenario. As noted in the sand wave clearance report, this would result in repeated disturbance of potentially incomplete sand wave recovery, delaying the eventual re-establishment of the bed and possibly leading to a period of dis-equilibrium in the local sediment transport. This should be assessed in the EIA.	Section 8.8.1.3 contains an assessment of the impacts from multiple phases of seabed clearance.
Chapter 8, Marine Geology, Oceanography and Physical Processes, Chapter	The MMO	December 2018	Appendix 8.1, Section 2.4.3 states that surge (adding up to 0.4m/s to flows and 2.5m of water depth) is relatively important for sediment transport. This information should also be highlighted in Chapter 8, Section 8.6.10, where detail on sandbank change and divergent sand wave migration directions in the cable corridor are considered.	This information has now been included within section 8.6.4. which discusses tidal flows.
Chapter 8, Marine Geology, Oceanography and Physical Processes, Chapter	The MMO	December 2018	In Section 8.6.9 of the PEIR, the figures relating to suspended sediment appear contradictory. Paragraph 114 states "Suspended sediment concentrations across the Norfolk Boreas site could range from 1 to 35mg/l. During the Land Ocean Interaction Study (NERC, 2016), measurements near to Norfolk Boreas recorded a maximum concentration of 83mg/l ..." However higher readings are also stated throughout the section. The MMO seeks clarification on the correct suspended sediment concentrations.	The older values for suspended sediment concentrations in section 8.6.9 have been superseded by bespoke measurements recorded from the adjacent Norfolk Vanguard offshore wind farm (OWF) site. The older values have been removed from this ES chapter. Turbidity measurements have been completed in the Norfolk Boreas site but a reliable conversion from Formazin Turbidity Unit (FTUs) to mg/l (suspended sediment concentration) is not available currently. The FTU values from the Norfolk Boreas site have been

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				reported here however the due to availability of a reliable conversion factor for the Norfolk Vanguard, data collected at that site has been used in the assessment.
Chapter 8, Marine Geology, Oceanography and Physical Processes, Chapter	The MMO	December 2018	In PEIR Chapter 8, reference is made to an average sediment depth for sand wave clearance of 3m, however, paragraph 324 says 'up to 3m' and paragraph 400 refers to 9m. The MMO seeks clarity on the correct sediment depths.	Reference to "up to 3m" has been removed from this Chapter and only the average depth is used.
Chapter 8, Marine Geology, Oceanography and Physical Processes, Chapter	North Norfolk District Council	December 2018	This area of North Norfolk in particular has seen significant loss of cliff in recent years due to the effect of coastal processes with an increased risk to life and property including numerous buildings of heritage interest. It will therefore be important for Development Consent Order to give appropriate consideration to the potential for the project to be affected by and/or contribute to coastal change and to consider any public benefits that can be derived either as part of formal mitigation or as part of any wider community benefits to manage those adverse impacts in accordance with the adopted Shoreline Management Plan (SMP 6).	Information regarding the predicted rates of coastal erosion at the landfall can be found in section and Appendix 4.5. Section 8.7.7.6 describes potential impacts of the landfall on coastal erosion
Chapter 8, Marine Geology, Oceanography and Physical Processes, Chapter	Local Resident	December 2018	As, I hope, you are aware this part of the coast is experiencing increasing erosion, and recently there have been devastating cliff falls and loss of land. If, as locals expect, the rate of loss continues and accelerates then your estimate of 25 years of life for your pits where the cable comes above ground onshore, will be very optimistic. I am not a geologist but noticed until last year there seemed to be a thick band of clay which was resistant to the waves, now that has been eroded, there is only soft sand which disappears at every high tide.	Details regarding coastal erosion at the landfall can be found in section 8.7.4. Section 8.7.7.6 describes potential impacts of the landfall on coastal erosion

Table 1.3 Feedback related to Marine Water and Sediment Quality (Chapter 9 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 9, Marine Water and Sediment Quality	Natural England	PEIR Response November 2018	In respect of J-Tube and Ladder cleaning, this activity typically involves either jet washing marine growth and bird guano off turbine foundation pieces, or cutting the growth from around the J-tube. The ES project description does not detail the number of occasions this would occur or the volumes of material being deposited in the marine environment. This does not seem to have been considered at all within the ES. Therefore, either information needs to be provided or this should not be considered as part of the works consented.	The impacts of cleaning the foundations are assessed in section 9.7.4.2.
Chapter 9, Marine Water and Sediment Quality	MMO	PEIR Response December 2018	In Section 8.6.9 of the PEIR, the figures relating to suspended sediment appear contradictory. Paragraph 114 states “Suspended sediment concentrations across the Norfolk Boreas site could range from 1 to 35mg/l. During the Land Ocean Interaction Study (NERC, 2016), measurements near to Norfolk Boreas recorded a maximum concentration of 83mg/l ...” However higher readings are also stated throughout the section. The MMO seeks clarification on the correct suspended sediment concentrations.	This is relevant to this chapter because it uses the same baseline data as that presented in Chapter 8 Marine Geology, Oceanography and Physical processes. The older values for suspended sediment concentrations are superseded by bespoke measurements in the Norfolk Boreas site and in the adjacent Norfolk Vanguard. The latest values are now presented in both chapters.

Table 1.4 Feedback related to Benthic Ecology (Chapter 10 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 10, Benthic Ecology	MMO	December 2018	It was recommended in previous advice that the impacts of operational noise and vibration on benthic species are scoped in for further assessment and that conclusions should be drawn based on the best available evidence in the scientific literature. The report states this comment has been addressed in Section 10.7.4.10; however, it is not clear that	An assessment of impacts of underwater noise during operation has been included in section 10.7.5.11

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			operational noise has been assessed. The MMO expects that this will be addressed in the EIA.	
Chapter 10, Benthic Ecology	MMO	December 2018	Section 10.7.3.7.1 of the PEIR states that regular maintenance of the wind turbines would be undertaken during operation of the wind farm. The MMO notes that the likely effects to the benthos for the operation and maintenance activities do not appear to have been considered in the PEIR and expect these will be addressed in the EIA.	Section 10.7.5.5 includes an assessment of regular maintenance of the wind turbines in relation to benthic ecology.
Chapter 10, Benthic Ecology	MMO	December 2018	The MMO expects that post construction surveys should be conducted for a period of 3 years (non-consecutive e.g. 1, 3, 6 or 1, 5, 10 years) to determine any long-term effects due to installation of the Norfolk Boreas OWF, and that any monitoring requirements will be included in the DML.	Section 10.7.2 describes the approach to monitoring in relation to benthic ecology. Monitoring requirements would be agreed with the MMO in consultation with the relevant Statutory Nature Conservation Bodies (SNCBs) as outlined in the In Principle Monitoring Plan (document reference 8.12).
Chapter 10, Benthic Ecology	MMO	December 2018	In Chapter 10, the effects on the benthic assemblages encountered during the decommissioning phase are presented as being consistent with those encountered during the construction phase. The MMO would welcome further discussion on the justification for this assumption and for this prediction to be validated.	Section 10.7.6 outlines the impacts in relation to decommissioning. As discussed at the Expert Topic Group (ETG) meeting (Feb 2019) Further information has been provided using the most recent examples of offshore wind decommissioning.
Chapter 10, Benthic Ecology	MMO	December 2018	Section 10.7.3.5.4 states that disposal of sediment arising from pre-sweeping the cable corridors will be in an area devoid of <i>S. spinulosa</i> reef and advises that further assessment will take place. The MMO recommends that the assessment should include an approach targeted at both the primary and secondary impact areas, ensuring the benthic assemblages (not solely <i>S. spinulosa</i>) within and outside of the disposal area are adequately characterised. The	Section 10.7.1.8 sets out the approach for sediment disposal, specifically all seabed material arising from the Haisborough, Hammond and Winterton Special Area of Conservation (SAC) during cable installation would be placed back within the SAC using an

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			assessment should also demonstrate that they are able to recover from the proposed dredging and disposal activity.	<p>approach, to be agreed with the MMO in consultation with the relevant SNCB, which would ensure that the sediment is available to replenish the sandbank features (Appendix 7.1 to the Information to inform HRA (document reference 5.3)).</p> <p>Sediment would not be disposed of within 50m of known <i>S. spinulosa</i> reef identified during pre-construction surveys (in accordance with advice provided to Norfolk Vanguard by Natural England in January 2018).</p> <p>Section 10.7.3.4.1 has been updated to reflect this.</p>
Chapter 10, Benthic Ecology	MMO	December 2018	Section 10.7.1.10 states that the ‘spreading [of] non-native species will be mitigated through [the] use of best practice techniques’. The MMO seeks to understand how the long term effects on the spread of non-native species will be addressed and would welcome further discussion with the developer.	Section 10.7.1.10 describes the relevant legislation and guidance that will be adhered to in relation to preventing the spread of non-native species.
Chapter 10, Benthic Ecology	MMO	December 2018	The MMO requires the evidence/rationale be provided to support the conclusion in Section 10.7.4.2.3 that the perceived response from benthic assemblage’s to cable laying abrasion equates to that of the bottom trawled fishing activity.	Section 10.7.4.2.3 has been rephrased. The impact assessment refers to other sources of disturbance occurring in the area including bottom trawled fishing activity.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 10, Benthic Ecology	MMO	December 2018	The MMO notes the findings of the 2014 MMO review, and the limitations of the post-construction monitoring which was based on round 1 wind farms which are neither comparable in size to Norfolk Boreas OWF nor considered as a network of arrays with cumulative or combined effects. Uncertainty remains over the long term impact of these larger developments, therefore the MMO would welcome further discussion with the developer on whether monitoring should be restricted to Annex 1 habitats, and to consider the most appropriate monitoring approach.	Monitoring requirements would be agreed with the MMO in consultation with the relevant SNCBs as outlined in the In Principle Monitoring Plan (document reference 8.12). The current strategy for monitoring is provided in section 10.7.2.
Chapter 10, Benthic Ecology	MMO	December 2018	The MMO considers the PEIR has characterised the existing environment appropriately using appropriate data.	Comment is noted and no changes have been made.
Chapter 10, Benthic Ecology	MMO	December 2018	The MMO considers the proposed 'micrositing' (of cable route and turbines) for <i>Sabellaria spinulosa</i> reef and boulders appropriate mitigation.	Comment is noted and no changes have been made.
Chapter 10, Benthic Ecology	MMO	December 2018	Section 3.1.2 of Appendix 10.2 introduces the ANOSIM test and caveats the interpretation of the results presented in section 3.2.4.4. The MMO considers that these results should be removed from the report as they are not appropriate. ANOSIM requires a prior knowledge of the grouping and this assumption is invalid in this instance as the groupings were determined using a clustering method.	The results of the Analysis of Similarities (ANOSIM) have been removed from Appendix 10.2
Chapter 10, Benthic Ecology	Eastern Inshore Fisheries Conservation	December 2018	Any activity that disturbs the seabed has the potential to have negative impacts on habitats and biodiversity.... Eastern IFCA recognise that the applicant has selected a landfall location that ensures the cables are not routed through the MCZ.	Comment is noted and no changes have been made.
Chapter 10, Benthic Ecology	Eastern Inshore Fisheries Conservation Authority (EIFCA)	December 2018	Despite this cable corridor not overlapping with Cromer Shoal Chalk Beds MCZ, there is still potential for cable installation activities to result in increased levels of suspended sediment and deposition within the MCZ. According to the PEIR, increased suspended sediment levels in the nearshore area closest to the MCZ are anticipated to be within background levels and less than those experienced during storm	Comment is noted and no changes have been made.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>conditions, “theoretical maximum bed level changes of only 0.8 mm are predicted at a distance of up to 20 km from cable trenches and changes of up to 2 mm within a few hundred metres”. Given the small level of change expected, the fact that surveys identified that more sensitive features are limited within the southern part of the MCZ (the area likely to be impacted), the low magnitude of effect and low sensitivity of the receptor, the PEIR predicts that the impact of the cable corridor will be of negligible significance to Cromer Shoal MCZ. Eastern IFCA consider that despite the close proximity of the cable corridor to the MCZ, the evidence supports that the project is unlikely to result in significant impacts on the MCZ.</p>	
Chapter 10, Benthic Ecology	EIFCA	December 2018	<p>While we understand that <i>S. spinulosa</i> have high recruitment rates that allow for rapid recovery and regrowth of reefs in the right conditions, resulting in the conclusion that their recoverability is ‘medium’, this requires the appropriate habitat for recolonisation to be maintained. The conservation advice for the site includes objectives for conditions suitable for reef formation to be maintained (Natural England, 2018). The developer should demonstrate whether re-settlement of <i>S. spinulosa</i> is anticipated to occur in areas where seabed habitat conditions are changed because of the project.</p>	<p>Section 107.7.5.2 and 10.7.5.9 considers the potential for colonisation of Norfolk Boreas infrastructure by <i>S. spinulosa</i>. However, Natural England (2019) does not consider <i>S. spinulosa</i> colonised on artificial structures as Annex I reef and it would not contribute to the favourable condition of a site designated for <i>S. spinulosa</i>.</p>
Chapter 10, Benthic Ecology	EIFCA	December 2018	<p>Eastern IFCA would strongly encourage micro-siting within the identified cable corridor around known areas of sensitive features including <i>Sabellaria spinulosa</i> reef following pre-construction surveys and Natural England’s formal advice on the distribution and extent of reef in the area.</p>	<p>Section 10.7.1.6 describes that micro-siting will occur within the cable corridor around known areas of <i>S. spinulosa</i> where possible.</p>
Chapter 10, Benthic Ecology	EIFCA	December 2018	<p>As stated in Eastern IFCA’s response to the Norfolk Vanguard Environmental Statement, we request that Vattenfall take note that Eastern IFCA are seeking to introduce fishing closures (via a byelaw) to protect sensitive features within</p>	<p>Comment is noted and no changes have been made. Continued discussion with EIFCA will be undertaken to monitor this process</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			the inshore section (within six nautical miles of the shore) of the SCI. These closures are yet to be finalised, but any works in this area will need to proactively take into consideration up-to-date closures and the latest available information on the location of sensitive species and habitats. Eastern IFCA will ensure that any changes to existing fishery closures are duly publicised.	
Chapter 10, Benthic Ecology	EIFCA	December 2018	Section 10.7.4.11 of Chapter 10 'Benthic and Intertidal Ecology' states, "the Norfolk Boreas site does not overlap with any designated site and as such, receptors within designated sites have only been considered in relation to the offshore cable corridor". Eastern IFCA consider this statement incorrect, as the Norfolk Boreas site does overlap with a designated site – the Southern North Sea cSAC. We understand that the impact of the proposed works on the cSAC have been assessed in Chapter 12 'Marine Mammal Ecology' and Appendix 12.3 'Additional Assessment for the Southern North Sea cSAC'. We therefore ask that the statement in section 10.7.4.11 is amended to avoid any confusion, we would recommend making it clear that this statement refers to there being no MPAs designated for benthic and intertidal features that overlap with the Norfolk Boreas site, rather than stating that there is no overlap with any designated sites.	Section 10.7.4.1.1 has been updated to make it clear that the Norfolk Boreas site does not overlap with any designated sites for "benthic ecology" receptors.

Table 1.5 Feedback related to Fish and Shellfish Ecology (Chapter 11 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 11, Fish and Shellfish Ecology	Natural England	November 2018	Issues requiring attention include; <ul style="list-style-type: none"> No further monitoring or independent surveys are proposed regarding Fish and Shellfish ecology within the In Principle Monitoring Plan (IPMP). 	The In Principle Monitoring Plan (IPMP) (Document 8.12) provides an appropriate framework for agreeing

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<ul style="list-style-type: none"> The role of fish within the food web as supporting Annex II species. <p>The loss of and recoverability of sandeel and herring habitat and impacts on their abundance.</p>	<p>monitoring. No intrusive surveys for fish and shellfish are proposed.</p> <p>The role of fish within the foodweb has been noted in Chapter 11, section 11.6.6, including the fact that some species constitute important prey to Annex II species.</p> <p>Consideration is given in sections 11.7.4, 11.7.5 and 11.7.6 to the potential impacts associated with the project on sandeel and herring habitat during construction, operation and decommissioning.</p>
Chapter 11 Fish and Shellfish Ecology	Marine Management Organisation (MMO)	December 2018	The MMO considers the proposed mitigation measures of soft-start pile driving and cable burial to a minimum of 1m to reduce potential effects of Electromagnetic field (EMF) are appropriate for fish.	Noted.
Chapter 11, Fish and Shellfish Ecology	MMO	December 2018	Sandeel are demersal fish which spawn in the areas which they inhabit. They have specific habitat requirements in terms of the substrate in which they live, so they are particularly vulnerable to marine developments which either disturb/remove their habitat or change the composition of the substrate in which they live. The magnitude of effect of such impacts could be further enhanced, should the activities (e.g. construction, dredging etc.) be undertaken during the winter hibernation period when Sandeel are most vulnerable. The MMO notes that large areas of the Southern North Sea that are considered to be suitable sandeel habitat are currently in the operational, construction or planning stages for large offshore windfarm developments and expects that the cumulative effects will be fully assessed in the EIA.	Consideration has been given in the cumulative assessment to the potential for other projects and activities in the Southern North to result in cumulative impacts on fish and shellfish receptors, including sandeels (section 11.8).

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 11, Fish and Shellfish Ecology	MMO	December 2018	<p>The MMO considers the likely effects on sandeel are uncertain, as very little monitoring is being undertaken to investigate the cumulative impacts to sandeel as a result of the construction and operation of offshore windfarms. The MMO seeks to understand how this uncertainty will be addressed in the EIA, and how the developer proposes to validate EIA predictions concerning impacts to sandeel.</p> <p>The MMO acknowledges that EIAs for previous developments have concluded impacts to sandeel are unlikely to be significant. The rationale given is that there are other areas of suitable habitat in the wider Southern North Sea area which sandeel can inhabit.</p> <p>However, this conclusion overlooks two key issues. (i) There are many areas of the wider Southern North Sea area that are not suitable sandeel habitat, e.g. due to incompatible substrate composition, water depth. (ii) Large areas of the Southern North Sea are already being utilised by marine developments including OWFs and aggregate extraction, which further reduces available sandeel habitat. The MMO advises that these are addressed in the EIA.</p>	<p>Consideration has been given to the potential impacts of the construction, operation and decommissioning phases of the project on sandeels (sections 11.7, 11.8 and 11.9).</p> <p>In addition, consideration has been given in the cumulative assessment to the potential for other projects and activities to result in cumulative impacts on sandeels (section 11.8).</p> <p>In the context of the cumulative assessment, with regards to construction works, the temporary and localised nature of potential impacts associated with other projects/activities should be noted. Furthermore, with regards to increased Suspended Sediment Concentrations (SSCs) and sediment re-deposition, as noted in Chapter 8 Marine Geology, Oceanography and Physical Processes, negligible cumulative seabed level changes (i.e. 2mm) would be expected given the rapid dispersion of sediment plumes.</p> <p>With regards to longer term cumulative impacts during operation such as permanent loss of habitat, the fact that habitat loss would only occur around relatively small localised areas at each individual</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				project should be noted. Furthermore, studies of fish assemblages in operational wind farms (Stenberg et al., 2011; 2015) have not detected significant changes to sandeel populations. It has been suggested (Stenberg et al., 2015) that direct loss of habitat associated with offshore wind farm infrastructure and indirect effects (i.e. changes to sediment composition) are too low to influence the abundance of sand-dwelling species such as sandeels. This would also apply in a cumulative context.
Chapter 11, Fish and Shellfish Ecology	MMO	December 2018	The MMO is content that the key fish receptors requiring consideration have been identified in detail, including species of conservation and ecological importance. Furthermore, the PEIR provides a thorough characterisation of fish ecology for the study area, providing a detailed account of the species known to have spawning and nursery grounds in the area, as well as the months in which spawning activities takes place for these species. As such, the potential impacts to fish resulting from the construction, operation and decommissioning based on worst case scenario have been correctly identified.	Noted.
Chapter 11, Fish and Shellfish Ecology	MMO	December 2018	A comprehensive list of data sources has been provided that will be used to inform the EIA. All data sources are considered to be appropriate to inform the EIA, and the limitations of the use of beam and otter trawls in respect of some fish species/groups e.g. pelagic fish, have been acknowledged in the report.	Noted.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 11, Fish and Shellfish Ecology	MMO	December 2018	Potential Atlantic herring spawning habitat (MarineSpace, 2013) criteria have been followed and supplemented using International Herring Larval Survey (IHLS) data. The information presented concludes that the Norfolk Boreas study area is not suitable as a herring spawning ground. The MMO agrees that the area is not considered to be a spawning ground of high importance to either the Banks or Downs herring stocks, although considers there are some discrete coastal areas, e.g. near Great Yarmouth where some spawning activity is likely to occur.	Noted. The potential for discrete inshore areas around Great Yarmouth to support herring spawning has been noted in Chapter 11, Table 11.1 and in Appendix 11.1. Note that these are located to the south of the offshore offshore cable corridor and do not overlap with the offshore project area.
Chapter 11, Fish and Shellfish Ecology	MMO	December 2018	Chapter 11, Paragraph 107 acknowledges that small sandeel, greater sandeel and lesser sandeel have been recorded in the study area using the International Bottom Trawl Survey (IBTS) data which suggests that sandeel are found in relatively low numbers in this area. The MMO does not consider that IBTS survey data is appropriate for determining sandeel abundance in the Norfolk Boreas area. This is because the bottom trawling methods used on IBTS surveys do not adequately target sandeel.	The limitations of bottom trawl gear to adequately target some species, including sandeels, are recognised in Appendix 11.1. The conclusion that the area of the project supports sandeels in relatively low numbers, is supported by the results of the International Beam Trawl Survey (IBTS), but also by the distribution of sandeel fishing activity (derived from Vessel Monitoring System (VMS) data), known sandeel fishing grounds (Jensen et al., 2011) and the fact that the offshore project area and the study area do not overlap with high intensity sandeel spawning and/or nursery grounds (Ellis et al., 2010).

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				<p>The location of high intensity spawning/nursery grounds, the distribution of sandeel fishing grounds and fishing activity, as well as data from the IBTS, all suggest that within Sandeel Assessment Area 1r, key sandeel areas are located north of the offshore project area, particularly around the Dogger Bank.</p>
<p>Chapter 11, Fish and Shellfish Ecology</p>	<p>MMO</p>	<p>December 2018</p>	<p>Figure 6.30 presents a map of the array and offshore cable route areas where grab data has been used to assess sandeel habitat suitability. Chapter 11, paragraph 106 acknowledges that a large proportion of the Norfolk Boreas site is classified as 'Preferred' Sandeel habitat based on the PSA undertaken from these grab samples.</p>	<p>Noted.</p> <p>Particle Size Analysis (PSA) data from benthic surveys undertaken in the offshore cable corridor, the Norfolk Boreas site and areas relevant to the project interconnector search area (Norfolk Vanguard East (NV East) and Norfolk Vanguard West (NV West)) have been analysed to provide an indication of the suitability of the offshore project area in terms of potential for provision of habitat for sandeells (see Appendix 11.1).</p> <p>As expected, given the sandy nature of the sediment across the offshore project area, preferred and marginal sandeel habitat has been identified across the majority of the offshore project area, with unsuitable areas identified at discrete locations (Appendix 11.1).</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				It should be noted that the habitat classification on which the above analysis is based (Marine Space, 2013) relies on sediment composition only rather than evidence of sandeel usage of the area. Therefore the presence of suitable sediment does not necessarily imply that sandeels are significantly abundant in a particular area.
Chapter 11, Fish and Shellfish Ecology	MMO	December 2018	Chapter 11, Paragraph 117 states the receptor sensitivity to be 'medium' and the magnitude of impact to be 'low'. The MMO agrees that the impact of physical disturbance/temporary loss of habitat should be assessed to be of minor adverse significance in relation to shellfish.	Noted.
Chapter 11, Fish and Shellfish Ecology	MMO	December 2018	Appendix 5.4 shows that a fleeing animal model for fish receptors has been used, assuming a fish flees from the source at a constant rate of 1.5 ms ⁻¹ , based on data from Hirata (1999). The MMO is not aware of scientific or empirical evidence to support fleeing responses to noise in fish. Whilst this isn't unrealistic for a swimming speed, it is overly simplistic as it overlooks the various swimming capabilities and sizes of different species of fish, as well as the biological drivers in fish, such as migration, spawning and philopatric behaviour. Furthermore, the use of an assumed swimming speed isn't appropriate when modelling the impact ranges for eggs and larvae which are a stationary receptor. The MMO therefore recommends that for the underwater noise assessment in the EIA, modelling is undertaken based on a stationary receptor (for fish, eggs and larvae).	Additional noise modelling has been undertaken taking a stationary animal approach. This is presented in Appendix 5.4, Annex 1, and summarised the Chapter 11. It should be noted that the stationary animal model assumes that, when exposed to any noise from piling, the fish do not react in any way to reduce their exposure to noise, which will remain at the highest level modelled in the water column. It is considered unlikely that, whether the fish reacts specifically to the noise or not, it would remain at the position of highest noise level for the hours of

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				piling. The outcomes of the modelling considering a stationary animal scenario therefore represent a highly conservative worst case.
Chapter 11, Fish and Shellfish Ecology	MMO	December 2018	The MMO would welcome further discussion on the most appropriate mitigation to be secured once the Environmental Impact Assessment (EIA) is completed.	<p>Noted.</p> <p>A number of embedded mitigation measures have been incorporated as part of the project's design process. Those relevant to fish and shellfish ecology receptors are outlined in section 11.7.1 and include, amongst other aspects:</p> <ul style="list-style-type: none"> • Cable burial to at least 1m where possible. • Where cable burial is not achievable (i.e. due to the presence of hard ground and/or at cables crossing) cable protection will be used. • During construction, where possible, overnight working practices would be employed; and • Implementation of soft start pile driving procedures.
Chapter 11, Fish and Shellfish Ecology	Eastern Inshore Fisheries and Conservation Authority (IFCA)	December 2018	Sandeels, which inhabit and spawn in the project area, are among the most important prey species for harbour porpoise. We acknowledge that the PEIR assessment determined that there will be only a low magnitude of impact on fish species, including sandeel and herring, and that the	<p>Noted.</p> <p>Consideration has been given in the cumulative assessment to the potential for other projects and activities in the Southern North to</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>impact of the proposed works on prey species of the Harbour Porpoise are therefore of 'minor adverse significance'.</p> <p>We defer to Natural England for formal conservation advice on this matter, however we would like to once again highlight Eastern IFCA's concern about the scale of both licensed and planned offshore activities (particularly aggregate extraction and offshore wind farm construction) in the Southern North Sea, because of cumulative effects these could have on seabed habitats. Sandeels depend on the presence of adequate sandy substratum in which they burrow and are demersal spawners that lay eggs on the seabed. Whilst we appreciate the difficulty in studying potential wide-scale impacts of all offshore activity, this is an important issue requiring consideration.</p>	<p>result in cumulative impacts on fish and shellfish receptors, including sandeels (section 11.8).</p>
Chapter 11, Fish and Shellfish Ecology	Inshore Fisheries and Conservation Authority (IFCA)	December 2018	<p>Many coastal habitats provide important spawning and nursery areas for a variety of marine species. Any disturbance to these habitats has the potential to negatively affect these populations. The inshore areas of the cable corridor identified in the PEIR are understood to support nursery grounds for thornback ray, herring, cod, whiting, mackerel, plaice and sole. Furthermore, the area supports spawning grounds for herring, sole and sandeels (Ellis et al., 2012) – an important prey of the harbour porpoise, which is protected within the Southern North Sea cSAC. Although the best available information (Coull et al., 1998; Jensen et al., 2011; Ellis et al., 2012) shows extensive spawning grounds for many species, Eastern IFCA is concerned about the scale of offshore activities (particularly aggregate extraction and offshore wind farm construction) in the Southern North Sea because of cumulative effects these could have on seabed habitats – and subsequently on dependent fauna. Whilst we appreciate the difficulty in studying potential wide-scale impacts, we consider the issue does warrant further consideration.</p>	<p>Consideration has been given in this assessment to fish species with known spawning and nursery grounds in areas relevant to the project (Table 11.8 and Table 11.10).</p> <p>Fish species which are of importance as prey to marine mammals, including herring, sole and sandeels have been considered in the impact assessment within this chapter (Table 11.10). Potential impacts of the project on marine mammals are discussed in Chapter 12 Marine Mammals.</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 11, Fish and Shellfish Ecology	Inshore Fisheries and Conservation Authority (IFCA)	December 2018	Eastern IFCA holds concerns about the proliferation of marine electricity cables off the East Anglian coast and the potential – but very poorly understood – impacts of electromagnetic fields on marine life. We would like to highlight that there are appreciable gaps in the scientific literature as to the potential effects of EMF emissions from subsea cables on marine fauna, and therefore there remain uncertainties in the ability of the Applicant to determine that there will be no adverse effects on fish and shellfish ecology.	<p>The assessment of the potential impact of electromagnetic fields (EMFs) on fish and shellfish species is based on the worst case scenario identified for the project (Table 11.13) and taking account of best available information.</p> <p>In the context of the assessment of EMFs it is important to note that from the results of post-consent monitoring conducted to date, there is no evidence to suggest that EMFs pose a significant threat to elasmobranchs at the site or population level, and little uncertainty remains (MMO, 2014) (section 11.7.5.4.1).</p> <p>Consideration has been given in the cumulative assessment to the potential impact of EMFs associated with the project and other developments in the wider area on sensitive receptors (section 11.8).</p> <p>As described in section 11.7.1, cables will be buried where possible to a minimum depth of 1m and protected where cable burial is not feasible.</p>
Chapter 11, Fish and Shellfish Ecology	VisNed	December 2018	The maps, that are used in the PEIR, are based on research from Ellis et al. 2010 and Coull et al. from 1998. The latter one is a study more than twenty years old. For a proper view, you need to have at least maps with data from the past five	Coull et al. 1998 and Ellis et al. 2010 provide a broad scale overview of the potential extent of

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>years. Even if you have this information, it remains extremely difficult to measure the nursery and spawning grounds in the future. To get a fair picture of the impact of offshore windmills, you should use a different economic approach. This assessment should not only focus on the micro effects of this/any specific windfarm involved, but include the cumulative economic and ecological impact from the large scale transformation of EEZ's resulting from the large scale rolling out of renewable energy projects. VisNed is available to help with this subject.</p>	<p>spawning/nursery grounds and relative intensity and duration of spawning. The limitations of these publications are noted in Appendix 11.1.</p> <p>Potential impacts on fish and shellfish species have been considered in relation to the project alone (section 11.7) as well as cumulatively with other projects and activities in the wider Southern North Sea (section 11.8).</p>

Table 1.6 Feedback related to Marine Mammals (Chapter 12 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 12, Marine Mammals	The Wildlife Trust	December 2018	<p>TWT consider that fishing should be included in both cumulative and in-combination assessments. Fishing is a licensable activity that has the potential to have an adverse impact on the marine environment. This is supported in the leading case C-127/02 Waddenzee [2004] ECR I-7405, the CJEU held at para. 6.</p> <p>“The act that the activity has been carried on periodically for several years on the site concerned and that a licence has to be obtained for it every year, each new issuance of which requires an assessment both of the possibility of carrying on that activity and the site where it may be carried on, does not itself constitute an obstacle to considering it, at the time of each application, as a distinct plan or project within the meaning of the Habitats Directive”.</p>	<p>By-catch by commercial fisheries is recognised as a historic and continuing cause of harbour porpoise mortality in the Southern North Sea. This will therefore be a factor in shaping the size of the current North Sea (NS) Management Unit (MU) population.</p> <p>The available prey resource for harbour porpoise has also been influenced by historic and continuing commercial fishing.</p> <p>As a result, the Norfolk Boreas Cumulative Impact Assessment (CIA) and in-combination assessments</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>This case law demonstrates that fishing is considered a plan or a project and therefore not part of the baseline.</p> <p>Current Defra policy is to ensure that all existing and potential fishing operations are managed in line with Article 6 of the Habitats Directive. The current, risk-based, 'revised approach' to fisheries management in European Marine Sites is a compromise agreed by all to prevent the closure of fisheries during assessment. This approach further supports that fishing is considered a plan or a project and therefore must be included in the in-combination assessment in line with Article 6(3) of the Habitats Directive.</p> <p>A precedent was set for the inclusion of fishing in in-combination assessments when TWT began Judicial Review proceedings against the Department for Energy and Climate Change (DECC) in August 2015 against the approval of Dogger Bank Teesside A & B Offshore Wind Farm Order due to the exclusion of fishing from the in-combination assessment as part of the HRA. TWT withdrew the claim due to assurances given by the government regarding the management of fishing within Dogger Bank SAC. One of those assurances was that steps would be put in place to ensure that this scenario would not happen again and that Defra and DECC would work together to ensure fishing would be included in future offshore wind farm impact assessments.</p>	<p>considers commercial fisheries to be part of the baseline environment for marine mammals, including harbour porpoise.</p> <p>Noise from vessels associated with other, non-wind farm, plans or projects such as oil and gas, aggregates and commercial fisheries, are also considered to be part of the baseline conditions.</p> <p>This approach is in accordance with the Planning Inspectorate Advice Note 17 Cumulative Effects Assessment.</p> <p>The draft Review of Consents (RoC) HRA suggests that by-catch has not hindered the population achieving Favourable Conservation Status (FCS). Information from the Business Energy and Industrial Strategy (BEIS) (2018) draft RoC HRA have been included in section 12.4.2. See Appendix 12.1 for full response.</p>
Chapter 12, Marine Mammals	The Wildlife Trust	December 2018	TWT does not agree with the SNCB advice on underwater noise management. The proposed thresholds are not based on strong science and are therefore not precautionary enough. TWT advocate the management approach used in Germany.	This is the current SNCB advice for assessments on the SNS SAC and is therefore used in the assessments. However, it should be noted that in addition to the area based approach, assessments were also conducted on the harbour porpoise North Sea Management Unit population, with

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				additional assessments on the estimated number of harbour porpoise that the SNS SAC site could support.
Chapter 12, Marine Mammals	The Wildlife Trust	December 2018	<p>TWT is pleased that Norfolk Boreas has committed to a piling and UXO MMMP and a Site Integrity Plan (SIP) for the Southern North Sea SCI. However, as detailed plans are not available at the time of consent, TWT wish to be named as a consultee in the development of the MMMPs and SIP. TWT also wish to continue the good relationship we have developed with Norfolk Boreas into the post-consent stage.</p> <p>TWT expect the MMMPs and the SIP to detail the effectiveness of the potential mitigation to ensure no adverse effect beyond reasonable scientific doubt.</p>	<p>Acknowledged. The Wildlife Trust will be consulted on during the development of the final Marine Mammal Mitigation Protocol (MMMP) for piling and the Site Integrity Plan (SIP).</p> <p>A draft MMMP for piling and In-Principle SIP has been included with this DCO application (document reference 8.13 and 8.17).</p>
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	<p>The results of the aerial surveys undertaken (Section 2.2.4 of Appendix 12.1 Marine Mammal Information and Survey Data), shows that for cetaceans identified as harbour porpoise that there is the highest peak in the summer months, but there are also smaller peaks in winter. Additionally, for unidentified small cetaceans, which are being assumed to be harbour porpoises for the purpose of the impact assessment, there was a peak in winter with a smaller peak in summer “indicating that higher than normal numbers are seen in these summer months, but the highest peaks are seen in winter”. Whilst Norfolk Boreas area is within the summer area of the SNS SCI, there are harbour porpoise, potentially at significant number, in the winter. Therefore, construction at any time of the year will require proven mitigation methods to ensure there is no adverse impact on the population of harbour porpoise at the site.</p>	<p>The potential for impacts on the winter area of the SNS SAC have been fully considered within the Information to Support Habitats Regulation Assessment Report submitted as part of this application (Document reference 5.3), due to the proximity of the winter area to the Norfolk Boreas site.</p>
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	<p>One of our main concerns is that the assessment on the harbour porpoise population in the SNS SCI is based against the North Sea Management Unit. WDC acknowledges that this is following guidance from the SNCB’s, and within the</p>	<p>Assessments were conducted based on the current SNCB advice. As outlined in section 12.6.1.5, it is currently not advised to use the SNS</p>

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			SNS SCI Site Selection Document, it states “because this estimate is from a one-month survey in a single year it cannot be considered as a specific population number for the site. It is therefore not appropriate to use site population estimates in any assessments of effects of plans or projects (i.e. Habitats regulation Assessments), as these need to take into consideration population estimates at the MU level, to account for daily and seasonal movements of the animals” (JNCC, 2017). WDC strongly disagree with this advice. The European Commission guidance on managing Natura 2000 sites also states that the integrity of the site (habitat and species) must be maintained (European Commission and Office for Official Publications of the European Communities, 2000).	SAC site population estimate in any assessments of effects of plans or projects, as these need to take into consideration population estimates at the MU level (JNCC, 2017b). However, an additional assessment has been completed, based on the estimate that the SNS SAC could support 29,384 harbour porpoise (SCANS-III data for 17.5% of the UK North Sea MU). This additional assessment which if for information only is provided in Appendix 12.4.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	The results of this assessment estimate that a significant area of the SNS SCI, and the harbour porpoise population supported by the site could be impacted by construction activities, particularly piling during construction when the data is extrapolated for 200 foundations required for Norfolk Boreas. As detailed below, pile driving during construction has been demonstrated to cause behavioural changes in harbour porpoises, and reduce abundance in the area during the entire construction window, and beyond (see section below on Potential Impacts).	The MMMP and SIP, will reduce the potential impacts of piling on harbour porpoise in the SNS SAC. A draft MMMP (document reference 8.13) and an In-Principle SIP (document reference 8.17) are submitted as part of this DCO application.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	We agree with the approach for the cumulative impact assessment (CIA) in paragraph 51, as this is the only way to ensure the cumulative impacts on the SNS SCI are adequately assessed. We agree with the other offshore wind farms that have been included in the CIA, however activities other than offshore wind farm construction within the SNS SCI, do not seem to be included e.g. oil and gas, marine aggregates etc.	The project and plans included in the CIA were determined in the CIA screening (Appendix 12.3), including marine aggregates etc. Seismic surveys from the oil and gas industry have been included in the CIA.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	During piling activities, it is possible that there could be two vessels driving piles at any one time, and that pile-driving will start at one site, and then continue at another. We	An assessment of the potential effects of concurrent piling has been undertaken for both Norfolk Boreas

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			recommend that the CIA includes pile driving commencing at a second location, whilst the first is still being driven. The impact of the second pile driving location on the harbour porpoise population of the SNS SCI is highly dependent upon the location of the second pile-driving site which is likely to have a different potential area of impact to the first. This second pile-driving location will increase the noise levels generated and have a cumulative impact.	alone (see section 12.7.3.2.4) and for concurrent piling at Norfolk Boreas cumulatively with other offshore wind farms (see section 12.8.4.1).
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	We recognise that the assessment has been undertaken with no mitigation measures applied, and we welcome the commitment to using mitigation methods to reduce the risk of piling activities on harbour porpoise and the SNS SCI. We also acknowledge that the full details of mitigation to be used are yet to be finalised in the MMMP, and the Site Integrity Plan (SIP) will set out the approach to deliver any project mitigation or management measures in relation to the SNS SCI. However, we have concerns over the embedded mitigation measures proposed and would like to see a commitment to using proven mitigation methods (see section below on Mitigation Methods). Until the details of the MMMP and SIP are finalised, it is impossible to conclude that there will be no Adverse Effect on Integrity (AEoI) on the SNS SCI.	Developing the MMMP and SIP in the pre-construction period will allow for a detailed review and assessment of the most effective and appropriate mitigation methods at that time, based on the latest scientific evidence to reduce underwater noise impacts, including embedded mitigation. A draft MMMP (document reference 8.13) and an In-Principle SIP (document reference 8.17) are submitted as part of this DCO application.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	We are concerned that the other datasets used to provide a baseline for assessment are not recent, are ad-hoc data or are not dedicated marine mammals surveys, and some only cover small parts of the Norfolk Boreas area. Whilst useful information they cannot be relied upon to provide a reliable baseline for assessment.	Potential impacts have been based on the highest site specific survey density estimates and the SCANS-III survey density estimate throughout the assessment, as a precautionary approach to assessing impacts. All currently publicly available data has been referred to including surveys have been undertaken / currently underway at other OWF sites, for example, Norfolk Vanguard,

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				East Anglia ONE North and East Anglia TWO.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	Our primary concern surrounds the intense noise pollution resulting from pile driving for all cetacean species and the harbour porpoise population supported by the SNS SCI. Reactions of harbour porpoises to the pile driving process have been recorded at distances many kilometres from the piling location (Brandt et al., 2018, 2011; Carstensen et al., 2006; Dähne et al., 2013; Thomsen et al., 2006). In some cases pile driving is audible by harbour porpoises beyond 80 km from the source and could mask communication at 30 – 40 km (Thomsen et al., 2006). Bottlenose dolphins (<i>Tursiops truncatus</i>) could exhibit behavioural responses at distances of up to 40 km from pile driving locations (Bailey et al., 2010).	<p>Acknowledged. An assessment of the potential for disturbance from pile driving is included in section 12.7.3.2.4.</p> <p>The assessments for the potential disturbance and possible behavioural response in harbour porpoise was based on the currently advised thresholds and criteria for underwater noise modelling, as well as the SNCB recommended 26km Effective Disturbance Radius (EDR). In addition, a review all relevant publications were conducted to put the assessment into context.</p> <p>There is no evidence that bottlenose dolphin would be present in the area of the Norfolk Boreas site, however, the MMMP and SIP (DCO document reference 8.13 and 8.17) although aimed primarily at harbour porpoise would provide mitigation for other cetaceans / EPS.</p>
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	Research has shown that pile driving causes behavioural changes in harbour porpoises which leave the area during construction and in some instances did not later return to their usual numbers (Brandt et al., 2011; Carstensen et al., 2006; Teilmann and Carstensen, 2012). Some studies have shown harbour porpoise start to return in one area, yet years later have not returned to other areas (Snyder and Kaiser, 2009). The longest running study into the effects of	<p>Acknowledged. An assessment of the potential for disturbance and behavioural response for harbour porpoise from pile driving is included in sections 12.7.3.2.4 and 12.7.3.2.5.</p> <p>Vattenfall Wind Power Limited has been heavily involved in the development of DEPONS</p>

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			windfarms on harbour porpoises shows that ten years later, the population has only recovered to 29% of the baseline level (Teilmann and Carstensen, 2012). Even where areas have been recolonised, it is not clear if these are the same animals returning or new animals moving into the area, or if the animals are using the area in the same way.	(Disturbance Effects of Noise on the Harbour Porpoise Population in the North Sea), which used at a strategic level would allow consideration of the biological fitness consequences of disturbance from underwater noise, and the conclusions of a quantitative assessment to be put into a population level context.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	Either scenario is a significant period of time in a harbour porpoise life span (608 days for single phase, 243 days in each phase for the two phase approach, paragraph 405 Chapter 12 Marine Mammal Ecology), and with the potential for piling at more than one location at any one time, therefore the potential impact of pile-driving for Norfolk Boreas on the harbour porpoise population is high, covering the lifespan of a porpoise and with a high potential to affect breeding and feeding activity.	The assessment of disturbance to harbour porpoise as a result of pile driving, taking into account the total time that pile driving may be undertaken, is included in section 12.7.3.2.4.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	Although it is likely that pile driving activity will not be constant, the installation of monopile foundations has been found to have a profound negative effect on harbour porpoise acoustic activity up to 72 hours after pile driving activity (Brandt et al., 2011). It is unlikely that harbour porpoises will return to an area during these gaps, resulting in them most likely being excluded from the area for the entire duration of construction.	Nabe-Nielsen et al. (2018) developed the DEPONS (Disturbance Effects of Noise on the Harbour Porpoise Population in the North Sea) model to stimulate individual animal's movements, energetics and survival for assessing population consequences of sub-lethal behavioural effects. The model was used to assess the impact of offshore windfarm construction noise on the North Sea harbour porpoise population, based on the acoustic monitoring of harbour porpoise during construction of the Dutch Gemini offshore windfarm.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				<p>Local population densities around the Gemini windfarm recovered 2–6 hours after piling, similar recovery rates were obtained in the model. The model indicated that, assuming noise influenced porpoise movements as observed at the Gemini windfarm, the North Sea harbour porpoise population was not affected by construction of 65 wind farms, as required to meet the European Union (EU) renewable energy target (Nabe-Nielsen et al. 2018).</p>
Chapter 12, Marine Mammal	Whale and Dolphin Conservation	<p>letter dated 28th November 2018</p> <p>Comments on the Norfolk Boreas PEIR</p>	<p>We are pleased that it is recognised in Chapter 12 Marine Mammal Ecology, section 12.7.3.2 that the impacts from piling include both physiological and behavioural impacts on marine mammals. We note that INSPIRE modelling has been used to predict underwater noise levels from the construction of Norfolk Boreas. Whilst we feel this is model will be helpful in the assessment, the model has been found to under predict noise levels (Spiga, 2015) which can potentially lead to underestimate the impact of piling on cetaceans. We are pleased that the National Marine Fisheries Service (NMFS) modelling (National Marine Fisheries Service (NMFS), 2016) is also used instead as agreed in the EWG.</p>	<p>Norfolk Boreas Limited are confident that the modelling used is appropriate for the purposes of this assessment. A precautionary approach has been used for the underwater noise modelling with the worst-case parameters used within the model, including piling hammer energies, soft-start and ramp-up scenarios, strike rate, duration of piling, receptor swim speeds and water depths. More information on the underwater noise modelling and INSPIRE model can be found in Appendix 5.4.</p> <p>During the development of the final MMMP for piling the underwater noise modelling will be reviewed, and updated, if required.</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	WDC is concerned about the impacts of increased vessel activity particularly during construction. Increased vessel noise can interrupt harbour porpoise foraging behaviour and echolocation, which can lead to significantly fewer prey capture attempts (Wisniewska et al., 2018). There is an increased risk of collision and disturbance to cetaceans from increased vessel activity (Dyndo et al., 2015; James, 2013). This is of particular importance as there are expected to be a large increase in the number of vessels in the Norfolk Boreas area during construction.	An assessment of the increase of collision risk to harbour porpoise has been included in section 12.7.3.6, and an assessment of the potential disturbance due to increased vessel presence is included in section 12.7.3.4.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	WDC do not agree with the assumption in 12.7.3.6 Chapter 12 Marine Mammal Ecology that “Marine mammals in the Norfolk Boreas offshore project area would be habituated to the presence of vessels and would be able to detect and avoid vessels”; as there is no evidence to base these assumptions upon. We also disagree with paragraph 505 “In addition, based on the assumption that harbour porpoise would be disturbed from a 26km radius during piling, there should be no potential for increased collision risk with vessels at Norfolk Boreas during the construction period” as harbour porpoise may not move out of the area, especially if the area is important for feeding and breeding.	Assessments on the potential impacts of vessels have been based on the worst-case scenarios. All vessel operators will use good practice to reduce any risk of collisions with marine mammals.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	Section 12.7.1 of Chapter 12 Marine Mammal Ecology cover the embedded mitigation measures that have already been incorporated into the project design. As discussed at EWG meetings, WDC are pleased to see a commitment to mitigation measures however, we strongly disagree that these measures are appropriate mitigation methods.	Developing the MMMP and SIP in the pre-construction period will allow for a detailed review and assessment of the most effective and appropriate mitigation methods at that time, based on the latest scientific evidence to reduce underwater noise impacts, including embedded mitigation. A draft MMMP (document reference 8.13) and an In-Principle SIP (document

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				reference 8.17) are submitted as part of this DCO application.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	We understand that the JNCC guidance for minimising the risk of injury to marine mammals from piling noise (JNCC, 2010) has been followed, with a more precautionary approach. We recognise that currently these are the only guidelines available to developers to use to minimise the impacts of piling activity on marine mammals, however it is widely known that these guidelines are outdated, and do not use the latest scientific evidence.	Reference to the JNCC guidance (JNCC, 2010) has been provided for context. Developing the MMMP in the pre-construction period will allow for a detailed review and assessment of the most effective and appropriate mitigation methods at that time, including the latest scientific evidence and guidance.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	In particular WDC have concerns over the guidance that soft-starts should be used and the use of Marine Mammal Observers (MMOs). WDC do not consider 'soft-start' to be an adequate mitigation measure as they are only a reduction in sound source at the initiation of a piling event. It cannot be assumed that cetaceans will leave an area during a soft-start as they may remain the area due to prey availability or breeding despite the harmful noise levels (Faulkner et al., 2018). Whilst a common sense measure, soft-starts are not a proven mitigation technique and so cannot be relied upon to mitigate impacts, especially for developments within the SNS SCI.	Developing the MMMP in the pre-construction period will allow for a detailed review and assessment of the most effective and appropriate mitigation methods at that time, including the latest scientific evidence and guidance for 'soft-starts'.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	We are concerned that acoustic deterrent devices (ADDs) such as pingers may be used to move marine mammals out of the area. Not only will this add another source of noise into the environment (Faulkner et al., 2018), the use of ADDs has not been proven as a mitigation for pile driving and cannot be relied upon for the range of species likely to be encountered in the wind farm region. The range of displacement from ADDs has the potential to exceed the range of displacement	The potential disturbance from the proposed use of ADDs has been assessed in section 12.7.3.2.4 If the use of Acoustic Deterrent Devices (ADD)s is proposed as a mitigation method the potential disturbance will be assessed against the risk of any physical or permanent auditory injury (PTS) to marine mammals.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			from pile driving itself when using bubble curtains (Dähne et al., 2017).	<p>Examples of ADD use were included, but as outlined above all effective and appropriate mitigation methods will be reviewed during the development of the MMMP.</p> <p>The use of ADDs has been used as mitigation during piling at several European and UK offshore wind farms.</p>
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	Due to Norfolk Boreas being located within the SNS SCI, WDC would like to see a commitment to using mitigation methods that have been proven in both test scale (Diederichs et al., 2013; Wilke et al., 2012) and full-scale sites, in particular bubble curtains (Brandt et al., 2018; Dähne et al., 2017; Nehls et al., 2016).	Norfolk Boreas Limited is committed to using effective, proven and appropriate mitigation methods based on the latest scientific evidence as necessary to comply with the Conservation Objectives of the SNS SAC.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	However, until the details of the MMP are decided it is impossible to conclude that the MMMP will ensure that impacts from piling activity will be sufficiently mitigated. We are concerned that the MMMP currently only includes mitigation methods from the JNCC guidelines and would like to see a commitment to ensure that only proven mitigation methods are included in the MMMP.	Developing the MMMP in the pre-construction period will allow for a detailed review and assessment of the most effective and appropriate mitigation methods at that time, including the latest scientific evidence.
Chapter 12, Marine Mammals	Whale and Dolphin Conservation	November 2018	Due to the concerns over the embedded mitigation methods, and until the mitigation methods that are to be used are known, it is inaccurate to conclude that the mitigation measures will ensure that impacts from piling on harbour porpoise and the harbour porpoise population supported by SNS SCI will be reduced. WDC strongly disagrees with the conclusions in the PEIR that either stand-alone or in-	<p>The MMMP and SIP will set out the approach to deliver any project mitigation or management measures in relation to harbour porpoise and the SNS SAC.</p> <p>Developing the MMMP and SIP in the pre-construction period will allow for a detailed review and</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			combination, that impacts on the harbour porpoise will be negligible with or without embedded mitigation.	<p>assessment of the most effective and appropriate mitigation methods at that time, based on the latest scientific evidence to reduce underwater noise impacts.</p> <p>It is acknowledged that WDC disagree with the conclusions of the assessment that either stand-alone or in-combination, that impacts on the harbour porpoise will be negligible with or without embedded mitigation. However, we stand by the findings of the assessment and as previously outlined, Norfolk Boreas Limited is committed to using effective, proven and appropriate mitigation methods based on the latest scientific evidence.</p>
Chapter 12, Marine Mammals	Natural England	November 2018	<p>Ongoing issues for Vanguard</p> <p>Marine Mammals:</p> <p>The main issues are summarised as:</p> <ul style="list-style-type: none"> • In combination underwater noise • Mitigation • Soft start as mitigation • Risk of injury from UXO • Review of Consents strategic approach to noise • 20% of SAC disturbance threshold <p>Advise that there will be a requirement to provide ‘a revised site integrity plan based on final project design</p>	<p>Norfolk Boreas Limited have had due regard to ongoing consultation between Natural England and Norfolk Vanguard, however due to the timescales of both projects it has not been possible to include all agreements or changes made to that project.</p> <p>It is acknowledged that Natural England’s concern regarding the soft-start as mitigation has now been removed (marine mammal ETG, 21st February 2019).</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			including adoption of possible mitigation measures which confirms the proposed timeframes of both site preparation and construction activities which pose a disturbance risk to marine mammals' to the MMO 6 months prior to construction.	
Chapter 12, Marine Mammals	Marine Management Organisation	December 2018	1.3 Chapter 3 describes the potential scenarios for construction of the Norfolk Boreas OWF; in one single phase or 2 phases, both spanning 4 years. Chapter 3 includes provision for a multi-phase construction approach with the proposed Norfolk Vanguard OWF. In the event that the Norfolk Vanguard OWF development is consented, this would increase overall duration of the construction phase. Chapter 3 also acknowledges that if the proposed Norfolk Vanguard OWF is not progressed, the construction programme for the Norfolk Boreas OWF could be brought forward by up to one year. In all scenarios, further consideration is required to demonstrate how the likely impacts will differ for each construction scenario, i.e. for a build scenario lasting 3 years compared to a build scenario lasting 7-10 years. If a multi-phase construction approach is to be adopted, then the MMO considers that the in combination impacts must be assessed accordingly.	Further work has been undertaken to better define the construction periods for both projects under single and two phased construction approaches. The revised indicative Norfolk Boreas programme (Table 12.6 and Table 12.7) show a three year construction programme. The most likely scenario would be that Norfolk Boreas is constructed approximately 1 year behind Norfolk Vanguard and therefore a the combined construction period would last for up to five years.
Chapter 12, Marine Mammals	Marine Management Organisation	December 2018	The underwater noise assessment should provide a plot showing the predicted received sound levels against range, for the single strike sound exposure level (SEL). This will facilitate and streamline the process of comparing predictions with any future construction noise monitoring data collected for compliance purposes.	The Underwater Noise report (Appendix 5.4) has been updated to include a plot showing the transects of the single strike SEL results, against range. See section 5.1.1 of Appendix 5.4.
Chapter 12, Marine Mammals	Marine Management Organisation	December 2018	2.3 Section 6 of Appendix 5.4 considers noise impacts (aside from piling activity). The text refers to a simple modelling approach based on measured data scaled to relevant parameters for the site. The MMO requests further detail on the modelling used.	The Underwater Noise report (Appendix 5.4) has been updated to include information on the 'SPEAR' model used within this assessment.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 12, Marine Mammals	Marine Management Organisation	December 2018	Table 6.2 summarises the estimated unweighted source levels for the different construction noise sources considered, which are based on various datasets. The MMO requests that the references be provided for these datasets.	<p>The data sets used to estimate the unweighted source levels are not formally published, and so cannot be directly referenced.</p> <p>It should be noted that data from hundreds of datasets have been built into the model and it doesn't refer explicitly to any of them, they only identify trends. In addition, because of confidentiality it is not possible to specifically reference any other projects. The modelling has been used successfully at other offshore wind farms and shown to be accurate/conservative based on the measurements during construction.</p>
Chapter 12, Marine Mammals	Marine Management Organisation	December 2018	2.6 Section 6.3 focuses on the assessment of operational noise. The MMO requests further detail is provided on why the linear fit is considered to give a worst-case estimate, as shown in Figure 6.1 (Appendix 5.4).	<p>The Underwater Noise report (Appendix 5.4) has been updated to include the following information:</p> <p><i>"This fit was applied to the data available for operational wind turbine noise as this was the extrapolation that would lead to the highest, and thus worst case, estimation of source noise level from the larger 15 MW turbine. This resulted in an estimated source level of 158.5 dB SPLrms, 12 dB higher than the 6 MW turbine, the largest for which noise data existed. Alternatively, using a logarithmic fit (3 dB per doubling of power output)</i></p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				<i>to data would lead to a source level of 149.8 dB SPLrms. A more extreme and unlikely 6 dB increase per doubling of power output would lead to 154.5 dB SPLrms. Thus, the linear estimate used is considerably higher than alternatives and is considered precautionary."</i>
Chapter 12, Marine Mammals	Marine Management Organisation	December 2018	2.7 In Table 6.5 of Appendix 5.4, it is not clear how the unweighted Root Mean Square source levels for operational wind farms have been derived. The MMO requests further clarification.	The Underwater Noise report (Appendix 5.4) has been updated to include the following information: <i>"The operational source levels (as SPLRMS) for the measured sites are given in Table 6.5 (Cheesman, 2016), with an estimated source level for Norfolk Boreas in the bottom two rows. These were derived from measurement campaigns at each of the identified wind farm sites, based on data at multiple distances to predict a source level."</i>
Chapter 12, Marine Mammals	Marine Management Organisation	December 2018	Whilst the East Marine Plans state that proposals that contribute to offshore wind energy generation within the Plan area should be supported, consideration needs to be given to the cumulative impacts that developments within the area and adjacent areas have on the ecosystem. The East Marine Plans support sustainably-developed offshore wind energy generation projects. There are many such projects in the southern North Sea, including Dudgeon, Sheringham Shoal, Scroby Sands, Race Bank, Triton Knoll, Lynn and Inner Dowsing, Lincs, East Anglia and Norfolk Vanguard offshore wind farms as well as other projects and	The project and plans included in the CIA were determined in the CIA screening (Appendix 12.3). The CIA for marine mammals has taken into account operational offshore wind farms (see section 12.8.5.1.2).

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			plans. While Eastern IFCA appreciate that the cumulative impacts of Norfolk Boreas with Norfolk Vanguard, East Anglia THREE and aggregate extraction activities have been comprehensively assessed within this PEIR, Eastern IFCA do not agree with the cumulative impact approach taken, in particular the consideration that already operational offshore wind farms, active licenced activities and implemented measures form part of the existing environment. Eastern IFCA would encourage further assessment of the cumulative impacts of all Southern North Sea wind farm activity, licenced or otherwise, as well as other activities. The impacts of these projects on the marine environment and fisheries should be assessed in-combination, highlighting any potential cumulative effects associated with the licence application and guiding decision-making and plan implementation in a stepwise approach.	
Chapter 12, Marine Mammals	Marine Management Organisation	December 2018	In Section 6.2 of the assessment, 'Other Construction Activities' are all continuous sources and source levels have been provided as root mean square (RMS) levels (which is appropriate), as summarised in Table 6-2 and 6-5 of the report. However, the National Marine Fisheries Service (NMFS) (2018) noise exposure criteria relevant for impulsive sources (for PTS) have been used, instead of the nonimpulsive criteria. This should be corrected.	The impulsive criteria are stricter than the non-pulse. All of the results for the continuous noise using the impulsive criteria are low, less than 500m. Any ranges calculated using the non-pulse criteria will therefore be much smaller than this. Thus we suggest that new modelling using the non-pulse criteria would not add anything further to the assessment.
Chapter 12, Marine Mammals	Marine Management Organisation	December 2018	Section 6.3 of the UWN assessment focuses on Permanent Threshold Shift (PTS) and there is no consideration of Temporary Threshold Shift (TTS) in marine mammals (see Table 6-3 and Table 6-6 in the report)..The MMO acknowledges that to date it remains difficult for TTS to be quantified and to what extent TTS results in PTS for	Temporary Threshold Shift (TTS) has not been modelled for other construction activities and operational turbines, but the ES provides an assessment of the possible behavioural response of harbour porpoise to underwater

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			Cetaceans. The MMO recommends that the ES should reference TTS in a qualitative manor for context	noise during other construction activities and from operational turbines based on the Lucke et al. (2009) Unweighted SEL 145 dB re 1 μ Pa criteria. The ES has referenced TTS in a qualitative manor for context.

Table 1.7 Feedback related to Offshore Ornithology (Chapter 13 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 13, Offshore Ornithology	Natural England	November 2018	Ornithological assessment – Collision Risk Modelling We request going forward that any ornithological analysis present both the Marine Scotland Science Stochastic Collision Risk Model (April, 2018) and the Band model (or non-stochastic/deterministic version) outputs using the central values for the various variables (bird density, flight heights, avoidance rates, nocturnal activity etc.) in line with other current OWF applications. The use of this model has also been requested for Vanguard.	Collision risk estimates are presented in section 13.7.4.3 However, attempts to use the Marine Scotland Science stochastic Collision Risk Modelling (CRM) were unsuccessful due to the presence of errors in the model code. These were brought to the attention of the model developer who addressed these issues. However there was insufficient time following this for the model to be used for this assessment.
Chapter 13, Offshore Ornithology	Natural England	November 2018	Natural England has identified a number of concerns that have not been addressed sufficiently and need addressing in the assessment of impacts on offshore ornithology receptors. These can be summarised as follows: <ul style="list-style-type: none"> • Seasonal definitions; • Seasonal apportioning of impacts for Habitats Regulations Assessments (HRA); 	Seasonal definitions are defined in section 13.6.2.1. Where relevant the assignment of months to seasons has been discussed in the text. Impacts in relation to Special Protection Areas (SPAs) are assessed

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<ul style="list-style-type: none"> • Assessment of displacement impacts (EIA and HRA); • Collision risk modelling (CRM) (EIA and HRA); • Cumulative and in-combination assessments (displacement and CRM); • Population modelling approaches (EIA and HRA). <p>Implications for EIA and HRA assessments</p>	<p>in full in the Information for the Habitats Regulations Assessment, including consideration of appropriate apportioning among populations and seasons.</p> <p>Displacement is assessed in sections 13.7.3.1, 13.7.4.1 and 13.8.2.6. These assessments have been informed by responses provided for the Norfolk Vanguard project by Natural England and the applicant.</p> <p>Collision risk is assessed in section 13.7.4.3. This assessment has been informed by responses provided for the Norfolk Vanguard project by Natural England and the applicant.</p> <p>No new population modelling has been undertaken for the current assessment as the existing population projections produced for previous applications are considered to remain valid.</p>
Chapter 13, Offshore Ornithology	RSPB	December 2018	Impact significance. The RSPB is unable to agree at this stage that no impacts greater than minor adverse significance will occur to ornithological interests as a result of offshore elements of the project. Our concerns relate principally to collision risk to gannet and kittiwake, particularly in relation to the Flamborough and Filey Coast SPA, lesser black-backed gull of the Alde-Ore Estuary SPA and great black-backed gull,	The RSPB's stated position on impact significance is acknowledged. Collision risk and displacement concerns for all species designated at SPAs which may have connectivity with the Norfolk Boreas wind farm have been considered and discussed

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			and to displacement of red-throated diver (including those of the Greater Wash SPA), razorbill and guillemot.	in The Information for the Habitats Regulations Assessment (see DCO Document 5.3). The impact assessment follows the methods set out in this ES (see section 13.4.1) and conclusions on impact significance are backed up with evidence in the appropriate sections.
Chapter 13, Offshore Ornithology	RSPB	December 2018	Methodological issues. The RSPB considers that some methodological procedures used in the assessment are inadequate to ensure a robust assessment and therefore a proper understanding of the likely impacts of the scheme. We have particular concerns regarding the stochastic model used in the assessment of collision risk, the use of median values for bird density within the deterministic collision risk model, the use of revised nocturnal activity factors and the change in approach to the baseline used in cumulative assessments.	The assessment has been updated to address the comments raised by the RSPB (section 13.7.4.3).
Chapter 13, Offshore Ornithology	RSPB	December 2018	Habitats Regulation Assessment (HRA). We note that apportioning of offshore impacts (collision risk and displacement) to SPAs both alone and in-combination with other projects has not yet been carried out and that this will need to be addressed to ensure compliance with the Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017 requirements.	The Information for the Habitats Regulations Assessment (see DCO Document 5.3) provides assessment of potential impacts on species designated at SPAs which may have connectivity with the Norfolk Boreas wind farm.
Chapter 13, Offshore Ornithology	RSPB	December 2018	Table 5.3 indicates that the project design life is around 30 years. Assessments of impacts, including population modelling to assess the effects of potential collision risk, should therefore work to this timescale.	Where necessary, impact consequences have been assessed in relation to population modelling outputs produced for previous wind farm applications. Cumulative collision risk for kittiwake (see section 13.8.2.7.2) makes reference

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				to population predictions covering a 30 year period as requested.
Chapter 13, Offshore Ornithology	RSPB	December 2018	We understand that the assessment presented in the PEIR is based on the 18 months of survey data available at the time of production. Our comments on impact significance are therefore subject to change, depending on the findings based on the full 24 months of survey data.	This caveat is noted. The assessment presented in this ES uses baseline data collected over a full 24 month period.
Chapter 13, Offshore Ornithology	RSPB	December 2018	The PEIR throughout makes the assertion that birds present in the breeding season are unlikely to be breeding birds, yet notes that the site is within mean-maximum foraging range of gannets from the FFC SPA and lesser black-backed gulls from the Alde-Ore Estuary SPA. It is stated that tracking of individuals from these colonies shows limited connectivity. However, no references are provided in support of this and it is not therefore possible to assess the numbers of birds studied and whether sufficient evidence to rule out connectivity exists.	This aspect is discussed and considered in The Information for the Habitats Regulations Assessment (see DCO Document 5.3) for species designated at SPAs which may have connectivity with the Norfolk Boreas wind farm.
Chapter 13, Offshore Ornithology	RSPB	December 2018	Benacre-Easton Barents SPA (designated for breeding little tern and marsh harrier, and breeding and wintering bittern) has been omitted from Table 13.9. This should be included for completeness.	Screening for SPA features is included in The Information for the Habitats Regulations Assessment (see DCO Document 5.3).
Chapter 13, Offshore Ornithology	RSPB	December 2018	Collision risk: Our concerns are principally around the assessment of impacts on gannet, kittiwake, lesser black-backed gull and great black-backed gull and relate to both the methods used in the assessment and the significance of potential impacts.	Impacts on these species are considered in detail in under appropriate species in section 13.7.4.3 of this ES.
Chapter 13, Offshore Ornithology	RSPB	December 2018	In order to predict the collision risk mortality of an offshore wind farm in the UK, the Band (2012) model has previously been used in assessment. This model uses a number of input parameters, such as bird size, flight speed and turbine blade dimensions, to calculate the probability of a bird that passes through the swept area of a turbine blade colliding with that	The assessment has been updated to use deterministic CRM models to address the comments raised by the RSPB (section 13.7.4.3).

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>blade. For this deterministic model the input parameters were defined as single values with no indication of variability around them. In reality, most of the parameters will exhibit a considerable degree of variability and stochastic collision risk modelling has been developed to allow this to be incorporated into the model and thus generate a potential range of output predicted collision mortalities. McGregor et al., (2018), under commission of Marine Scotland Science and overseen by an expert steering panel, produced a revised and fully tested stochastic model to widespread stakeholder acceptance. By contrast, the Applicant has presented an entirely untested new version that does not follow a recognised methodology, with insufficient detail provided as to how it incorporates variability or how it overcomes the statistical difficulties of non- independence (the degree of interrelation) of some of the variables. The RSPB therefore does not agree that the model presented by the Applicant is fit for purpose and recommend that the Marine Scotland (McGregor et al., 2018) model version is used in preference.</p>	
Chapter 13, Offshore Ornithology	RSPB	December 2018	<p>The documents present deterministic and stochastic versions of the CRM (see above). For the deterministic version (Band 2012) of the CRM the correct value to use for bird density is the mean monthly value, however, the values used in this assessment are median values, which will result in the model predicting considerably lower collision mortalities.</p>	<p>The assessment has been updated to use deterministic models to address the comments raised by the RSPB (section 13.7.4.3). These use the mean seabird densities as requested.</p>
Chapter 13, Offshore Ornithology	RSPB	December 2018	<p>We note that, with the exception of lesser black-backed gull, the migration-free breeding season has been used rather than the standard breeding season as it is assumed that there is a very low presence of breeding birds within the project area. We disagree with this assertion, as discussed above. For example for gannet, the migration-free breeding season excludes March and September, which reduces the number of predicted collisions. But gannets start arriving in January</p>	<p>These aspects are discussed and considered in The Information for the Habitats Regulations Assessment (see DCO Document 5.3) for species designated at SPAs which may have connectivity with the Norfolk Boreas wind farm.</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>and establishing their nest sites in March. Whilst peak fledging is in August, some birds are still fledging in September, hence there is a strong argument for considering these months to be part of the breeding season.</p> <p>For kittiwake, the migration-free breeding season excludes March-April and August, which again significantly reduces the number of collisions. The first kittiwakes arrive at the colony in February, with most birds back by March and remaining until August, hence there is a strong argument for considering March, April and August to be part of the breeding season.</p> <p>If figures for the migration-free breeding season are to be presented, we consider that it would be necessary to attribute birds in the crossover months to breeding and dispersal in order to ensure collision risk to breeding birds is not underestimated. We would therefore prefer to see mortality figures presented for the standard breeding season (alongside the migration-free breeding season, if required), as well as the autumn period, so that the contribution of the different seasons to total annual mortality can be determined and, for the purposes of HRA, impacts on the FFC SPA understood more clearly.</p>	
Chapter 13, Offshore Ornithology	RSPB	December 2018	<p>We note that an avoidance rate (AR) for gannet of 98.9% is used for all seasons. Whilst the RSPB accepts the SNCB's recommended amendment to the gannet AR (from 98% to 98.9%) for non-breeding birds, we do not agree that this figure should be applied to the breeding season due to the lack of available evidence relating to breeding birds. The reason for the difference between Natural England and the RSPB in their preferred avoidance rates for gannet is that the avoidance rate review carried out by the BTO for gannet was almost entirely based on birds</p>	<p>The applicant acknowledges the RSPB's stated position on gannet collision avoidance rates, however the evidence based rates used in the assessment are those advised by Natural England.</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>outside the breeding season. It would be expected that breeding gannets would behave differently from non-breeding birds, and work by Cleasby et al. (2015) demonstrated that foraging birds flew higher, and were therefore at greater risk of collision, than commuting birds.</p> <p>In light of this recent evidence, and given that the BTO review was so heavily biased to non-breeding birds, while we accept the rate for the non-breeding season, we prefer a lower, more precautionary rate for the breeding season. We therefore consider that an AR of 98% should be presented for the breeding season.</p>	
Chapter 13, Offshore Ornithology	RSPB	December 2018	<p>We do not agree with the changes in Nocturnal Activity Factor (a parameter used in collision risk modelling) proposed. The value presented for kittiwake is based on unpublished evidence and therefore we are unable to assess the robustness of the study. The current factor is derived from the expert opinion collected by Garthe and Huppopp (2004) and this use is endorsed by Band (2012). A review of seabird vulnerability to offshore wind farms (Furness et al., 2013) recommended that no changes be made to the nocturnal activity scores for these species, and an update, including the same authors (Wade et al., 2016) maintained this recommendation.</p> <p>It is also not clear how these revised rates account for the distinction between the definition of daylight as used in the Band model and with the official concept of 'twilight' and 'night'. This is an issue as the Band (2012) model considers the nocturnal period as between sunset to sunrise and so treats flight activity that occurs at twilight as being within the nocturnal flight period.</p> <p>Evidence from tagging shows that an important number of seabirds actively forage at twilight.</p>	<p>The RSPB's stated position on the use of nocturnal activity rates in collision risk modelling is acknowledged. However, it is considered that the evidence for the revised rates presented in Furness et al. (2018) is robust and the rates identified are appropriate for their intended purpose (i.e. accounting for nocturnal flight activity in assessing gannet collision risk).</p> <p>With respect to comments on the timing of surveys during the day and how these relate to diurnal patterns of behaviour, it is agreed with the RSPB that peaks in activity may be missed by daytime aerial surveys, however, it is in fact more important that these surveys are conducted at a time of day when activity is around</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>While we welcome the latest published evidence review for gannet (Furness et al., 2018), we are concerned that the mortalities predicted using revised nocturnal activity rates for gannet (and this is also applicable to kittiwake) are potentially underestimated because they do not account for the potential interaction between survey timing and diurnal behavioural patterns. Peaks in foraging activity at first and last light (see for example Fig. 3 in Furness et al. 2018) will not be accounted for in the assessment if these did not coincide with surveys (the timings of which are currently unknown, but likely to be midday if aerial), and the survey may have been carried out at a time of much lower activity. Thereby the application of the revised nocturnal activity factor recommended by Furness et al., (2018) could result in inaccurate underestimates of collision risk.</p> <p>The Nocturnal Activity Scores presented for gannet in the application documents are also not in accordance with this latest review (Furness et al., 2018). The values used in the assessment, 4.3% and 2.3% respectively, are even lower than the recommendations of the review (8% in the breeding season and 4% in the non-breeding season) and thus reduce predictions of collision risk further. The robustness of this assessment must therefore be questioned.</p>	<p>an average level, rather than either a peak or a trough in activity, since the latter two will over and under estimate flight activity respectively. Thus, it can be seen in the example cited by the RSPB (Figure 3 in Furness et al. 2018) that surveys conducted during the day (e.g. between 9am and 4pm as is typical for offshore aerial surveys) will record activity in the middle of the range and are thus, contrary to the RSPB's comment, appropriate for estimating average activity levels.</p>
Chapter 13, Offshore Ornithology	RSPB	December 2018	The assessment of collision risk to migrant non-seabirds is taken from work carried out for East Anglia THREE and the population and flight activity data used in that assessment have not been updated. We recommend that this assessment is updated to include more locally relevant species, such as those from the Breydon Water, Broadland and North Norfolk Coast SPAs. These may also require consideration in the HRA.	Updated assessment of collision risk for non-seabird migrants is provided in section 13.7.4.3 and the supporting technical appendix.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 13, Offshore Ornithology	RSPB	December 2018	For collision risk modelling of breeding season kittiwake, a biologically defined minimum population size (BDMPS) for 'breeding season populations of nonbreeding individuals' is calculated based on the percentage of the spring BDMPS which are subadults. This equates to 47.3% of the spring BDMPS for kittiwake. We do not agree, as stated above, that there is sufficient evidence that all birds present in the breeding season are likely to be non-breeders. We also would not agree that these assumptions could be used to avoid apportioning any impacts to the SPAs in the HRA.	The RSPB's stated position on kittiwake populations is acknowledged. Additional work has been undertaken on population connectivity and movements (see section 13.7.4.3) and this has informed the relevant sections of this assessment (section 13.7.4.3 and 13.8.2.7.2).
Chapter 13, Offshore Ornithology	RSPB	December 2018	The PEIR claims that the longest foraging trips from the RSPB FAME/STAR kittiwake data were largely from colonies where the breeding success was zero or close to zero. This is incorrect. The longest trips were recorded from Flamborough and Filey, where breeding success was comparatively high over the time of tracking.	With respect to comments on kittiwakes for the longest recorded foraging trips, it is agreed with the RSPB that the longest kittiwake trips have been recently recorded from Flamborough and Filey. However, the PEIR stated that longer trips tended to be recorded at colonies with poor breeding success, but this did not preclude long trips being recorded at other colonies, such as Flamborough and Filey Coast SPA.
Chapter 13, Offshore Ornithology	RSPB	December 2018	We are concerned that the methods used for calculating a reference population for lesser black-backed gulls are inadequately explained, with insufficient reference to current knowledge and lacking precaution. Such a calculation is difficult because of two competing factors. Throughout the UK, the urban population of lesser black-backed gulls is increasing, while those in "natural" colonies is generally decreasing (JNCC, 2018). In simplistic terms this could be argued as reducing any impact on the Alde-Ore Estuary SPA. The calculations of the number of breeding birds within foraging range of the developments includes a number of	Additional discussion on lesser black-backed gull population sizes is provided in The Information for the Habitats Regulations (see DCO Document 5.3), to which this comment applies.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>inland, urban colonies, such as Ipswich and Norwich as likely sources of birds foraging in the development areas. While we acknowledge that there is a need for more research on the foraging behaviour of urban gulls, it is unlikely that such gulls, especially those from non-coastal urban colonies will forage in the offshore marine environment to the same extent as those breeding at coastal “natural” colonies, such as the Alde-Ore Estuary SPA. The inclusion of birds from such sites dilutes the potential significance of impact on the Alde-Ore Estuary SPA.</p> <p>Furthermore in calculating the number of non-SPA birds the Applicant gives a rounded up figure of 5400 birds, then simply doubles it (and rounds up further) to 11000, with scant justification other than saying 5400 was a likely underestimate, but presenting no supporting evidence. By overstating the non-SPA population in this way, the potential impact on the Alde- Ore Estuary SPA is again significantly understated.</p>	
Chapter 13, Offshore Ornithology	RSPB	December 2018	<p>Cumulative collision Risk:</p> <p>Our concerns are principally around the assessment of impacts on gannet, kittiwake, lesser black-backed gull and great black-backed gull and relate to both the methods used in the assessment and the significance of potential impacts. We do not agree that cumulative collision risk to these species can be considered to be of minor adverse significance. These impacts should be regarded as of moderate adverse significance.</p>	The cumulative collision risk assessment has been updated (section 13.8.2.7) and is considered to provide a robust, evidence based assessment
Chapter 13, Offshore Ornithology	RSPB	December 2018	Projects constructed in 2016 or earlier are considered part of the baseline for the purposes of the cumulative collision risk assessment for the reason that these pre-date the Norfolk Boreas ornithological surveys. We note that previous projects have considered that the baseline does not include the	This statement by the RSPB appears to be in error: this approach was not used in the assessment of collision risk presented in the PEIR and has also not been used in the collision assessment presented in this ES.

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			effects of older windfarms due to the fact that much of the available seabird population data pre-dates these projects. Given that this represents a change to the previously accepted approach and the justification does not address the original issues raised, we do not consider that sufficient evidence has been presented to accept this change.	
Chapter 13, Offshore Ornithology	RSPB	December 2018	It is stated that many of the collision estimates for other windfarms are based on higher numbers of turbines than were actually installed – based on a method of updating collision estimates presented by EATL (2016) this is stated to overestimate mortality by 13% for gannets, 14% for kittiwakes, 35% for lesser black-backed gull and 30% for great black-backed gull. This is an acceptable point for windfarms where the DCO has been amended and therefore there is legal certainty regarding the reduction, but where windfarms still have their original DCOs, it is not appropriate to do anything less than assess the full extent of those DCOs when considering in-combination/cumulative effects.	It is acknowledged that the legal aspect of the argument made by the RSPB with respect to acceptance of lower collision risks for wind farms constructed with fewer turbines (and invariably using turbines which generate lower per capita collision risks). However, it is still informative to consider this aspect as it contributes to the growing degree of precaution in offshore wind farm impact assessments.
Chapter 13, Offshore Ornithology	RSPB	December 2018	We do not accept the arguments for including compensatory density dependence in the PVAs for kittiwake and great black-backed gull put forward in the PEIR. The reasons for this are outlined in Green et al. (2016) and the BTO review (Cook and Robinson, 2015), and are not that density dependence does not exist, but rather that we do not have the means to accurately quantify the strength and form of it in a biologically meaningful way in order to incorporate it into PVA. Whilst we accept that density dependence is likely to exist in seabird populations, precise species and colony specific knowledge of its size and shape are needed to correctly parameterise the population models. This is important to acknowledge because density dependence is	It is acknowledged that the RSPB's stated position on the inclusion of density dependence in population modelling. Indeed the population modelling to which the RSPB makes reference explicitly considered the uncertainties in these aspects of seabird population dynamics and used density dependent methods suggested by RSPB experts. A range of strengths of density dependent regulation were reviewed alongside available evidence and the most

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			<p>not always compensatory, but can also be depensatory, slowing the rate of population growth at lower population densities. In other words, a population decline arising from an offshore wind farm could have larger consequences on the population than are predicted by the compensatory density dependent or even density independent models.</p> <p>Horswill and Robinson (2015) identified depensation occurring in three gull species (black- legged kittiwake, black-headed gull and herring gull). As such it would be very wrong to simply assume that density independent outputs are “highly precautionary”, rather that they are the most sensible to use for assessment.</p>	<p>realistic ones used in the modelling. In all cases outputs have been provided for both density dependent and density independent models which are considered to bracket the range of probable population projections.</p> <p>It is also acknowledged that density dependence is not always compensatory (as has been used in the population models) however the examples noted by the RSPB all relate to very small populations of these species, and thus are not relevant to the very large populations currently being considered.</p>
Chapter 13, Offshore Ornithology	RSPB	December 2018	<p>Displacement:</p> <p>Our concerns are principally around the assessment of impacts on red-throated diver (including those of the Greater Wash SPA during construction) and relate to both the methods used in the assessment and the significance of potential impacts. We do not agree that displacement of this species can be considered to result in impacts of minor adverse significance. These impacts should be regarded as of moderate adverse significance.</p>	<p>The assessment of red-throated diver displacement (sections 13.7.3.1.2, 13.7.4.1.1 and 13.8.2.6.1) has been conducted using accepted methods and with rate of displacement and mortality derived from a detailed review of available evidence. The magnitude and significance of predicted impacts follows the methods as set out in section 13.4.1.</p>
Chapter 13, Offshore Ornithology	RSPB	December 2018	<p>For red-throated diver, displacement rates of 80% and mortality of 1-5% have been used in the assessment. As there are few robust studies of displacement, results differ, and we do not know the consequences for mortality or population</p>	<p>The red-throated diver assessment has been updated following a detailed review of evidence presented in relation to the Norfolk</p>

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			trajectories, it is appropriate to consider a range of putative displacement and mortality rates. The RSPB therefore considers that mortality of up to 10% represents an appropriate level of precaution and should be used in the assessment. We note that this would result in prediction of potentially significant impacts on this species.	Vanguard assessment (Norfolk Vanguard Appendix 3.1-Red-throated diver displacement: Document reference ExA; WQApp3.1;10.D1.3).
Chapter 13, Offshore Ornithology	RSPB	December 2018	The annual increase in baseline mortality for red-throated diver is not given, although it is stated that it is unlikely to be detectable. We are concerned that this impact could be significant and therefore request that the annual increase in baseline mortality is presented, based on an assessment using mortality rates of up to 10%.	The red-throated diver assessment presents quantitative details in full (sections 13.7.3.1.2, 13.7.4.1.1 and 13.8.2.6.1).
Chapter 13, Offshore Ornithology	RSPB	December 2018	Cumulative displacement: Our concerns are principally around the assessment of impacts on red-throated diver, guillemot and razorbill and relate to both the methods used in the assessment and the significance of potential impacts. We do not agree that displacement of these species can be considered to result in impacts of minor adverse significance. These impacts should be regarded as of moderate adverse significance.	The assessment of red-throated diver displacement (sections 13.7.3.1.2, 13.7.4.1.1 and 13.8.2.6.1) and for guillemot and razorbill (sections 13.7.4.1.3 and 13.8.2.6) have been conducted using accepted methods and with rate of displacement and mortality derived from a detailed review of available evidence. The magnitude and significance of predicted impacts follows the methods as set out in section 13.4.1.
Chapter 13, Offshore Ornithology	RSPB	December 2018	The assessment of displacement for guillemot and razorbill only considers mortality of 1%, rather than up to 10% as recommended. This, coupled with a failure to present figures for the increase on background mortality (it is only stated that increases are less than 1%), means that we are unable to	The assessment of guillemot and razorbill displacement impacts has been informed by an evidence review presented in relation to the Norfolk Vanguard assessment (NV

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			agree that impacts are of no greater than minor adverse significance.	ref). This provides support for the impact rates used derived from available evidence.

Table 1.8 Feedback related to Commercial Fisheries (Chapter 14 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 14, Commercial Fisheries	Norfolk County Council	November 2018	<p>While commercial fishing is an offshore issue it is considered appropriate to comment on the impacts the above proposal may have on this sector as Norfolk is home to many commercial fishing activities from its numerous ports and landing areas (i.e. potential economic issue).</p> <p>The PEIR considers the impact of the proposed windfarm and ancillary infrastructure (offshore cable route; substations; convertor stations and accommodation blocks) on the commercial fishing sector. The type of fishing carried out in the Array area comprises:</p> <ul style="list-style-type: none"> · Local UK Static gear Fishing potting by UK vessels (i.e. for brown crab, lobster and Whelk); · Dutch Vessels undertaking trawling <p>The PEIR indicates that fishing will be permitted within the Norfolk Boreas project area following construction and therefore much of the current activity will be able to recommence during operation of the wind farm. The PEIR does, however, accept that there could potentially be a significant impact during the construction phase on those UK vessels using static gear. As such Vattenfall have indicated that where necessary appropriate mitigation could be arranged.</p> <p>It is felt that where there is likely to be a demonstrable impact on commercial fishing affecting communities in</p>	Noted.

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			Norfolk that Vattenfall should provide appropriate mitigation and compensation to those fishing communities affected.	
Chapter 14, Commercial Fisheries	Marine Management Organisation (MMO)	December 2018	The MMO acknowledges that Chapter 14 states that the impact on the local inshore fleet, primarily using static gear, would be minor adverse. It should be noted that many of the vessels in question are small, with limited capability to relocate to other fishing grounds especially during peak season. There is the potential for the impact on individual fisherman to be significant. The MMO expects that impacts on smaller fishing vessels will be fully assessed in the EIA.	The sensitivity of the local inshore fleet to loss of fishing grounds has been noted in the assessment (section 14.7.4.2.3). Whilst the overall impact significance of loss of grounds/restricted access during construction has been identified to be minor for the fleet, the assessment recognises that there may be occasions when certain vessels may need to relocate their gear. In these instances it has been proposed that evidence based mitigation, as specified in Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) Guidelines, is applied.
Chapter 14, Commercial Fisheries	Marine Management Organisation (MMO)	December 2018	The PEIR does not take into account the longer term operational and maintenance impact on fishing grounds. For example if cables are exposed this could make fishing grounds inaccessible. The MMO expects the long term impacts will be assessed in the EIA.	The assessment of loss of grounds during the operational phase (section 14.7.5.2) takes account of the potential for sections of the cables to become exposed during the operational phase, making discrete areas temporarily inaccessible to fishing.
Chapter 14, Commercial Fisheries	Marine Management Organisation (MMO)	December 2018	The MMO notes that the most recent UK data described in Appendix 14.1, Annex 2 were from 2016. Since this time there has been an increase in demand by the inshore fleet for white fish, particularly bass. The MMO questions whether there are more up to date data available to inform the EIA to reflect this, and requests this data is used to inform the EIA.	The commercial fisheries assessment takes account of the latest dataset that has been made available by the MMO. At the time of writing this includes data up to the year 2016.

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Chapter 14, Commercial Fisheries	Marine Management Organisation (MMO)	December 2018	Appendix 14.1, Figure 6.11, Dutch VMS value and effort by beam trawl (average 2012 to 2016), indicates that the cable route passes through the area of high value and effort for Dutch vessels. The impact on these vessels is assessed as minor in the PEIR Chapter 14. The MMO seeks to understand the rationale for this assessment. The MMO considers that restricted access to principle fishing grounds during construction, in addition to the potential deployment of rock protection in the cable corridor should be considered a more significant impact even if only for a relatively small number of vessels.	The assessment presented in section 14.7.4.2.1 with regards to the impact of loss of grounds during construction on the Dutch beam trawl fleet recognises the high levels of activity that the offshore project area sustains (in areas beyond the 12 nm limit). However, in determining impact magnitude the extent of the area affected needs to be put into context. The level of fishing activity that the offshore project area sustains is considered but also the relative importance of this area in the context of the overall extent of the grounds that the fleet is able to exploit and the levels of fishing that these grounds sustain. In the case of beam trawling, the large extent of grounds that the fleet can exploit should be noted. As shown in Figure 14.4 and Figure 14.5, Dutch beam trawlers exploit fishing grounds over a very large area of the Southern North Sea (International Council for the Exploration of the Seas (ICES) Division IVc) and activity occurs across this large area consistently at relatively high levels. In addition, fishing activity is also undertaken by these vessels in wide areas of the Central North Sea (ICES Division IVb)

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				<p>albeit at relatively lower levels. Considering this, together the temporary nature of the construction phase impact magnitude is assessed as low. This combined with the low sensitivity of the fleet to loss of grounds, results in an impact of minor significance.</p>
Chapter 14, Commercial Fisheries	Marine Management Organisation (MMO)	December 2018	The MMO welcomes further detail on how the “trawl-ability” of the seabed after the construction of the windfarm is going to be assessed and how this is to be communicated to the fishing industry.	<p>An Outline Scour Protection and Cable Protection Plan is submitted with the Norfolk Boreas DCO Application (Document 8.16). A cable burial risk assessment will be undertaken post consent, in consultation with stakeholders.</p> <p>In the event that cables become unburied during the operational phase this would be communicated to the fishing industry through appropriate channels. This is noted in the Outline Fisheries Liaison and Co-existence Plan (FLCP) (Document 8.19) and has been reflected in the draft DCO under Schedule 9 and 10, Part 4, condition 9 (11) and Schedule 11 -12, Part 4 condition 4 (11) as follows:</p> <p><i>(11) In case of damage to, or destruction or decay of the authorised scheme seaward of MHWS or any part thereof the</i></p>

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				<i>undertaker must as soon as reasonably practicable and no later than 24 hours following the undertaker becoming aware of any such damage, destruction or decay, notify MMO, MCA, Trinity House, and the UK Hydrographic Office. In case of exposure of cables on or above the seabed, the undertaker must within five days following the receipt by the undertaker of the final survey report from the periodic burial survey, notify mariners by issuing a notice to mariners and by informing Kingfisher Information Service of the location and extent of exposure.</i>
Chapter 14, Commercial Fisheries	Eastern IFCA	December 2018	As stated in Eastern IFCA's response to the Norfolk Vanguard Environmental Statement, we request that Vatenfall take note that Eastern IFCA are seeking to introduce fishing closures (via a byelaw) to protect sensitive features within the inshore section (within six nautical miles of the shore) of the SCI. These closures are yet to be finalised, but any works in this area will need to proactively take into consideration up-to-date closures and the latest available information on the location of sensitive species and habitats. Eastern IFCA will ensure that any changes to existing fishery closures are duly publicised.	Noted
Chapter 14, Commercial Fisheries	Eastern IFCA	December 2018	Within the Eastern IFCA district, the Norfolk Boreas export cable corridor and surrounding areas that could be impacted by the proposed development lie within important fishing grounds, primarily targeted for whelks, crabs and lobster.	The potential impact of loss or restricted access to traditional fishing grounds and associated displacement has been considered

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			These fisheries represent a substantial contribution to the local coastal economy, in terms of first sale value, shellfish factories and attracting tourism. Although the level of fishing effort occurring inshore is much smaller than that applied by larger (predominantly Dutch) offshore fishing vessels, displacement (for example during construction or maintenance works, or because of cable exposure) can have disproportionately large effects on inshore fisheries, which are characterised by small vessels operating within a short range from launch sites.	for assessment within this chapter for all relevant commercial fisheries receptors, including the local fleet (section 14.7 and section 14.8).
Chapter 14, Commercial Fisheries	Eastern IFCA	December 2018	Eastern IFCA note the embedded mitigation outlined in the PEIR for this development, including Norfolk Boreas Ltd.'s commitment to burying offshore cables where possible to reduce requirement for surface cable protection, the distribution of notice to mariners, kingfisher notifications and other navigational warnings to the fishing community, and the appointment of a fisheries liaison officer. Eastern IFCA support the use of these mitigation measures to minimise disruption to fishery stakeholders. We would ask that these measures are used alongside regular communication with the relevant fisheries managers – this will be Eastern IFCA out to six nautical miles and the Marine Management Organisation as well as Defra beyond the Eastern IFCA boundary. This regular communication will ensure that mitigation takes into account the most up-to-date fisheries management measures and issues.	Noted. Consultation with fisheries stakeholders is on-going and will continue post-consent. An outline of Norfolk Boreas Limited approach to fisheries liaison is included within the Outline FLCP (Document 8.19).
Chapter 14, Commercial Fisheries	VisNed	December 2018	Several vessels (e.g. fly shoot fishery) fish in the area where the turbines will be built. This area is important, as can be seen on several maps in the Preliminary Environmental Information Report (EIR). The loss of a fishing ground is minor adverse for this specific win farm, but all the farms together have a severe influence on the fishing industry. Displacement is a consequence of the reduction of space.	The assessment presented in the chapter considers the impact of loss of grounds on seine netting (fly shoot fishery) and associated displacement, both as a result of the project alone and cumulatively with other projects and activities (section 14.7 and section 14.8). With regards

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			<p>The fly shoot vessels that fish in the Boreas area now, are obliged to go to an area where other ships are fishing. It is an omission, in the opinion of VisNed, that there are no figures of the expulsion effects when vessels that fly shoot (or beam trawl) need to go to other areas. The consequence of this lack of information is that it is now unclear what the consequences of the wind farms are for this specific fishing industry.</p> <p>Furthermore, an economic approach by dividing zones, does not give a fair look at the impact that the wind mills will have on the fishing industry. The value of an area can differ per period and expulsion effects will also have an effect.</p>	<p>to wind farm projects, the cumulative assessment assumes that there is little potential for activity by seine netters to resume in operational wind farm sites.</p> <p>In the context of the assessment of cumulative impacts on this fleet, it is important to note that the highest levels of activity are recorded in the English Channel with relatively low levels of activity in the area of the project and the wider North Sea, where the majority of other projects and activities which could result in cumulative impacts are located.</p>
Chapter 14, Commercial Fisheries	VisNed	December 2018	It is sometimes possible for parts of the demersal fleet to fish in windfarms, but we recommend to have a inter turbine spacing of at least 2,000 meter be viewed as a minimum spacing for fishing to be undertaken, rather than the 700 meter to 800 meter which is the distance in several wind farms.	From feedback received by VisNed/ National Federation of Fishermen's Organisations (NFFO) during consultation undertaken for Norfolk Vanguard (conference call 31/01/2019) and as noted in the Statement of Common Ground between Norfolk Vanguard Limited and VisNed/NFFO , it is understood that VisNed/NFFO preference in relation to the minimum spacing required to facilitate fishing to resume within operational wind farms would be at least 1km in the case of beam trawlers and at least 2km in the case of seine netters.

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				<p>It should be noted that since the production of the PEIR the project design has been reviewed and the 9MW option is no longer being considered. This results in a reduction in the maximum number of turbines (from 200 to 180) and in an increase in the minimum spacing between turbines (from 680m to 720m). Under the scenario where Tetrabased foundations are used (worst case scenario), the minimum width of the corridor left clear of infrastructure between foundations would be 650m.</p> <p>There is currently no legislation in the UK preventing fishing from occurring within operational wind farms. The level of fishing activity which may resume within the operational Boreas site will therefore largely depend on the perception of individual skippers with regards to operating fishing gear within the site.</p>
Chapter 14, Commercial Fisheries	VisNed	December 2018	We understand the challenges with laying inter-array cables. Nonetheless, we want to keep you in mind that a good burial of the cables is very important. Not only for the short term, but under all circumstances the cables must be buried at the appropriate minimum depth. It is impossible for fishing gear to damage the cables, if they are buried properly.	Norfolk Boreas Limited are committed to bury cables where possible. Where burial is not possible cables will be protected. In the event that cables become unburied during the operational phase this would be communicated

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				to the fishing industry through appropriate channels. As previously mentioned, this is noted in the Outline Fisheries Liaison and Co-existence Plan (FLCP) (Document 8 .19) and has been reflected in the draft DCO under Schedule 9 and 10, Part 4, condition 9 (11) and Schedule 11 -12, Part 4 condition 4 (11).
Chapter 14, Commercial Fisheries	VisNed	December 2018	VisNed argues that the entire Boreas area should not immediately be closed to fishing when building wind farms. Let the closure of an specific part coincide with the location of the work, so that the rest of the area remains open for fishing as long as possible.	The assessment presented in Chapter 14 with regards to the construction phase takes a conservative approach based on the theoretical worst case assumes that fishing would be excluded from the entirety of the offshore project area during construction. The total area from which fishing may be excluded at a given time would however change depending on the level of works being carried out and the level of infrastructure installed or partially installed at a given time. Norfolk Boreas Limited's committed to promote co-existence with the fishing industry and will implement suitable procedures to minimise disturbance to normal fishing operations. Further detail with regards to Norfolk Boreas Limited fisheries liaison and co-existence

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				strategy is provided in the Outline FLCP (Document 9.19).
Chapter 14, Commercial Fisheries	VisNed	December 2018	As usual with these projects, we are available to negotiate a statement of common and un- common ground, including the mitigation of negative effects. As before, in this respect we closely work together with the National Federation of Fishermen's Organisations (NFFO), whom we send a copy of this letter.	Noted.
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	The categories applying to sensitivity and magnitude criteria in the Commercial Fisheries Assessment (Ch 14) needs to defined in a more quantitative way. This is particularly the case for the definitions used under sensitivity which lack specificity over what constitutes limited, moderate and extensive operational range and dependence upon the number of fishing grounds.	<p>The assessment on commercial fisheries follows an impact significance matrix approach taking account of receptor sensitivity and impact magnitude. This is in line with standard environmental impact assessment methodologies (as outlined in ES Chapter 6 EIA Methodology).</p> <p>The identification of sensitivity is based on parameters such as the operational range, versatility (i.e. ability to deploy various gears/target various species) and availability of grounds. The evaluation of sensitivity levels using the parameters above is informed by information gathered during consultation with fisheries stakeholders (i.e. vessel specifications, gear used, extent of grounds) as well as fisheries data (landings, Vessel Monitoring System (VMS) data, etc.). Taking account of</p>

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				the parameters above, and given the wide operational range and fishing opportunities of the beam trawl and seine net fleets, their sensitivity to loss of grounds was assessed as low in Chapter 14 Commercial Fisheries.
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	Aggregating the assessment by nation and gear groupings means that it is not possible to assess impact at the level of individual businesses. The ability of individual businesses or sub-groupings of vessels to be able to relocate to alternative grounds is therefore not defined by the full extent of fishing grounds for an entire sector of each nation's fleet.	As outlined in sections 14.7.4.2 and 14.7.5.2, the assessment of loss or restricted access to traditional fishing grounds is discussed on a fleet by fleet basis. Due to data limitations it is beyond the scope of this assessment to assess the impacts on individual vessels. It is however recognised that the level and distribution of fishing activity and dependence on fishing grounds within the offshore project area will vary between individual vessels within the same fleets.
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	The assessment would benefit from having greater transparency over what extent different fishing activities are expected to be able to operate within the array area.	In general terms the assessment of loss of grounds during operation in respect of vessels which operate towed gear considers that the level of activity that will resume within the operational site would depend on the perception of individuals skippers with regards to operating gear within wind farm sites. As a worst case, it assumes that skippers will elect not to fish within the Norfolk Boreas site.

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				<p>In the case of seine netting, the assessment considers that under the worst case scenario (minimum width of the corridor left clear of infrastructure between foundations of 650m), there is little potential for activity to be able to resume within the site and therefore assumes that seine netting will not be undertaken within the site during operation.</p>
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	<p>We agree that the use of the standard impact assessment matrix is not appropriate for assessing safety risk (Ch14, p42 para 155). However, there appears to be no probabilistic assessment similar to that completed for other navigation related impact risks (Ch 15). How have "frequency of occurrence" and "severity of consequence" criteria been applied and what data has been used? The worst case scenario is not sufficiently defined to provide a transparent assessment of the risk to fishing activities and therefore determine the appropriateness of mitigation measures. Nor does the assessment establish what the safe fishable distance from a turbine is in the worst case scenario in order to avoid gear interaction with the project infrastructure. This is also fundamental to assessing Impact 2 and 9: Access to fishing grounds and Impact 3: Safety issues for fishing vessels.</p> <p>Therefore at present there is insufficient evidence that the risk to fishing vessels under the worst case scenario has been appropriately assessed.</p> <p>Consequently, it is not clear how the conclusion that under the present proposal how safety issues for fishing vessels have been determined to be within acceptable limits.</p>	<p>For assessment of safety issues the standard sensitivity/magnitude matrix approach is not considered appropriate. In this instance, the assessment is instead undertaken as a risk assessment.</p> <p>The assessment identifies potential risks and proposes a number of measures to minimise them so that they remain within acceptable limits.</p> <p>These measures are aimed at ensuring that skippers which intend to fish within the operational site are provided with adequate information to allow them to make an informed judgement of the risks associated with fishing in areas relevant to the project.</p> <p>As outlined in sections 14.7.4.6 and 14.7.5.6, safety zones will be in place around all surface structures up until</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				<p>the point of commissioning and where cables are exposed, localised advisory safety zones over vulnerable cables would be implemented.</p> <p>In addition, the required levels of information distribution would be undertaken through the channels of the Kingfisher Information Service, Notice to Mariners (NTMs), as well as direct liaison with fishermen and their representatives. The primary purpose of this would be to ensure the required level of awareness of potential risks and the locations and periods of safety zones, amongst fishing vessel owners and crews. In addition, where appropriate, guard vessels and Offshore Fisherielse Liaison Officers (OFLOs) would be employed (see Outline FLCP, Document 8.19).</p> <p>It should be noted that under the current worst case scenario (180 x 10MW turbines) the minimum spacing between turbines is 720m and floating foundations are no longer considered within the project desing envelope.</p> <p>Under the 10MW scenario, the worst case with regards to fishing would be a result with the use of</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				Tetrabase foundations. Considering that the radius of the legs of TetraBase structures on the seabed could be up to 35m, the minimum width of the corridor left clear of infrastructure between foundations would be 650m.
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	<p>Based on the information provide we estimate that the worst case scenario using 200 x 9MW turbines on tension leg platforms with 12 anchor lines (of 20m in length) and mooring up to 30 degrees and 45m floating structures based on a minimum turbine distance of 680m translate to a theoretical fishable clearance of 600m between turbines reduced to 535m once a 50m safety zone is applied to the floating structure (assuming from the structures edge – this provides for a safety zone buffer of 33m beyond the anchor points. The safety zone buffer would decrease to 10m if 50m safety zone is applied from the centre point of the structure). We note that the above calculations do not reflect our view that these dimensions represent a safe fishing distance. Indeed under these circumstances outlined above we consider it highly unlikely that bottom towed fishing activities could operate safely within the vicinity of the array.</p>	<p>It should be noted that under the current worst case scenario (180 x 10MW turbines) the minimum spacing between turbines is 720m. Floating foundations are no longer considered within the project desing envelope.</p> <p>Under the 10MW scenario, the worst case with regards to fishing would be a result with the use of Tetrabase foundations. Considering that the radius of the legs TetraBase structures on the seabed could be up to 35m, the minimum width of the corridor left clear of infrastructure between foundations would be 650m.</p>
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	<p>We note that the inclusion of floating wind raises under the worst case parameters raises questions over the most appropriate safety management regime for the project under the worst case scenario.</p> <p>We note that under these circumstances the relevance of measures to reduce safety risk and promote coexistence will</p>	It should be noted that under the current worst case scenario (180 x 10MW turbines) the minimum spacing between turbines is 720m (rather than the 680m considered in the PEIR). Furthermore, floating

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			vary depending upon the actual project plan selected within the Rochdale Envelope provisions.	foundations are no longer considered within the project desing envelope.
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	The CIA (Ch 14, p58, para 248) assumes that fishing will be able to occur in other windfarm projects. Under the worst case scenario for the Norfolk Vanguard Project it will not be possible to operate fishing activities.	<p>The desing envelope for Norfolk Vanguard has been reviewed and no longer considers inclusion of floating foundations. In addition, the 9MW option is no longer considered for Norfolk Vanguard resulting in an increase in the minimum spacing from 680m to 760 for this project. It is therefore considered that some level of fishing activity would be able to resume within Norfolk Vanguard.</p> <p>As noted with regards to Norfolk Boreas, there is currently no legislation preventing fishing from occurring within operational wind farm sites. The level of activity that may resume within Norfolk Vanguard would depend of the perception of individual skippers with regards to operating their gear within the operational site.</p>
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	In the case of safety issues, we disagree that the same factors and obligations would apply to other projects/ activities that would negate the potential for cumulative effects occurring (Ch14, p54, para 236). This presupposes that those measures removes the safety risk. In our view each project, where	With regards to safety risks in a cumulative context, as outlined in ES Chapter 14, it is considered that the same factors and obligations applied for the project would apply to other

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			there is an interaction with fisheries will incrementally increase risk to a fleet overall, irrespective of measures applied.	projects/activities. Safety risks in a cumulative context would therefore remain as assessed for the project alone (i.e. within acceptable limits).
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	In addition, It is not possible at present to verify the results of the CIA assessment. This is partly due to a lack of definition of the sensitivity categories in particular but there also needs to representation of analytical outputs. The qualitative nature of the sensitivity and magnitude criteria means that the CIA needs to clearly evidence its analysis in order to draw conclusions on the significance of impacts to fleets so that we are able to consider the validity of the conclusions in more detail. This should include spatial representations of the restrictions against available fishing activity data.	The methodology used for assessment in the CIA is in line with the standard methodology used for assessment of impacts on the project alone. VMS data has been analysed and illustrated together with the projects/activities and measures included for assessment to facilitate visualization of the cumulative impact.
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	We are concerned that existing plans and projects are not factored into the assessment and are assumed to form part of the baseline. We consider this will disguise impacts already being carried by impacted parts of the fleet. This results in a "shifting baseline syndrome" similar to that which is attributed to environmental change as reference points change from one project application to the next; there is no "review mirror" in the assessment. In addition, it does not appear that MPAs outside of the UK EEZ have been included in the assessment. It is not clear whether or how proposed fisheries measures associated with the marine protected areas have been factored into the CIA.	Existing projects are considered part of the existing environment. Including existing projects in the assessment would therefore represent double counting of their effect. With this in mind, existing plans and projects have not been considered for assessment of potential impacts on commercial fisheries. Consideration has been given in the assessment to proposals for closed areas in Marine Protected Areas (MPAs) outside the UK

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			These will have additional impacts on some of the fleet sectors impacted by the project.	European Economic Zone (EEZ) to contribute to cumulative impacts.
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	With respect to interactions, we consider that there is a potential Impact 2 and 3 (loss of access and displacement to have an effect on safety issues for fishing vessels and it can impact on the safe operation of vessels, particular smaller vessels with limited range (Ch14, table 14.20.)	The majority of activity carried out by smaller vessels (i.e. local inshore fleet) is undertaken within the 12nm limit, and particularly within the 6nm. Large vessels active in the Norfolk Boreas site have no access to areas between 0- 6nm. Therefore significant conflicts/safety issues between the inshore fleet and larger vessels are not anticipated as a result of the project.
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	<p>Notwithstanding the identified limitations in the PEIR we consider that additional measures to mitigate gear snagging risks should include:</p> <p>The cable burial plan should be consulted on with the fishing industry</p> <p>The results of post burial inspection surveys should be communicated to the regulator/fishing industry.</p> <p>The cable burial risk assessment should comprise an assessment of cable exposure risk as well as risk to other marine users. It should be reappraised at appropriate intervals during the operational phase of the project</p> <p>The cable burial risk assessment should be linked to an appropriate cables survey/monitoring regime.</p> <p>Burial status results from monitoring should be communicated to the fishing industry.</p>	<p>A number of measures have been proposed by the Applicant which are of relevance with regards to minimising potential for snagging risks. These are outlined below:</p> <p>The Scour Protection and Cable Protection Plan required under the draft DCO Schedules 9 and 10 (Part 4 Condition 14(1)(e)) of the Generation Assets Deemed Marine Licences (DMLs) and Schedules 11 and 12 (Part 4 Condition 9(1)(e)) of the Transmission DMLs, in accordance with the Outline Scour Protection and Cable Protection Plan (document reference 8.16), must be approved by the MMO prior</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>Identified cable exposures should be communicated to the fishing industry via NTM and Kingfisher (we wish to see this secured appropriately via the DCO/DML).</p> <p>Reporting of dropped objects (secured by DCO/DML)</p> <p>Exposed cables should be protected by guard vessel until appropriate remedial measures can be completed.</p> <p>Remedial approaches should be consider reburial in the first instance as a way of avoiding the needed for cable protection. Where cable protection is necessary the approach should be considered so that it minimises the potential for snagging risks. The approach should be consulted on with the fishing industry</p> <p>Post remediation surveys should be undertaken and communicated to the fishing industry to provide best assurance post works that no residual snagging risks remain.</p>	<p>to construction. This document will be updated as the final design of the Project develops and will include justification of the location, type, volume and area of cable protection, based on crossing agreements and pre-construction survey data to ensure only essential cable protection can be installed.</p> <p>Furthermore Condition 14(1)(e) of Schedule 9 and 10 and Condition 9(1)(e) of Schedule 11 and 12 require that prior to commencement of licensed activities "...details of the need, type, sources, quantity and installation methods for scour protection and cable (including fibre optic cable) protection..." must be approved by the MMO. The Condition also requires the plan to be updated and resubmitted for approval if changes to it are proposed following cable laying operations. Therefore, to the extent that there are any changes to the details of the as built cable protection and scour protection, this will be provided in the updated plan.</p> <p>In addition, the Cable Specification, Installation, and Monitoring Plan (to be agreed with the MMO pursuant</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				<p>to Condition 14(1)(g) (Schedules 9 and 10) and Condition 9 (1) (g)(Schedules 11 and 12) must include:</p> <p><i>(ii) a detailed cable (including fibre optic cable) laying plan for the Order limits, incorporating a burial risk assessment to ascertain suitable burial depths and cable laying techniques, including cable landfall and cable protection measures...;</i></p> <p><i>(iii) proposals for monitoring offshore cables including cable protection during the operational lifetime of the authorised scheme which includes a risk based approach to the management of unburied or shallow buried cable.</i></p> <p>Dropped objects will be reported to the MMO using the Dropped Object Procedures Form outlined in Schedule 10, Part 4, Condition 12 (9), and Schedules 11 and 12, Part 4, Condition 7 (11) and Schedule 13, Part 4, Condition 5 (10).</p> <p>Additional co-existence procedures noted in the Outline FLCP (Document 8.19) relevant in this context include:</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				<ul style="list-style-type: none"> • Regular and routine communications with the fishing industry; • Early provision of construction and cable laying plans, including location and methods for cable protection, if required; • Consideration for the use of guard vessels; • Development of a fisheries guidance document to reduce interactions with fishing activity and provide response procedures; • Cable monitoring throughout construction and operation; • Provision of procedures for the safe recovery of lost or snagged fishing gear; and • Appropriate communication with the fishing industry in the event that cables become unburied during the operational phase (i.e. through the FLO and appropriate channels such as the Kingfisher Information Service). As previously mentioned this has been reflected under in the draft DCO under Schedule 9 and 10, Part 4, condition 9 (11) and Schedule 11 -12, Part 4 condition 4 (11).
Chapter 14, Commercial Fisheries	National Federation of Fishermen's	December 2018	In addition, a Fisheries Liaison and Coexistence plan, secured via the DCO/DML, should include operational management arrangements such as provisions for gear clearance and disruption settlements, navigation corridors and protocols,	The Outline FLCP (Document 8.19) Includes provisions with regards to relevant aspects such as gear snagging, loss of gear claims, static

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
	Organisations (NFFO)		gear snagging protocols and processes for attributable claims, and retrieval of displaced static gears from safety zones as well as safety risk management arrangements as outlined above relating to cables. This should adhere to FLOWW guidelines and should in our view be provided in outline pre-consent.	gear relocation and notification of cable exposures to the fishing industry. The Outline FLCP submitted takes account of best practice as outlined in FLOWW guidelines.
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	As reflected in the consultation document we note reference made to our preferences indicated with respect to the Norfolk Vanguard PEIR consultation for post installation trawl surveys to be conducted post decommissioning and no seabed hazards to remain post decommissioning.	Decommissioning will be subject to a separate licensing process, taking account of the latest scientific understanding and available guidance at that time.
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	We would also encourage the use of funding arrangements like the West of Morecombe Fisheries Fund as a mechanism to support fishing industry stakeholders affected by the project and provisioning of work opportunities (e.g. guard vessels or surveys for example) available to affected fisheries stakeholders as far as practically possible.	The potential for a community benefit fund is outwith the DCO consenting regime and therefore wider community benefits should not be taken into account when determining the Application.
Chapter 14, Commercial Fisheries	National Federation of Fishermen's Organisations (NFFO)	December 2018	We encourage to support the adoption of the Fish Safe device by fishing vessels operating in the area – see http://www.fishsafe.eu/en/fishsafe-unit.aspx . This technology, which combined with other safety elements above, provides automated means of integrating safety information into the navigational systems on fishing vessels that in turn provide a real-time warning of safety hazards in the wheel house. This will greatly promote safe working regime around the vicinity of the project and minimise the likelihood of incidents occurring in an area where there exists high levels of fishing activity.	Notwithstanding this, the Applicant has and will continue to engage in relevant wider industry initiatives as appropriate. For example Vattenfall Wind Power Limited is a member of European Subsea Cables Association (ESCA).

Table 1.9 Feedback related to Shipping and Navigation (Chapter 15 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 15, Shipping and Navigation	MCA	December 2018	The development area carries a significant amount of through traffic. Attention therefore needs to be paid to routeing, particularly in heavy weather to ensure safe passage without significant large scale deviations.	The majority of traffic in the area is utilises the nearby Deep Water Routes (DWRs), with traffic through the Norfolk Boreas site itself being less frequent. Displacement and adverse weather routeing are assessed within section 15.7 of this chapter, noting that vessels within the existing routeing measures will not be displaced.
Chapter 15, Shipping and Navigation	MCA	December 2018	Possible cumulative and in combination effects on routes should be considered taking into account Norfolk Vanguard East, Norfolk Vanguard West, East Anglia 3 and other Southern North Sea operations.	Cumulative impacts are assessed in section 15.8 of this chapter.
Chapter 15, Shipping and Navigation	MCA	December 2018	Turbine layout design will require MCA approval prior to construction to minimise risk to surface vessels, including rescue boats and SAR aircraft. Structures must be aligned in straight rows and columns, including any platforms with a minimum of two lines orientation. Any additional navigation safety and / or SAR requirements as per MGN 543 Annex 5 (v2) will be agreed at the approval stage.	The layout and any additional navigational safety and / or SAR requirements would be agreed with the MCA post consent in line with the Design Rules.
Chapter 15, Shipping and Navigation	MCA	December 2018	An approved ERCoP is required prior to construction. The ERCoP is an active operational document and must remain current during all stages of the project. A SAR checklist will be discussed post consent.	An Emergency Response Cooperation Plan (ERCoP) would be produced post consent and agreed with the MCA as per section 15.7.1. The SAR checklist process will be discussed and agreed with the MCA post consent.
Chapter 15, Shipping and Navigation	MCA	December 2018	Supports safety zones during construction, maintenance and decommissioning phases. Should be noted that operational safety zones may have maximum 50m radius from individual turbines. Justification and evidence for 50m operational safety zone would be required.	A safety zone application would be produced and agreed with the MCA post consent, noting that the application for safety zones is assumed as embedded mitigation in

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				section 15.7.1. This may include provision for operational safety zones around manned platforms. Floating tension leg platforms are no longer being considered therefore no response is required.
Chapter 15, Shipping and Navigation	MCA	December 2018	Information on potential mooring arrangements for floating turbines should be included in the ES. This includes possible anchor and line spread, monitoring, recovery of turbines and third party verification. Recent MCA and HSE guidance should be referenced.	Floating tension leg platforms are no longer being considered therefore no response is required.
Chapter 15, Shipping and Navigation	MCA	December 2018	MCA would like to see continuous construction which is progressive across the wind farm with no opportunity for two separate areas to be constructed with a gap in the middle.	Norfolk Boreas Limited considers that the effects of disparate construction sites are mitigated, notably through the use of aids to navigation during the entire construction phase. Embedded mitigation is listed in section 15.7.1.
Chapter 15, Shipping and Navigation	MMO	December 2018	A cable burial risk assessment is proposed pre-construction. The cable burial risk assessment also needs to be conducted post construction and updated regularly to provide understanding of burial and mitigate risks to other sea users. Risk assessment should include mitigation that will be required. This should be presented within the ES. Further information required on how changes in burial depths over time are addressed in the EIA, and how risks are to be communicated to fishermen and other sea users.	Norfolk Boreas Limited would undertake an assessment of cable burial / protection post consent as per section 15.7.1 (embedded mitigation). Further details, including risk mitigation and promulgation of information are summarised in section 26.3 of the Navigational Risk Assessment (NRA) (Appendix 15.1).
Chapter 15, Shipping and Navigation	MMO	December 2018	If during construction, any unused cables are to be cut and clumped at the point of intersection with the windfarm cables, requests clarification on how the impact on other sea users will be assessed and mitigated to avoid navigational risk.	Norfolk Boreas Limited would undertake an assessment of cable burial / protection post consent as per section 15.7.1 (embedded mitigation), where the approach to disused cables would also be detailed.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 15, Shipping and Navigation	MMO	December 2018	Notes that Vattenfall has stated that cable protection is to be kept to a minimum which is welcomed. However, the MMO expects that contingency for unexpected exposures / unburied cables will be built into the assessments.	Norfolk Boreas Limited would undertake an assessment of cable burial / protection post consent as per section 15.7.1 (embedded mitigation). Protection would be periodically monitored to identify any areas of exposure or ineffective protection as per section 26.3 of the NRA (Appendix 15.1).
Chapter 15, Shipping and Navigation	TH	December 2018	Contents of letter noted. Look forward to working with Norfolk Boreas Limited up to and throughout the application process.	Noted.
Chapter 15, Shipping and Navigation	Rijkswaterstaat	December 2018	Of the 40+ potential impacts on shipping and navigation, only 12 have been assessed as 'Tolerable' of which 4 Tolerable with mitigation'. The other potential impacts are assessed as 'Broadly acceptable' or 'no impact'. This seems a mild result, certainly if cumulative effects are considered. Could you elaborate on this issue and especially on the following two issues?	<p>The impact assessment has been undertaken using the International Maritime Organisation Formal Safety Assessment (IMO FSA), as per MCA requirements and in line with the shipping and navigation assessments that have been undertaken for similar UK developments. Under the relevant MCA guidance this approach is primarily concerned with ensuring mariner safety, considering consequence (safety) and the frequency of the effect into account to determine overall impact significance. Further details are provided in section 15.4 of the ES.</p> <p>The rankings for the Norfolk Boreas ES are considered justified on the basis that impact significance has</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				been based on the likely frequency at which any given consequence will occur (as assessed within this comprehensive NRA).
Chapter 15, Shipping and Navigation	Rijkswaterstaat	December 2018	Could you explain why a collision of a commercial vessel with third party vessels or a structure would only have MINOR consequences (slight injury, minor damage, tier 1 pollution assistance, minor business safety)? Experts in The Netherlands have pointed out more severe consequence due to the exchange of a lot of energy. Even in the case when a large ship drifts into an OWF. But of course real data on this subject sparse.	The assessment considers both frequency and consequence of each impact, with consideration of both most likely and realistic worst cases considered within the hazard log, produced as part of the NRA process (Appendix 15.1 to the ES), which ultimately feeds into the impact assessment. In this case, the minor consequence ranking was attached to the assessed frequency at which a collision with such consequences was estimated to occur (at most reasonable probable), based on the findings of the NRA (Appendix 15.1 to the ES). A collision resulting in more severe consequences (which is acknowledged as a feasible outcome) would be assessed as being of a lesser frequency than a collision with minor consequences, leading to the same overall significance (at most tolerable with mitigation).
Chapter 15, Shipping and Navigation	Rijkswaterstaat	December 2018	Deviation of routeing due to adverse weather – for commercial vessels the frequency is considered to be remote 1 in 10 to 100 years) but according to our information this should be ‘frequent’(yearly)	The remote frequency assessed refers to the frequency at which an incident of restricted adverse weather routeing would be likely to result in moderate safety consequences. It is agreed that

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				<p>Norfolk Boreas will impact upon adverse weather routing on a more frequent basis (as per Section 18.4 of the NRA (Appendix 15.1 to the ES)), however the significant majority of such cases were assessed as being likely to be of a lower consequence i.e. time increases rather than safety effects. Therefore, had a higher frequency been considered, the overall significance would not have changed (tolerable with mitigation).</p>
<p>Chapter 15, Shipping and Navigation</p>	<p>Rijkswaterstaat</p>	<p>December 2018</p>	<p>It is stated that DFDS IJmuiden – Newcastle is the busiest route required to deviate, however minor and that’s a fair assessment. But it can also be said that with minor adjustments to the OWF (‘topping off’), this deviation can be avoided and collision will further decrease. Is this something Vattenfall would consider?</p>	<p>This was raised previously during a consultation call between Rijkswaterstaat and Vattenfall Wind Power Limited on the 8th May 2018. At this application stage of the project it cannot be confirmed how much of the site will be built out, however Vattenfall Wind Power Limited will consider consultation responses on the subject during the layout approval process which will be undertaken with the MCA and Trinity House (TH). No concerns were raised during consultation with regular operators regarding the northern boundary of the Norfolk Boreas site (including from the operator of the route that intersects the Northern tip). Cumulative assessment also shows any deviation to be manageable when considered with the identified projects that</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				could include cumulative impacts. It is noted that as per Environmental Impact Assessment regulations it is only reasonable that Vattenfall Wind Power Limited consider cumulative projects which are reasonably foreseeable.
Chapter 15, Shipping and Navigation	Rijkswaterstaat	December 2018	The Dutch government has indeed planned a corridor in the scheduled OWF 'IJmuiden Ver' coinciding with the routing IJmuiden Newcastle.	As per EIA regulations any assessment of cumulative impacts is based on projects or other activities that are active or reasonably foreseeable. Given that a detailed design of the proposed navigation corridor is not publicly available we are not able to make an assessment.
Chapter 15, Shipping and Navigation	Rijkswaterstaat	December 2018	It is stated that there is likely to be a collective increase in emergency response requirements due to increased incident rates, more personnel and more vessels. You refer to self-help capability, which should also be considered within the project specific impacts. Could you elaborate on this issue? What does that mean? What kind of measures will be taken?	Self-help refers to any vessel, personnel, facility or resource associated with Norfolk Boreas that could be used in an emergency situation. A full list of the available resources cannot be provided at this stage of the project, however comprehensive details would be provided in the Emergency Response Cooperation Plan (ERCoP) which would be produced post consent in consultation with the MCA. Indicatively, this will include construction/maintenance vessels and crew, lifesaving equipment on board the vessels and wind farm structures, and any further relevant onshore facilities.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 15, Shipping and Navigation	Rijkswaterstaat	December 2018	Why is it relevant to note the majority of fishing vessels are Dutch beam trawlers?	The NRA and ES follow the guidance contained within MGN 543 which requires the assessment to detail break downs of vessels types within the study area. It is typical to note type and nationality of fishing vessels given that this provides additional detail on the nature of transits and movements.

Table 1.10 Feedback related to Aviation and Radar (Chapter 16 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 16, Aviation Radar	Ministry of Defence (MoD)	November 2018	In response to statutory consultation the MoD stated that when operational the Norfolk Boreas wind turbines will be detectable to and cause unacceptable interference to the radar. Furthermore, the wind turbines and associated offshore platforms will affect military low flying activities conducted in the area. The MoD have accepted a proposed mitigation solution to mitigate the Norfolk Boreas 'sister project' Norfolk Vanguard impact to the Trimmingham ADR, it is expected that this mitigation solution will also be applicable to Norfolk Boreas.	Section 16.7.5.2 and 16.7.6.1
Chapter 16, Aviation Radar	Oil and Gas Platform Operators	November 2018	Only Shell, of the 3 platform operators consulted responded to the consultation request. Shell informed the applicant that the Corvette platform helideck is decommissioned and therefore Shell had no further comment to make.	Section 16.6.7.2
Chapter 16, Aviation Radar	Dutch Military	November 2018	No further action	N/A

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 16, Aviation Radar	Dutch Air Traffic Control (ATC)	November 2018	<p>The Dutch CAA stated that they will complete an audit of the Dutch commercial aviation impact of the Norfolk Boreas site and will keep the applicant advised of any impact.</p> <p>The Dutch Ministry of Infrastructure and Water Management confirmed on behalf of the civil aviation authority that the Norfolk Boreas site would not affect operations.</p>	N/A

Table 1.11 Feedback related to Offshore and Intertidal Archaeology and Cultural Heritage (Chapter 17 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Overall we are broadly supportive of the approach taken to the PIER. It is detailed and provides a thorough analysis of the historic environment in relation to this development. In particular there are good summaries of what has been identified to date and the approaches taken to produce initial impact assessments as required by the Environmental Impact Assessment (EIA) Directive (85/337/EEC) (as amended).	Noted, approach taken forward through to the ES (Chapter 17).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	There is an area of cross over between onshore and offshore methodologies and heritage and visual impact methodologies and the LVIA report needs to consider cumulative impacts as well as the differences between landscape and seascape where it is relevant to a heritage asset, and how this will be delivered in the resulting ES.	Cross references are made throughout Chapter 17 and Chapter 28 as to where the cross over exists. Heritage setting and character considerations are presented in Chapter 28 (Onshore Archaeology and Cultural Heritage) rather than LVIA Chapter 29.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	We noted outline detail was provided about the Marine and Coastal Access Act 2009, and we suggest in reference to Marine Licensing provisions in the 2009 Act that mention is made of how the environment is defined and what it is considered to include, such as provided through section 115(2) of the 2009 Act.	This is now defined in Table 3.1 of chapter 3 Policy and Legislative context.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Given the clear construction relationship between this project and the proposed Norfolk Vanguard project, any project design envelope used within the EIA exercise should be focused matters as relevant to the two implementation scenarios.	While Norfolk Vanguard may undertake some enabling works for Norfolk Boreas, these are only relevant to the assessment of impacts onshore (Chapter 28) where the two different scenarios (see Chapter 5 project description) are assessed independently. For offshore archaeology, the worst case does include project interconnector cables which could only be required if Norfolk Vanguard is constructed.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	In our view more analysis needs to be undertaken in relation to the cumulative impact of multiple planned offshore arrays and the overall numbers of turbines.	It is acknowledged that strategic analysis in relation to the cumulative impact of multiple constructed and planned projects would facilitate greater understanding of the cumulative effect of offshore wind development within the North Sea. Although this is considered beyond the scope of an individual project Norfolk Boreas Limited are committed to making data from the Project available should a request for data be made to them for such a strategic study.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Section 5.4.2.2 (Installation process) describes pre-installation works inclusive of preconstruction surveys (paragraphs 58-61), although the need for seabed preparation to facilitate construction appears to focus on risks associated with Unexploded Ordnance (UXO) and boulders without any specific reference to survey data interpretation to deliver archaeological objectives whereby	The Worst Case Scenario (WCS) for offshore archaeology (Chapter 17 section 17.7.4, Table 17.16) includes consideration of all proposed construction methods including seabed preparation (which includes UXO and boulder clearance) and the

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			identifiable anomalies of possible (or even known) archaeological interest are avoided. This same comment is applicable to Section 5.4.13 (Cable installation methods) and any ES prepared for this project must include direct consideration of this matter. The ES must assess all proposed construction methods in terms of risk of impact on any buried or near-surface archaeology and detail any suitable mitigation strategies that should be adopted as a condition of consent.	installation of offshore cabling and cable installation at the landfall. Mitigation strategies are addressed in Chapter 17 section 17.7.2 (Embedded Mitigation) and through the Outline Written Scheme of Investigation (WSI) (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Similar analysis and strategies will be needed for the areas where it is not possible to bury the cables, and where cable protection is needed (Section 5.4.14). This is particularly important for any cable protection required at the landfall HDD exit points, when considering the potential for internationally significant archaeological remains to be present in this area.	The WCS for offshore archaeology (Chapter 17 section 17.7.4, Table 17.16) includes consideration of cable protection, including that which may be required at the landfall.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Any of the possible options suggested in Section 5.4.14 (Cable protection) also need to consider changes to the coastal processes, which may lead to the increased erosion of material in adjacent areas and therefore the exposure and loss of potentially significant archaeology.	The effects of cable protection are considered in detail in Chapter 8 (Marine Geology, Oceanography and Physical Processes) section 8.7.7 with specific reference to Impact 5 (Morphological and sediment transport effects due to cable protection measures within the Norfolk Boreas site and Project interconnector search area) and Impact 6 (Morphological and sediment transport effects due to cable protection measures within the offshore cable corridor). Within the Norfolk Boreas site and Project interconnector search area it is concluded that there will be no impact from cable protection (and

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				consequently no impact on potentially significant archaeology). Similarly, there would be no impact on coastal morphology at the cable landfall and a negligible impact upon the Haisborough, Hammond and Winterton Special Areas of Conservation (SACs), and specifically the sandbanks within the SAC.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	We add that anchorage factors also require consideration as might be required during construction process for foundations or cables, which may impact on any near-surface or buried archaeology that is present and designated anchorages will need to be subject to analysis and mitigation.	Seabed contact by legs of jack-up vessels and / or anchors on vessels during installation are considered as part of the WCS for offshore archaeology (Chapter 17 section 17.7.4, Table 17.16) and any anchoring strategy will necessary incorporate the principles of avoidance as set out in the Embedded Mitigation (section 17.7.2) and the Outline WSI (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	We appreciate that turbine foundation type and construction method of the offshore electrical platforms has not yet been finalised, and so a number of options are presented (see Sections 5.4.3 and 5.4.4). Information is therefore required regarding the potential impact on any buried or near-surface archaeology. Likewise scour protection may be required for the different foundation options, which would also have the potential to affect, through erosion or construction, any sea bed deposits in the adjacent areas. This in turn may result in archaeological deposits or features becoming exposed or buried. The impacts of this work will need to be discussed for the chosen option and if necessary a mitigation strategy agreed in a WSI.	Foundation options and associated scour protection requirements are considered as part of the WCS for offshore archaeology (Chapter 17 section 17.7.4, Table 17.16). Any mitigation requirement for the chosen option would be established through the mechanism of the WSI and associated Method Statements to be prepared and agreed in consultation with Historic England post-consent.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Sandbank features may contain presently unknown archaeological materials and it is therefore a relevant matter that contemporaneous survey data remains a priority requirement to determine change and potential (or burial) of sites of known or possible archaeological interest.	A requirement for the archaeological analysis of pre-construction marine geophysical data forms part of the Embedded Mitigation (Chapter 17 section 17.7.2) and is captured through the Outline WSI (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	It is relevant to note that the comments we offer here support the advice provided for the Norfolk Vanguard PEIR (our letter dated 11/12/2017) in that the shallow geology for the proposed development and electricity export cable corridor have significant potential to support palaeo-environmental objectives. We will expand on such matters further in our review of Chapter 17 (Offshore and Intertidal Archaeology).	The results of the palaeolandscapes assessments for Norfolk Boreas and for Norfolk Vanguard are detailed in Appendix 17.1 and Appendix 17.4 respectively. This has been supported by geoarchaeological assessment detailed in Appendix 5, Appendix 6, Appendix 7 and Appendix 8.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	However, an additional matter to be highlighted is the possible interconnector search area which occupies the southern half of Norfolk Vanguard West (and its connection to the cable corridor) and the north-west portion of Norfolk Vanguard East. We therefore require any ES produced following this PEIR consultation exercise to include further survey methodologies as might be employed for any interconnector between Norfolk Boreas and Norfolk Vanguard.	A requirement for the archaeological analysis of pre-construction marine geophysical data forms part of the Embedded Mitigation (Chapter 17 section 17.7.2) and is captured through the Outline WSI (document reference 8.6). This would include data within the footprint of any interconnector which may be required between Norfolk Boreas and Norfolk Vanguard.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Table 17.8 summarises the geophysics data acquired as part of the project so far, classified as being either of Good, Average or Variable quality. A comment has been included in the 'Suitability' column regarding the potential of the results to resolve archaeological features/remains of interest, which we are pleased to see. However, the line spacing used is generally much larger than is recommended in the Historic	It is the position of Norfolk Boreas Limited that the geophysical data acquired in support of this ES is sufficient to provide an accurate characterisation of the archaeological potential of the study area. Additional explanation is

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			England Marine Geophysics guidance published 2013). We are concerned that the resolution of the resulting surveys would not be able to identify feature/deposits of archaeological interest.	provided in Chapter 17 section 17.5.3 (Assumptions and Limitations)
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	We accept the geophysical surveys carried out to date were intended to be preliminary surveys only, with further higher resolution and full coverage surveys planned for later on in the development process. It would therefore be appropriate to have further discussion with regards to the appropriate level of survey in relation to the above guidance and to ensure that we receive method statements for all further surveys undertaken.	The requirement to consult with Historic England on the scope of surveys post-consent to ensure that the data generated are sufficiently robust to meet archaeological objectives and to enable professional archaeological interpretation and analysis is captured through the Outline WSI (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	The discovery of a terrestrial peat deposit in Unit 7 that covers as much as 3,500 years from the Late Devensian to the Early Holocene is potentially of great archaeological significance (paragraph 91) and therefore warrants additional work.	Following PEIR, additional work has been undertaken (Stage 4 palaeoenvironmental assessment) and the results are included as Appendix 17.8.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	A very strong relationship and coordinated programme of delivery must exist between the IPMP and WSI, so that all post-consent data acquisition programmes are effectively synchronised.	The In principal Monitoring Plan states that the principal mechanism for delivery of monitoring for offshore archaeology is through agreement on the offshore Written Scheme of Investigation.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	A strategy is presented in Section 17.7.5 (paragraph 169) to assess the heritage significance of each heritage asset, which states that each individual discovery will be considered independently in terms of its heritage significance and that any requirements for further data gathering or analysis would be considered on a case by- case basis. This approach seems appropriate and we broadly agree with the results of the assessment of importance presented in Table 17.18.	Noted, approach taken forward through to the ES (Chapter 17).

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Section 17.7.6.1 discusses the potential impacts to known heritage that may occur during the construction activities. We agree that it may be possible to adjust the proposed AEZs where necessary if further relevant information becomes available. It is noted thought that AEZs will not be recommended for inclusion in the “A2” category of anomalies, although the position of the anomalies will be avoided through a scheme of micro-siting. If the anomalies cannot be avoided then they will be investigated and recorded further prior to their removal.	Noted, approach taken forward through to the ES (Chapter 17).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	In terms of the direct impacts to potential heritage assets, it is stated in Section 17.7.6.2 that additional information will be gathered as part of the embedded mitigation strategy. This will include a programme of geoarchaeological assessments (paragraph 185), the further examination of geotechnical and geophysical data (paragraphs 186 & 187), and the reception of prompt archaeological advice in the event of any discoveries (paragraph 188). We broadly agree with this approach, but suggest that the line spacing used in any subsequent geophysical work will need to consider the scale of the archaeological features that are being investigated and the resolution required to understand them in more detail.	Noted. The requirement to consult with Historic England on the scope of surveys post-consent to ensure that the data generated are sufficiently robust to meet archaeological objectives and to enable professional archaeological interpretation and analysis is captured through the Outline WSI (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	It is noted that there will be changes to the physical processes during the construction phase of the proposed project, which will potentially result in increased sediment concentrations and have the potential to deposit sediments and hence raise the seabed elevation (Section 17.7.6.3). We broadly agree with the how sediment deposition is classified as a beneficial effect upon archaeological receptors.	Noted, approach taken forward through to the ES (Chapter 17).
Chapter 17, Offshore and Intertidal	Historic England	December 2018	Section 17.7.6.5 includes important detail about the potential impact of bentonite fluid outbreak occurring during the HDD process on heritage assets. It is also noted that CF-bF deposits were not recorded within the top 20m below ground level,	Noted, approach taken forward through to the ES (Chapter 17).

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Archaeology and Cultural Heritage			and that if present they are expected to occur beneath the glacial tills at significant depth and beneath the HDD target depths. We therefore agree that the potential for drilling fluid outbreak to impact on archaeological materials is negligible (paragraph 209).	
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	The line spacings used during the surveys are predominantly at the very limit that is recommended in the Historic England guidance, or they exceed them. It is therefore possible that features of archaeological interest may not be resolved to a point that they can be adequately interpreted. We note that high precision geophysical surveys will be carried out pre-consent for the purposes of UXO identification (Section 17.7.6.2); ideally the strategy for the survey should be developed with the help of an archaeological geophysicists to ensure that the data is suitable for archaeological purposes as well, allowing any gaps in the current understanding to be filled. We recommend that such details are specified within the outline In Principle Management Plan to ensure effective coordination.	It is the position of Norfolk Boreas Limited that the geophysical data acquired in support of this ES is sufficient to provide an accurate characterisation of the archaeological potential of the study area. Additional explanation is provided in Chapter 17 section 17.5.3 (Assumptions and Limitations). The requirement to seek archaeological advice during planning offshore surveys and a recommendation to undertake a data review in order to qualify the continued suitability of the existing data and assessment (including the identification of any data gaps) is captured through the Outline WSI (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	It would be useful to understand how much of this data was classed as being “below average” quality, and if it is felt that any parts of this survey need to be repeated (post-consent) in order to fully understand the potential for archaeological remains to be present.	This will be addressed post-consent as captured through the Outline WSI (document reference 8.6) which recommends that, prior to the acquisition of further survey data during the pre-construction phase, a data review be undertaken by a suitability qualified and experienced archaeological contractor in order to qualify the continued suitability of

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				the existing data and assessment to the project, including the identification of any data gaps.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Some of the issues with the data were caused by poor weather conditions at the time the surveys were carried out, by environmental conditions (e.g. weather noise and shallow water depths), or due to issues with data that was handed to Wessex Archaeology to process. It was subsequently stated that “it cannot be guaranteed all palaeogeographic features of archaeological potential have been identified within the areas covered by these datasets” (Section 3.3.26). The uncertainty and lack of confidence in the conclusions drawn from this data begs the questions of whether additional surveys will be required in order to fully understand the potential for archaeological remains to be present in these areas. Some of the issues noted as having a detrimental effect on the resulting data will need to be kept in mind during subsequent surveys to ensure the areas have been adequately surveyed to allow archaeological features to be identified.	It is the position of Norfolk Boreas Limited that the geophysical data acquired in support of this ES is sufficient to provide an accurate characterisation of the archaeological potential of the study area. Additional explanation is provided in Chapter 17 section 17.5.3 (Assumptions and Limitations). The recommended data view captured in the Outline WSI (document reference 8.6) will inform the scope of subsequent surveys to ensure that areas have been adequately surveyed to allow archaeological features to be identified.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	65 geotechnical sampling locations have been investigated so far, but it would be useful to know if the cores still exist intact, or if they have been extruded. If the samples have been extruded, then the resolution to which this was carried out should be stated in any ES produced.	23 of the vibrocores identified as having geoarchaeological interest are stored intact at Wessex Archaeology, although they have been opened and five have been sub-sampled to inform the geoarchaeological assessment for Norfolk Vanguard.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Nearly 1,400 anomalies have been classed as “A2s”, and so a strategy will need to be developed that will mitigate the impacts that the proposed developments would have on them.	As part of the Embedded Mitigation (Appendix 17.7.2) all “A2s” will be avoided where possible through design. Those which cannot be avoided will be subject to further investigation as specified in the

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				Outline WSI (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	The early Pleistocene hominin footprints are mentioned in Section 6.1.4, as well as the archaeological material from other nearby sites. The evidence from these sites is of international significance, and so if similar features/remains are identified through works carried out as part of the Vanguard project, they will need to be assessed in an appropriate manner.	Noted. The selection of the long HDD option means that there will be no effect upon the beach and nearshore zone.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	The assessment of the finds recovered from the intertidal area demonstrated the importance and continued use of the area over time, with artefacts being recovered from the Pleistocene to the Modern day periods (Sections 6.1.4 to 6.1.15). The quantity of material recovered from the intertidal area suggests that the area is of high archaeological potential, with archaeology of international significance being recorded in the area (Section 6.2.2). We agree with this statement and would expect to see an appropriate mitigation strategy to deal with any findings, whether this involves avoidance or investigation (preservation by record) included in the ES.	Noted. The selection of the long HDD option means that there will be no effect upon the beach and nearshore zone.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Section 9, Table 18 presents the (research) value of the seabed prehistory, highlighting that any information is of high value, with the exception of isolated discoveries of artefacts or palaeoenvironmental remains. We would agree with this statement.	Noted, approach taken forward through to the ES (Chapter 17).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	It is stated in Section 9.1.28 that although 35 find spots have been recorded in the intertidal area dating from the Palaeolithic to the Bronze Age, these artefacts have been removed and therefore will not be affected by the development. This statement is true for the artefacts that have been recovered, but the finds do highlight the potential for further material to be recovered from this area, as well as	The potential further material to be present within the intertidal zone is discussed in Chapter 17 section 17.6.3.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			providing information on the anthropogenic activity in the area over these broad timescales.	
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Section 9.1.29 discusses the value of the Early Pleistocene hominin footprints discovered at Happisburgh in 2013 and the potential for further similar remains to be uncovered, which would be of high value. We would agree with this statement, as similar finds would be of international importance.	Noted, approach taken forward through to the ES (Chapter 17).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	We agree that avoidance should be used as the primary mitigation strategy for the marine archaeological resource (Sections 10.2.3 & 10.2.7). It is noted that AEZs will not be implemented for “A2” and “A3” anomalies, but that an avoidance strategy with respect to these features will be advised where possible. We feel that this approach is sensible, but the reassessment of the “A2” anomalies should occur in a timely manner to allow any additional discoveries to be taken into account when designing the development: the high resolution surveys proposed may result in some “A2” anomalies being upgraded to “A1” anomalies, or new “A1” anomalies may be identified. The resulting AEZs would therefore need to be taken into account in terms of positioning the array and cable corridor and spatial data for any agreed AEZs included within other relevant project documentation as will accompany any subsequent DCO application.	Noted, approach taken forward through to the ES (Chapter 17). The final avoidance strategy in terms of the application of Archaeological Exclusion Zones (AEZs and micro-siting to avoid) A2 anomalies and A3 recorded sites will be informed by further survey to be undertaken post-consent, as captured through the Outline WSI (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	The outline written scheme of investigation presented in this document is generally good, being thorough, sensible and appropriate. It states the need for collaboration and communication with non- archaeological specialists. We were pleased to see this as it will ensure that a joined-up and efficient approach is maintained that maximises opportunities whilst minimising the risk of duplication of effort.	Noted. This is maintained in the Outline WSI submitted as part of the DCO application (document reference 8.6).

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	The embedded mitigation approaches that will be employed as part of the project (Section 7.1) are proportionate, as they are focused on avoidance of archaeological remains where possible by including archaeologists at the planning and execution stages of each phase of works.	Noted. This is maintained in the Outline WSI submitted as part of the DCO application (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	We are also pleased to see that key guidance documents are cited within the document, such as the Model Clauses for Archaeological Written Schemes of Investigation (Crown Estate, 2010) and the Historic England Marine Geophysics guidance (2013).	Noted. This is maintained in the Outline WSI submitted as part of the DCO application (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	We note that method statements for each package of works will be prepared under the requirements of the final Offshore WSI (paragraph 41), which will be agreed in consultation that Historic England, as provided for through any DCO.	Noted. This is maintained in the Outline WSI submitted as part of the DCO application (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	It is stated in Section 9.1, paragraph 45 that each archaeological report will include a statement regarding the potential of the results, but it would also be useful to understand any limitations as well. For example, did bad weather impact the resolution available from the geophysics surveys? Identifying limitations in the data will help identify gaps that currently exist in our understanding and knowledge for the sites in question.	The Outline WSI has been amended to incorporate a requirement to identify limitations in the data.
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	We are pleased to see that the planning of additional geophysics programmes will involve experienced archaeologists. This will ensure that the data will be collected with archaeology in mind and that the data will allow features of interest to be resolved.	Noted. This is maintained in the Outline WSI submitted as part of the DCO application (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	A programme of geoarchaeological investigation has already been implemented as part of the works to define the baseline environment for the site. The results of this work and the generation of a deposit model will be of value to the wider archaeological community and should be published in an appropriate journal, so that the findings can be disseminated.	Noted. Publication recommendations are presented in Appendix 17.8 following completion of the Stage 4 palaeoenvironmental assessment.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	We are pleased that the need for additional geoarchaeological work is being considered, which may require “archaeology only” cores to be collected and analysed (paragraph 88). We are also pleased to see the collaboration and communication between the geoarchaeological and geotechnical specialist as this will ensure that opportunities are maximised and reduce the risk of duplication of effort.	Noted. This is maintained in the Outline WSI submitted as part of the DCO application (document reference 8.6).
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	Section 4.2 discusses the Optically Stimulated Luminescence (OSL) approach used to date key deposits that have been investigated. Historic England have previously commented on the OSL approach utilised by the project (our letter dated 10th May and 11th June 2018), and how it deviates from the approaches discussed within the Historic England Luminescence Dating guidance document (2008). It was felt that the use of transparent liners and that OSL samples were collected from cores that had been split and exposed to light may add multiple layers of additional uncertainty to what is already an extremely complicated scientific process. Although the approach presented here is potentially hazardous, it is not impossible; we therefore highlighted that additional laboratory work may be required to investigate if the exposure to light resulted in the partial resetting (bleaching) of the luminescence signal, as this would affect the accuracy of the resulting dating evidence. Partial bleaching of the luminescence signal was investigated as part of this work using signal analysis, which was good to see, but a caution was placed on the results which are strongly dependent on the pre- and post-burial experience of a given sample (Section 5.1.4). Inter-aliquot distribution studies were also used to test for partial bleaching, but it was noted that the results were not conclusive and that additional, smaller aliquots may need to be analysed. It was not clear if this work	Further detail on how OSL has been undertaken, including consideration of partial bleaching, has been provided in the Stage 4 report (Appendix 17.8).

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			would be carried out at Stage 4 and should therefore be clarified in any ES subsequently produced.	
Chapter 17, Offshore and Intertidal Archaeology and Cultural Heritage	Historic England	December 2018	A series of recommendations have been made in in Sections 6 and 7 for additional work to be carried out, which includes the need for greater age control and statistically valid palaeoenvironmental analysis to place the information generated through the geoarchaeological work into context (Section 6.2.4, 7.2.3 & 7.3.5, and Table 19). Additional OSL and Radiocarbon dates are therefore recommended as well as pollen, charcoal and diatom analysis (Section 7.3.5) which we would support. It was noted that the OSL result from VC047 could only be tentatively accepted at this stage, but it was not clear if additional work would be carried out to investigate the samples further, which should be clarified with the ES.	Following PEIR, additional work has been undertaken (Stage 4 palaeoenvironmental assessment) and the results are included as Appendix 17.8.

Table 1.12 Feedback related to Infrastructure and Other Users (Chapter 18 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 18, Infrastructure and Other Users	Swift Energy	December 2018	Our main concerns are the preservation of access by helicopters and support vessels including drilling rigs to the seabed areas that we have identified for future development before during and after wind farm construction. It is particularly important that the turbines are located a sufficient distance from the potential drill and platform sites to allow safe access by helicopter.	All helicopter and vessel access routes will be maintained see Chapter 15 Shipping and Navigation and Chapter 16 Aviation and Radar for more details.
Chapter 18, Infrastructure and Other Users	Swift Energy	December 2018	Please find updated a map showing the location of our 2 priority areas at Acle and Earlham where we have been working to raise finance to develop these areas for gas production. We have set out our main concern in the earlier document that we have sent you which relate to access to these areas before during and after windfarm construction. We have also identified the location of potential and possible	Noted

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			new pipelines in the area. We have sent you this map, timing and project information so it can be part of the PEIR consultation process. Timing of developments in this area are dependent on finance and award of the licence in the Netherlands as shown on the map but have been set out in the attached document along with a brief description of the Earlham/P01-FA joint project.	
Chapter 18, Infrastructure and Other Users	Shell	December 2018	Of the listed locations below the Corvette is the only Shell location and it's helideck is decommissioned for good mid 2018. For that reason I do not further review and/or comment on your document as per your request below. Please note the Sean locations have been sold some years ago to Oranje Nassau Energy.	Noted. Norfolk Boreas Limited are in consultation with Oranje Nassau Energy
Chapter 18, Infrastructure and Other Users	Atkins (on behalf of BBL Company)	5th April 2019	We note that the project includes proposed crossing of the BBL Pipeline by HVDC export cables and potentially other cables. We also note that Vattenfall identifies that a crossing agreement will need to be put in place with BBL Company and that the crossing design will need to be mutually agreed between the two parties.	Discussions between Norfolk Boreas Limited and BBL Company will continue post application and an appropriate pipeline crossing agreement will be reached
Chapter 18, Infrastructure and Other Users	Atkins (on behalf of BBL Company)	5th April 2019	The response contained a number of points that will require consideration during the detailed design stage of the Norfolk Boreas project. These included: Locating cables sufficiently distant from the BBL pipeline, minimising the number of crossings and when crossings are required, grouping multiple cables together at as few a crossing points as possible.	The full response will be used to inform the crossing agreements with BBL Company at the detailed design phase.
Chapter 18, Infrastructure and Other Users	Atkins (on behalf of BBL Company)	5th April 2019 Section 42 Response	We note that the offshore order limit change report includes for additional cables which may cross the BBL Pipeline. The observations given on the PEIR above would also apply to any such cable crossings of the BBL Pipeline.	The full response will be used to inform the crossing agreements with BBL Company at the detailed design phase.

Table 1.13 Feedback related to Ground Conditions and Contamination (Chapter 19 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 19, Ground Conditions and Contamination	Breckland Council	November 2018	<p>In relation to the air plane crash:</p> <p>“Hydrazine and radioactive materials were reportedly present on the site. The location appears to be in a field near Ivy Todd Road, Necton, PE37 8JB, TF894100 which appears to be close to where you will be laying underground pipes/cables.</p> <p>We have now been advised that the impact point was 52.39.29 N 000.47.83 E on a heading of 089 degrees (from West towards the East).”</p> <p>It is recommended that the conceptual model specifically takes into account the possibility of hydrazine and radioactive materials being present.</p> <p>It is noted that the report recommends that the potential risk posed by the off-site sources is established and that further desk based assessment should be undertaken to establish the presence of this linkage.</p>	Relevant information has been incorporated and these are presented in Appendix 19.1
Chapter 19, Ground Conditions and Contamination	Norfolk County Council	November 2018	<p>Norfolk County Council in its capacity as the Mineral and Waste Planning Authority has been involved in discussions with Vattenfall about the Wind Power Projects; regarding mineral and waste safeguarding, both of sites and resources. Throughout the project preparation information has been exchanged between the parties regarding these safeguarding issues. The Mineral Planning Authority welcomes the recognition of mineral safeguarding issues, contained within the PEIR.</p> <p>It is felt that Vattenfall should continue to work closely with the County Council with regard to mineral and waste planning issues.</p>	Norfolk Boreas Limited acknowledge need for ongoing consultation with Norfolk County Council with regards to the mineral and waste planning issues. Potential impacts on mineral resources can be found in section 19.7.4.7.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 19, Ground Conditions and Contamination	North Norfolk District Council	November 2018	This area of North Norfolk in particular has seen significant loss of cliff in recent years due to the effect of coastal processes with an increased risk to life and property including numerous buildings of heritage interest. It will therefore be important for Development Consent Order to give appropriate consideration to the potential for the project to be affected by and/or contribute to coastal change and to consider any public benefits that can be derived either as part of formal mitigation or as part of any wider community benefits to manage those adverse impacts in accordance with the adopted Shoreline Management Plan (SMP 6).	The potential impact of landfall works on the coastline are discussed in section 19.7.4.7.1. For coastal processes see Chapter 8 Marine Geology, Oceanography and Physical Processes.
Chapter 19, Ground Conditions and Contamination	Environment Agency	November 2018	We agree if any works are proposed within or close to SPZ1 further ground investigation and associated risk assessments should be undertaken. Further ground investigation and risk assessments should also be undertaken in those areas identified as being potentially contaminated (as determined in the PRA). In those areas where piling is proposed, piling risk assessments will need to be undertaken to demonstrate the works will not have a detriment impact on groundwater quality.	Commitment has been added as a mitigation measure section 19.7.4.4

Table 1.14 Feedback related to Water Resources and Flood Risk (Chapter 20 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 20, Water Resources and Flood Risk	Environment Agency	November 2018	Requested that mitigation measures are considered post completion of works to help water bodies achieve 'Good' status under the WFD. Highlighted that, should work result in the raising of ground levels, local flood risk should be considered and compensated for.	Enhancements to water bodies directly affected by the project will be considered as part of the reinstatement process, although due to the restrictions associated with the DCO process these will be limited to within the project red line boundary.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>Requested that careful consideration of the impacts upon the watercourse should be made when applying for the open trench crossings, and recommended that assessments should demonstrate that impacts will be kept to a minimum and crossings will be kept to the original standard, ideally with enhancement.</p> <p>An environmental permit for flood risk activities will be required for works in, under, over or within 8m of a fluvial main river/any flood defence structure or culvert/16m from a tidal main river/from any flood defence structure or culvert.</p> <p>Potential risks associated with other sources of flooding should be considered.</p>	<p>Considered in Sections 20.7.4.4 and 20.7.5.1 and Appendix 20.1.</p> <p>Details are provided in Section 20.7.4.1 addressing trench techniques and impacts upon watercourses. This will be included in the CoCP for consideration during the post-consent.</p> <p>Environmental Permits will be applied for post-consent.</p> <p>Considered in detail in Appendix 20.1.</p>
Chapter 20, Water Resources and Flood Risk	Norfolk County Council	November 2018	<p>It has not been determined what method of discharging surface water will be utilised in the final design and no assessment of the current or proposed runoff rates has been undertaken.</p> <p>NCC would wish to see that drainage strategies contain maintenance and management plans detailing the activities required and who will adopt and maintain the surface water drainage features for the lifetime of the development.</p> <p>The project should consider the flood risk it could introduce elsewhere as well as to the development. Risk to any nearby properties should also be considered.</p> <p>There are many ordinary watercourses within the proposal area and these also have a flood risk associated with them</p>	<p>Site-specific methods for discharging surface waters will be confirmed during the post-consent design stage.</p> <p>Drainage strategies which include maintenance plans will be confirmed during the post-consent design stage.</p> <p>Considered in Sections 20.7.4.4 and 20.7.5.1 and Appendix 20.1.</p> <p>Considered in Sections 20.7.4.4 and 20.7.5.1 and Appendix 20.1.</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>(equivalent to flood zone 2 and 3) as defined by the Environment Agency online Flood Map for Planning, which are not shown on the EA map. This should be considered and all sources of flooding should be assessed.</p> <p>Where the proposals involve works to any ordinary watercourse (temporary or permanent) a consent will be required. The number of these, where applicable, should be determined and applications for block, or phased consents should be made to the appropriate authority, including the flood and water management team at NCC or the Internal Drainage Board. Environmental permits/consents will likely be required for crossing points over ditches and watercourses.</p> <p>The Methodology for any temporary construction at crossing points shall be agreed with the EA and relevant Local Authority. Management techniques will be required to mitigate surface water flooding at the location of the National Grid substation extension.</p> <p>Original flow rates to be maintained to ensure flood risk is not increased during the temporary damming/re-routing of watercourses during onshore cable corridor construction.</p> <p>Confirmation of the minimum depth of cables beneath watercourses is required.</p>	<p>Necessary permits and consents will be obtained post-consent in consultation with the Environment Agency, LLFA and Internal Drainage Board (IDB).</p> <p>A detailed methodology will be prepared during the post-consent design stage and agreed with the Environment Agency and Lead Local Flood Authority (LLFA).</p> <p>Addressed in Sections 20.7.4.4 and 20.7.5.1 and Appendix 20.1.</p> <p>Minimum depth clarified in Sections 20.7.2 and 20.7.4.1. The cable will be a minimum of 2m below the bed at all trenchless crossings and</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>Post-construction, watercourses should be reinstated to pre-construction channel depths and bank slopes.</p> <p>Mitigation of the existing flood risk at key crossing points during the construction phase should be managed.</p> <p>Construction work located within Flood Zone 2 or 3, or within proximity to an ordinary watercourse should undertake suitable risk assessments.</p> <p>Consideration regarding signing up to Met Office weather alerts required for Ordinary Watercourses. This risk of creating a 'conduit' should be considered when assessing any back-fill materials to the trench, and how this could affect the local flow routes. The surface water drainage requirements for the permanent compounds will be dictated by the final drainage study.</p> <p>There is no assessment of the current and proposed runoff rates to determine the surface water attenuation requirements for the sites in line with The SuDS Manual (2015), which should indicate that the flow rate discharged from the sites must not exceed that prior to the proposed development for the 1 in 1 year event; 1 in 30 year event; and 1 in 100 year event. The sites have not yet been assessed against a 'greenfield' baseline, assumed to be 100% permeable surfacing. Further information should be requested to be provided at design stage.</p>	<p>minimum 1.5m below bed level at trenched crossings.</p> <p>The reinstated channel will have at least the same capacity as the pre-construction channel to prevent impacts on flood risk, although bank profiles may vary according to the agreed scope of environmental enhancements.</p> <p>Addressed in Sections 20.7.4.4 and 20.7.5.1 and Appendix 20.1.</p> <p>Addressed in Sections 20.7.4.4 and 20.7.5.1 and Appendix 20.1.</p> <p>Addressed in Sections 20.7.4.4 and 20.7.5.1 and Appendix 20.1.</p> <p>Site-specific methods for discharging surface waters will be confirmed during the post-consent design stage.</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			At present, it has not been determined what method of discharging surface water will be utilised in the final design and no assessment of the current or proposed runoff rates has been undertaken. The County would also wish to see that any drainage strategies contain maintenance and management plans detailing the activities required and who will adopt and maintain the surface water drainage features for the lifetime of the development.	Addressed in Sections 20.7.4.4 and 20.7.5.1 and Appendix 20.1.
Chapter 20, Water Resources and Flood Risk	Burgh and Tuttington Parish Council	November 2018	Concerns raised regarding changes in sediment levels in King's Beck or other factors which might affect its flow or flooding downstream, and the introduction of pollutants into King's Beck which pass downstream.	Impacts associated with increased sediment supply are discussed in Sections 20.7.4.2 and 20.8.2.2. Impacts associated with the release of contaminants are assessed in Sections 20.7.4.3 and 20.8.2.2. Impacts on flood risk are discussed in sections 20.7.4.4 and 20.7.5.1 and Appendix 20.1.
Chapter 20, Water Resources and Flood Risk	Anglian Water	November 2018	Reference is made to a number of groundwater source protection zones (SPZs) located within the onshore project area. It is essential to protect the aquifer and Anglian Water's existing assets from contamination from any activities that might cause pollution. Anglian Water are currently in dialogue with Vattenfall and their appointed consultants regarding the proposed crossings of groundwater Source Protection Zones which include public water supplies in Anglian Water's ownership within the onshore cable route. Anglian Water have previously requested that the Environmental Report for the above project includes reference to all potential sources of flooding including sewer flooding. We welcome the inclusion of reference to sewer	Potential impacts on groundwater and SPZs are considered in Section 20.7.4.3.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>flooding in the Flood Risk Assessment as part of the above report.</p> <p>Reference is made to potential foul and surface water connections to public sewerage for the proposed substation site - a preferred option for the proposed method of drainage has yet to be identified. Anglian Water would welcome further discussion about any required connection(s) to the public sewerage network for the substation sites or as part of the construction phase. In relation to surface water disposal, regard should be had to Anglian Water's Surface Water Drainage Policy¹ which specifies the circumstances in which we would agree a surface water connection to the public sewerage network. Anglian Water would wish to be involved in the development of proposed Surface Water Management Drainage Plan where it interacts with the public sewerage network.</p>	<p>Requirements for foul and surface water connections at the project substation will be confirmed through consultation with Anglian Water during the post-consent design stage.</p>
Chapter 20, Water Resources and Flood Risk	Canal & River Trust	November 2018	The Trust has reviewed the proposals, and on the basis that they appear unlikely to have any impact on waterways under their jurisdiction they have no comment to make at this time.	No response required.

Table 1.15 Feedback related to Land Use and Agriculture (Chapter 21 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 21, Land Use and Agriculture	ESP Utilities Group Ltd	November 2018	<p>I can confirm that ESP Gas Group Ltd has no gas or electricity apparatus in the vicinity of this site address and will not be affected by your proposed works.</p> <p>ESP are continually laying new gas and electricity networks and this notification is valid for 90 days from the date of</p>	<p>Potential impacts on Utilities has been assessed in Sections 21.7.4.6 and 21.7.5.4. There will be ongoing consultation with all Utilities providers in the area as required through the post-consent</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			this letter. If your proposed works start after this period of time, please re-submit your enquiry.	and detailed design phase, prior to construction. Norfolk Boreas Limited would undertake utility crossings in accordance with industry standard practice as agreed with the utility owners. The continuity of water supplies during the construction works would be ensured.
Chapter 21, Land Use and Agriculture	Harlaxton Gas Networks Ltd.	November 2018	Harlaxton Gas Networks Ltd. at this time has no assets in the area, and will not be implementing any in the near future, therefore Harlaxton has no comment to make on this project.	See above response
Chapter 21, Land Use and Agriculture	National Grid	November 2018	Electricity Transmission National Grid Electricity Transmission has a high voltage electricity overhead transmission line and a high voltage substation within the onshore scoping area. The overhead line and substation form an essential part of the electricity transmission network in England and Wales. Overhead Lines <ul style="list-style-type: none"> • 4VV (400kV) overhead line route - Norwich Main to Walpole 1 • Norwich Main to Walpole 2 Substation <ul style="list-style-type: none"> • Necton (400kV) Substation 	See above response
Chapter 21, Land Use and Agriculture	National Grid	November 2018	Gas Transmission National Grid Gas has high pressure gas transmission pipelines and gas terminal located within or in close proximity to the onshore scoping area. The transmission	See above response

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>pipelines form an essential part of the gas transmission network in England, Wales and Scotland:</p> <p>Gas Transmission Pipelines:</p> <ul style="list-style-type: none"> • Feeder Main 02 - Bacton to Brisley/ Wisbech Nene West • Feeder Main 03 - Bacton to Roudham Heath • Feeder Main 05 - Bacton to Yelverton 	
Chapter 21, Land Use and Agriculture	National Grid	November 2018	We would request that the potential impact of the proposed scheme on National Grid's existing assets as set out in our response is considered in any subsequent reports, including the Environmental Statement, and as part of any subsequent application.	See above response
Chapter 21, Land Use and Agriculture	BPA	November 2018	Your proposed works cross the high-pressure gas and gas condensate pipeline systems operated by BPA. Previous consultation responses regarding the Norfolk Vanguard Offshore Wind Farm (2018/0182) mentioned that the works also affected the Great Yarmouth Line (GYPL) on sheet 4 of 18 DWG No 57980-1AG-700-019, however since October BPA no longer maintain this line with all responsibilities transferred to Penspen.	See above response
Chapter 21, Land Use and Agriculture	Anglian Water	November 2018	There is existing water and water recycling assets in Anglian Water's ownership located within the onshore cable area as outlined in the consultation documentation. It is understood that the Norfolk Boreas Offshore Windfarm could come forward together with Norfolk Vanguard Offshore Windfarm or as a separate project. We would expect any requests for alteration or removal of foul sewers or water mains to be conducted in accordance with the Water Industry Act 1991	See above response
Chapter 21, Land Use and Agriculture	Anglian Water	November 2018	We have previously requested that the Environmental Report for the above project includes reference to Anglian Water's existing water and water recycling infrastructure.	See above response

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			We welcome the inclusion of reference to existing utility infrastructure including that owned by Anglian Water located within onshore cable route.	
Chapter 21, Land Use and Agriculture	Burgh and Tuttington Parish Council	November 2018	<p>I would like to formally register with you our interest in the Norfolk Boreas project through this consultation process and to outline the concerns of the residents in the parish of Burgh and Tuttington. These concerns are:</p> <ol style="list-style-type: none"> 1. Traffic disruption in the roads and lanes around Colby and Banningham. 2. Changes in sediment levels in King's Beck or other factors which might affect its flow or flooding downstream. 3. Introduction of pollutants into King's Beck which pass downstream. 4. Any of the above or any other factors which might have a deleterious impact on local industrial activity (principally agriculture) or on the local natural environment affecting living species within or adjacent to King's Beck. <p>Consequently, if during the course of the work any of the above factors come into play - especially those which significantly alter the risks assessed in your documentation - we would like to be informed by you to enable us to consult further with our residents.</p>	Potential impacts and proposed mitigation on Traffic are discussed in Chapter 24 Traffic and Transportation. Potential impacts on flood risk and pollutants are discussed in Chapter 20 Water Resources and Flood Risk, this is also assessed in the Flood Risk Assessment (FRA) in Appendix 20.1. Any potential effects on the local agricultural industry have been assessed in Section 21.7, in particular, Section 21.7.4.2. Any potential effects to the local natural environment and living species are discussed and assessed in Chapter 22 Onshore Ecology.
Chapter 21, Land Use and Agriculture	National Farmers Union	November 2018	The PIER under Chapter 21 Land Use and Agriculture highlights on page 40 that field drainage will be affected during construction and states that field drains will be truncated during excavation and installation. We would like to see greater detail of how field drainage will be treated during construction and post works. For the wording to be agreed with LIG and for this to be included in the Code of Construction under the draft DCO. The	Potential impacts on drainage and associated mitigation measures are discussed in section 21.7.4.1. This includes the provision of a specialist drainage contractor to provide mapping and figures where appropriate prior to and

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			landowner will want full engagement on this level of detail and the ability to use a preferred drainage expert.	<p>post construction, to identify field drains and ensure their protection during construction.</p> <p>Handling and protection of soils and drainage systems will be managed through the Soil Management Plan, which will be included within the Code of Construction Practice (CoCP). An outline CoCP (DCO document 8.1) has been submitted as part of the DCO application.</p>
Chapter 21, Land Use and Agriculture	National Farmers Union	November 2018	The PEIR states that the minimum depth of cables would be 1.05 metres. Please be advised that a depth of 1.20 metres is the minimum that can be accepted otherwise the cable will interfere with deep farming operations, the growing of certain crops and interaction with land drains. We note it has been stated that the cables will be laid in accordance to National Grid UK Power Networks ECS 02-0019.	Norfolk Boreas Limited have committed to burying the ducts up to 1.20m in ground which is used for “deep ploughing”. Table 5.40 in Chapter 5 Project Description makes this commitment which will be taken forward to the DCO application.
Chapter 21, Land Use and Agriculture	National Farmers Union	November 2018	It is noted that a running track up to 8 metres wide may be required on a scenario 2. Please confirm why this width is required. The construction is noted, however there does not appear to be any provision for drainage. How do Vattenfall propose to deal with run off from the running track?	The running track, as described in Chapter 5 Project Description, will be limited to 6m width, which is the minimum distance required for two construction vehicles to pass. A separation of 2m is maintained from the edge of the running track and the trench for safety, drainage and duct storage prior to pulling.
Chapter 21, Land Use and Agriculture	National Farmers Union	November 2018	The PEIR indicates that link boxes will be required and the locations of the link boxes will be required at	These points are noted. Chapter 5 Project Description states that: “where possible, link boxes would

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>approximately 5km intervals along the onshore cable route. It states that link boxes would either be buried under ground, or alternatively, above ground link box cabinets may be installed with maximum dimension of 1.2m x 0.8m x 1.8m. Link boxes interfere with agricultural operations on a day to day basis and so every effort should be made for these to be located in field boundaries. LIG would like to see that all link boxes are buried underground with manhole covers and for these to be as close to the ground surface as possible.</p>	<p>be located close to field boundaries and in accessible locations". Given the current level of design detail at this stage of the project it is not possible to provide further information regarding the location and design of link boxes that may be required.</p>
Chapter 21, Land Use and Agriculture	National Farmers Union	November 2018	<p>There have been some discussions with landowners with regard to access points across holdings from the road network to the onshore cable route corridor for Vanguard and it is understood that the same access points will be used for Boreas. Further negotiations with landowners are required as some access points are not viable.</p>	<p>It is a correct statement that the same accesses will be used for the Norfolk Vanguard and Norfolk Boreas projects. There are a number of accesses that have been identified in the land plans for both cable pulling construction access and ongoing future maintenance and emergency access purposes. Affected land interests have been consulted on these accesses since September 2017.</p>
Chapter 21, Land Use and Agriculture	National Farmers Union	November 2018	<p>There have been no discussions or details of how landowners will be able to cross the working corridor to gain access to their other land if it has been land locked due to the presence of the corridor. Further consultation is required.</p>	<p>Norfolk Boreas Limited wish to clarify that during both the informal and formal stages of consultation a detailed Land Pack was issued to all affected land interests in June 2017 and March 2018 which contained a number of detailed Q&As relating to the project. This land pack was also</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				made available online on the project website.
Chapter 21, Land Use and Agriculture	National Farmers Union	November 2018	There is considerable concern over EMF and the impact on health. The PEIR is unclear what additional mitigation Vattenfall will be undertaking at the crossing point with Orsted if Orsted use HVAC. Further clarification needed. Greater detail is also required on potential interference on Soil Sense Technology, RTK and other agricultural software.	The analysis of potential EMF effects, undertaken by National Grid for Vattenfall Wind Power Limited and Ørsted, is presented in two documents that are available on the Vattenfall website. These documents are: Vattenfall EMF-information sheet 4 Vattenfall- Ørsted EMF information sheet 5 Potential impacts associated with EMF are considered in Chapter 27 Human Health.
Chapter 21, Land Use and Agriculture	National Farmers Union	November 2018	Greater clarity is required on how the soils are to be treated, what is the weed control programme, how will the soils be stored, under what conditions will you undertake reinstatement, how do you propose to reinstate? What topographical and geological analysis will be undertaken? What aftercare programme will be set up? Due to the diverse range of soil types confirmation is required that the land will be worked on in the appropriate conditions ie. working on heavier land in the Summer months and lighter land in Spring and Autumn. This will ensure that the land is reinstated and given the best opportunity to recover following the works. We understand re-instatement will be phased in line with duct installation, please confirm.	Under Scenario 1 there would be very limited impact to soils as the ducts will already have been installed by Norfolk Vanguard. Under Scenario 2 each 150m (circa) section of duct installation along the cable route would take approximately one to two weeks to complete and the land above the ducts reinstated, thus giving soil the best opportunity to recover. At this stage of the project, Norfolk Boreas have made no commitment to working on different sections of the cable route during different seasons.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				<p>Norfolk Boreas Limited have made a commitment to providing a SMP which will form part of the CoCP, an outline of which (DCO document 8.1) has been submitted as part of the DCO application. This document would then be finalised post consent and agreed with the relevant local authorities.</p> <p>An aerial photogrammetry topological survey of the onshore cable route was undertaken in February 2017. Geological boreholes have been conducted at proposed trenchless crossing locations along the cable route and desktop research of other relevant geological data along the cable route has been conducted. Further geological surveys will be undertaken as part of pre-construction surveys as necessary.</p>
Chapter 21, Land Use and Agriculture	National Farmers Union	November 2018	Recent field trials have shown that cereal crops have a root depth in excess of a metre. What will be the impact of the cables be on growing crops?	Potential Impacts on crops along the onshore cable route during operation are assessed in section 21.4.5.2.1
Chapter 21, Land Use and Agriculture	National Farmers Union	November 2018	There are a number of HDD points along the route and greater clarification is sought on the procedures to be adopted to respond to any drilling fluid breakout.	Drilling fluids will be of an inert form, typically bentonite or similar which is a mixture of mainly water and a small percentage of natural clays, to minimise the impact of any breakout. Chapter 20 Water

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				Resources and Flood Risk details outline mitigation measures to manage the accidental release of contaminants during construction. Further details, including method statements to manage drilling fluid breakout, will be provided within a final CoCP. An outline CoCP (DCO document 8.1) has been submitted as part of the DCO application.

Table 1.16 Feedback related to Onshore Ecology (Chapter 22 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 22, Onshore Ecology	Natural England	December 2018	Ongoing issues for Vanguard Terrestrial Ecology: <ul style="list-style-type: none"> • River Wensum SAC – further information required • Paston Great Barn SAC – further information required Norfolk Valley Fens SAC – further information required	Issues raised in relation to the Norfolk Vanguard HRA have been considered within the Norfolk Boreas HRA. The findings of the Norfolk Boreas HRA are summarised in section 22.7.
Chapter 22, Onshore Ecology	The Forestry Commission	December 2018	We are aware that the proposers have used the Horlock Rules and that the route endeavours to avoid passing through ancient woodland and other woodland and trees. However, there are places where it skirts the boundaries of ancient woodland and consideration of potential impacts of the cabling process also needs to be considered and any mitigations measures which might be required at certain locations. We have looked at the PIER (<i>sic</i>) and see quite a lot about landscape impact, but not so much about physical impact on the ancient woodlands which we acknowledge are few on the route.	The onshore project area will stay at least 15m from all ancient woodlands, as per Forestry Commission guidance (Natural England and Forestry Commission, 2014). Potential impacts upon ancient woodlands are considered in in section 22.7.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 22, Onshore Ecology	The Forestry Commission	December 2018	<p>Little Wood to the North West of Dereham Map 19 and 20 of 22 does appear to be impacted, the route runs through the southern edge between Little Wood and Old Carr, however any damage to this small area of ancient woodland may make it unviable, a better option would be to move the route to the north of the wood, on the map it doesn't appear to require much of a re-route, this would mean that the two woods could be buffered at some future date to offer greater climate change resilience. The Standing Advice provides detail on considerations such as impact of noise, dust, changes to water table to name three, any buffering with new plantings might help mitigate this prior to commencement of construction Whilst Necton Great Wood appears far enough away from the sub-station development (500metres) to suffer few impacts there is an opportunity to link the smaller woods nearby with some judicious planting this would provide some wildlife corridors as well as screening. We have not examined any mitigation proposals associated with this scheme only what is in the PIER.</p>	<p>Route selection at Little Wood / Old Carr has been undertaken to specifically avoid ancient woodland. In this location, as was no viable alternative route available, the project intends to use trenchless techniques to install the cable beneath these ancient woodlands. Potential impacts on ancient woodland is considered in in section 22.7.</p>
Chapter 22, Onshore Ecology	Norfolk County Council	December 2018	<p>The ecological baseline information provided in Chapter 22 of the PEIR for the Boreas project is essentially the same as that in the PEIR and DCO submission for the sister Vanguard project, although some additional ecological surveys are described that were undertaken in 2018. The Natural Environment Team are supportive of the approach taken with regards to ecology and agree the baseline data presented in the current PEIR is appropriate. It is noted that in some locations, survey access was not possible in either 2017 or 2018, and surveys in these areas will be required in due course.</p> <p>As with the Vanguard project, some mitigation for ecology is embedded through design (summarised in Tables 22.22 and 22.23 of Chapter 22 of the PEIR) and some will be achieved through the Outline Landscape and Ecological Management</p>	<p>No action required.</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			Plan which will be submitted with the DCO submission. We are supportive of this approach.	
Chapter 22, Onshore Ecology	Environment Agency	December 2018	<p>22.2.3.3 A Green Future: Our 25 Year Plan to Improve the Environment 2018 This has been incorporated into many elements of the project however it should also be extended to achieving 'net gain' in priority habitat rather than just an aspiration to avoid net loss. For example, additional pollinator corridors could be planted to link other habitat in the ecological network which is aligned with the National Pollinator Strategy.</p> <p>Other options could involve partnership with the EA on the River Wensum restoration project. This is an ongoing project to restore the River Wensum SSSI/ SAC/ SPA. This could include floodplain reconnection, installation of woody debris, creation of berms and tree planting.</p> <p>Enhancements such as these will help ensure that there is no net loss of biodiversity and contribute to the government's target of leaving the environment in a better state than when we found it.</p>	River enhancements at water crossing locations are discussed within Chapter 20 Water Resources and Flood Risk, and summarised in section 22.7.
Chapter 22, Onshore Ecology	Environment Agency	December 2018	<p>22.7.5.17: Impact 17: Fish</p> <p>If using open-cut trenching at Reephams Stream and Booton Watercourse, we would like to see riverine habitat improvements (such as installing gravel riffles or shallow bays) used in conjunction with the existing mitigation plan listed for brown trout and bullhead. These improvements could potentially create new or improve the existing spawning habitat, providing a net gain for biodiversity.</p>	River enhancements at water crossing locations are discussed within Chapter 20 Water Resources and Flood Risk, and summarised in section 22.7.

Table 1.17 Feedback related to Onshore Ornithology (Chapter 23 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 23, Onshore Ornithology	Natural England	November 2018	Due to Natural England's ongoing engagement with Norfolk Vanguard OWF examination and similarities between the sister projects, including the content of their Environmental Statements, we believe that it would be most beneficial to the project to take into account the evolving position on many key issues.	Norfolk Boreas has considered in the production of this ES the key issues raised with respect to onshore ornithology from the Norfolk Vanguard Relevant Representations (please see Appendix 23.5 for details).

Table 1.18 Feedback related to Traffic and Transport (Chapter 24 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 24, Traffic and Transport	Ingworth Parish Council	November 2018	Ingworth Parish Council noted concerns that an increase in traffic, particularly HGVs, through the village of Ingworth could weaken a 25 year old bridge with existing damage, already in need of work.	This is not a haul route for Norfolk Boreas
Chapter 24, Traffic and Transport	Norfolk County Council	November 2018	Norfolk County Council noted concerns over the delivery of materials and plant to the cable installation locations occurring between 7am and 7pm which goes against avoidance of traffic sensitive times on some key routes.	Traffic sensitive routes with time restrictions have been identified in the Outline Traffic Management Plan (OTMP) (document reference 8.8), with a commitment to avoid those sensitive periods.
Chapter 24, Traffic and Transport	Norfolk County Council	November 2018	Norfolk County Council noted that the PEIR indicated that the ES will incorporate a more detailed TA when submitted but in the meantime, the current methodology used to date is acceptable.	The ES contains a level of detail equivalent to a TA.
Chapter 24, Traffic and Transport	Norfolk County Council	November 2018	Norfolk County Council requested that the CTMP contains a specific commitment to managing HGV movements on any specifically identified adverse links. Norfolk County Council noted that since opening of the NDR, traffic flows have increased on the A1067. To inform the DCO submission, a survey of traffic flows has been requested by Norfolk County	The OTMP (document reference 8.8) contains the requisite commitments and sets out the proposed crossing technique for the A1067.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			Council to be undertaken on the A1067 during peak hours and an appropriate crossing method agreed.	
Chapter 24, Traffic and Transport	Norfolk County Council	November 2018	Norfolk County Council requested that the developer confirms any cumulative impacts associated with all three wind farm projects utilising the same access route to the compound at Oulton airfield. Norfolk County Council have stated that they are holding an objection until this issue has been suitably addressed.	A Cumulative Impact Assessment contained within Section 24.8 details a traffic management plan associated with these projects utilising the same access route to the compound at Oulton Airfield.
Chapter 24, Traffic and Transport	Norfolk County Council	November 2018	Norfolk County Council advised that Vattenfall liaises with Highways England and Norfolk County to ensure that the planned cable route does not prevent any future major road plans in the area (such as dualling of the A47(T)) and result in additional costs and/or delay to road schemes. Where diversion is required to the cable route as a result of highway works, VWPL will be responsible for upgrades or diversion costs.	Engagement with Highways England has established that Norfolk Boreas does not conflict with any future widening schemes. Section 24.8.1.1 details all future major road plans and how they interact with Norfolk Boreas.
Chapter 24, Traffic and Transport	Norfolk County Council	November 2018	Norfolk County Council advise that VWPL need to satisfy Highways England with regards to the safety of the proposed access at Necton onto the A47(T) and ensure Highways England assess the impact upon driver delay along the trunk road network.	A Substation Access Clarification Technical Note is contained in Appendix 24.33.
Chapter 24, Traffic and Transport	Norfolk County Council	November 2018	Norfolk County Council requested that cumulative effects of traffic movements on narrow roads are considered. Specifically, the impact of increased traffic movements on the villages of Cawston, Salle and Heydon should be assessed.	A Cumulative Impact Assessment (CIA) is set out in section 24.8.
Chapter 24, Traffic and Transport	The National Trust	December 2018	The National Trust advise that the restriction of roads to, and around the Blickling Estate are avoided so to mitigate the potential loss of business for the National Trust. Where this is unavoidable, potential visitor income loss should be underwritten by VWPL. The impact of the proposed development on the local road network should be considered both individually, and in combination with other proposed	The OTMP (document reference 8.8) contains measures specific to the Blickling Estate to mitigate the potential loss of business.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			wind farm developments such as Norfolk Vanguard and Hornsea Three.	
Chapter 24, Traffic and Transport	North Norfolk District Council	December 2018	North Norfolk District Council have advised that the timing of construction works will be critical to minimising adverse highway impacts due to peak tourism months and narrow country roads already limiting opportunities for larger vehicles to pass one another.	The OTMP (document reference 8.8) contains measures to ensure that the project's traffic can be safely accommodated on local roads ensuring minimal delay to road users. Timing restrictions on sensitive routes are also identified.
Chapter 24, Traffic and Transport	North Norfolk District Council	December 2018	North Norfolk District Council have advised that the likely adverse traffic impacts during the construction phase are properly captured and appropriately mitigated through Traffic Management Plans and Codes of Construction Practice. Specific consideration should be given to construction phasing and determining what will happen in the event of significant delay between first and second phases including construction compounds, temporary access routes and mobilisation works within North Norfolk.	The DCO application contains an OTMP (Document reference 8.8) that includes the proposed strategy for both duct installation and cable pulling phases.
Chapter 24, Traffic and Transport	Oulton Parish Council	December 2018	Oulton Parish Council have questioned whether the pilot scheme for routing traffic to and from the mobilisation and cable route 'The Street' is for all vehicles and how this can be achieved safely as the route is already used by agricultural vehicles.	A full Cumulative Impact Assessment is contained within Section 24.8. A number of mitigation measures have been proposed for 'The Street' and agreed with Norfolk County Council. Further details are provided in the OTMP (document reference 8.8).
Chapter 24, Traffic and Transport	Oulton Parish Council	December 2018	Oulton Parish Council questioned what mitigation measures have been considered for addressing the issue of large volumes of traffic passing a residential property; 'The Old Railway Gatehouse' as a result of Norfolk Boreas and Norfolk Vanguard. Specifically, Oulton Parish Council asked whether an alternative route will be considered to avoid passing the property.	A full Cumulative Impact Assessment is contained within Section 24.8. A number of mitigation measures have been proposed for 'The Street' and agreed with Norfolk County Council. Further details are provided in the OTMP (document reference 8.8).

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 24, Traffic and Transport	Burgh and Tuttington Parish Council	December 2018	Burgh and Tuttington Parish Council have raised concerns on the potential traffic disruption along the local highway network around Colby and Banningham.	The OTMP contains measures to ensure that the Project's traffic can be safely accommodated on local roads ensuring minimal delay to road users. Timing restrictions on sensitive routes are also identified.

Table 1.19 Feedback related to Noise and Vibration (Chapter 25 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 25 Noise and Vibration	North Norfolk District Council	November 2018	<p>Construction noise impacts and any complaint resolution will require comprehensive and well-resourced complaints procedures to resolve complaints and ensure the provision of suitable mitigation.</p> <p>In particular, the Swafeld Road area has been highlighted as being affected by the construction phase and assurances are sought on mitigation measures here.</p> <p>Operational noise impacts have been highlighted (as part of Norfolk Vanguard) which may also apply to Norfolk Boreas. Details of the effectiveness of mitigation measures should be submitted to enable assessment and comment in terms of both their term effectiveness and long-term maintenance.</p>	<p>The proposed working hours are committed to (save for essential, emergency or non-intrusive works): 0700 hours and 1900 hours Monday to Friday, and 0700 hours to 1300 hours Saturday, with no activity on Sundays or bank holidays. The construction working hours restrict the time that deliveries may be received at site, i.e. no deliveries would be received outside of the stated working hours. The control of deliveries is set out within the Outline Traffic Management Plan which requires contractors to use a booking system to limit deliveries to fixed timeslots.</p> <p>As part of the communication liaison process set out in the OCoCP (document reference 8.1) a complaints procedure will be</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				<p>established. Any complaints will be logged, investigated and, where appropriate, rectifying action will be taken. Should the complaints be related to construction noise then any investigation would likely include noise monitoring to determine any requirement for rectifying action.</p> <p>The operational noise mitigation will introduce standard mitigation measures to ensure that noise levels attributable to the operational substation do not exceed those limits set out in paragraph 109 and Table 25.2. This assessment demonstrates that standard commercially available noise mitigation is capable of achieving the noise reduction required.</p>
Chapter 25 Noise and Vibration	Oulton Parish Council	December 2018	<p>OPC would wish Vattenfall to note that all activities at both the Mobilisation and Cable Logistics Areas should be daytime working hours only and this should apply to all Vattenfall staff and contractors/sub-contractors. Vattenfall should be mindful of light and noise pollution especially at night as this is a very rural location, any light or noise will have a severe impact.</p>	<p>An outline Code of Construction Practice, which references working hours, is included as part of the DCO submission (DCO document 8.1). This states that onshore construction activities would normally be conducted during working hours of 7am to 7pm Monday to Friday and 7am to 1pm Saturdays. Evening or Saturday pm / Sunday working may be required to maintain programme</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				progress and for specific time critical activities such as trenchless drilling; however, these would be kept to a minimum and would be subject advance notification and approval by the relevant local planning authority.

Table 1.20 Feedback related to Human Health (Chapter 27 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 27, Human Health	Public Health England	November 2018	We have considered the submitted documentation and can confirm that we are satisfied with the approach taken in preparing the Environmental Statement (ES) and the conclusions drawn. We wish to make no further comment at this time.	No action required.

Table 1.21 Feedback related to Onshore Archaeology and Cultural Heritage (Chapter 28 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 28, Onshore Archaeology and Cultural Heritage	NCC HES	November 2018	Vattenfall/Norfolk Boreas Ltd and their heritage consultants (Royal HaskoningDHV) should continue to liaise with Norfolk County Council Environment Service, Historic England and other key stakeholders (e.g. AHOB, National Trust) regarding the potential physical impact on buried and above-ground archaeological remains. It is requested that this includes discussion of archaeological written scheme of investigation for the proposed mitigation measures prior to the production of the full Environmental Statement for the DCO application.	Consultation with Norfolk County Council (NCC) Historic Environment Services (HES), Historic England (HE) and other key stakeholders will continue beyond the DCO application and into the subsequent post-consent stages of the project, if consented. The Outline WSI (document reference 8.5) will be subject to agreement as part of this process.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 28, Onshore Archaeology and Cultural Heritage	National Trust	6 th December 2018 / PEIR (Section 42 Consultee Response)	The proposed on-shore underground cable route will pass through the Blickling Estate, which is owned by the National Trust. The estate extends to just over 1900 hectares. It includes a Grade I listed mansion and Grade II* Registered Park and Garden. The Trust is pleased to see that the proposed route would avoid the Registered Park and Garden and would not impact upon the setting of the listed mansion.	Noted. No action.
Chapter 28, Onshore Archaeology and Cultural Heritage	National Trust	6 th December 2018 / PEIR (Section 42 Consultee Response)	The applicant should work with the National Trust's Archaeologist and the County Council Archaeologist to achieve a suitable and appropriate methodology for the archaeological work to be undertaken on the Estate prior to the submission of a Development Consent Order application. This should include agreement regarding a Written Scheme of Investigation and proposed mitigation. The potential impact of development on archaeological remains in the Estate is very significant for the Trust. Our preference would be for long-term preservation of buried remains. Where excavation is necessary, the National Trust would like to ensure thorough preservation by record. The National Trust would also like to secure a method to ensure that this information is made available to visitors and the community in a way that enriches their experience and understanding of the Estate.	The Outline WSI (document reference 8.5) includes a commitment to consult with the National Trust in developing the programme of post-consent archaeology survey work anticipated to take place across relevant parts of the Blickling Estate. The final WSI will be submitted to and approved by the relevant planning authority in consultation with HE and NCC HES. Norfolk Boreas Limited welcomes working collaboratively with the National Trust's Archaeologist in this regard to ensure positive outcomes for both parties. It is envisaged that more detailed discussions will take place in the post-consent stages of the project once additional detail is known. The Applicant is committed to exploring options for delivering wider benefits for local communities. Opportunities for public engagement and involvement (where appropriate – for example, public open days and presentations) will be sought and can also be

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				discussed with the Trust in developing the programme of post-consent archaeology survey work anticipated to take place across relevant parts of the Blickling Estate. This level of detail would be agreed and included in the subsequent WSIs to be produced post-consent.
Chapter 28, Onshore Archaeology and Cultural Heritage	National Trust	December 2018	As a minimum requirement, the National Trust seeks to better understand and interpret the archaeology within its care and contextualise any buried remains within the wider historic and ancient landscape. In order to achieve a greater sense of knowledge in terms of the nature, date, location, extent and significance of the archaeology that will be impacted upon by the development, the corridor through the estate should first be subjected to geophysical survey. This will help locate potential buried remains and examine the extent of the cropmark remains as well as collate surface finds and artefacts which have been disturbed by modern agriculture and ploughing. Artefact recovery may also provide indicative dating for some of the known or unknown buried remains (Saxon cemetery sites, for example are often found by metal detecting and fieldwalking).	A priority archaeological geophysical survey (Appendix 28.2) has been undertaken which includes the acquisition of survey data within the relevant parts of the Blickling Estate. Additional geophysical survey (including the utilisation of alternative techniques, if/where relevant) will be considered within the post-consent stages of the project, as agreed with NCC HES and HE (i.e. as part of the initial informative stages of mitigation). Other surveys (metal detecting and field walking) will be undertaken post-consent as part of Norfolk Vanguard (or Norfolk Boreas under Scenario 2) at targeted locations and will be undertaken in discussion and agreement with NCC HES. Survey-specific WSIs will be produced and agreed post-consent. The Project is committed to working collaboratively with the National Trust and their Archaeologist in this regard, alongside NCC HES

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 28, Onshore Archaeology and Cultural Heritage	National Trust	December 2018	<p>On the basis of the geophysical results, a systematic trench evaluation should be conducted within the corridor of up to 5% of the total area, targeting specific anomalies and/ or blank spaces to test the nature, extent and date of the buried archaeological remains. The results of the geophysics and trench evaluation will help determine those areas in need of full excavation which will preserve by record any significant remains which will be lost or destroyed by the proposed development. The National Trust has a duty to investigate fully any significant remains and in line with this, it would be imperative to ensure that significant archaeological remains are excavated to a high standard and importantly, are excavated in their entirety where necessary. This would include, for example, if the corridor bisected a Bronze Age burial mound, then it would be essential to widen the excavation area to encompass the entire mound.</p> <p>The information above has been written as a basic guide to the National Trust archaeological requirements at Blickling and further consultation for any archaeological investigations should be sought, working in conjunction with the County Planning Archaeologist, the National Trust planning and archaeology consultants and the developer.</p>	A comprehensive project-wide programme of archaeological trial trenching will be undertaken within the post-consent phases of the project. Should archaeological remains of notable significance be encountered during the programme, they are to be considered on a case-by-case basis, in consultation with NCC HES and HE, and will be subject to recognised standard and bespoke approaches to archaeological mitigation (as set-out in the project-specific Outline WSI, (document reference 8.5).
Chapter 28, Onshore Archaeology and Cultural Heritage	HE	December 2018	Overall we are broadly supportive of the approach taken to the PIER. It is detailed and provides a thorough analysis of the historic environment in relation to this development. In particular there are good summaries of what has been identified to date and the approaches taken to produce initial impact assessments as required by the Environmental Impact Assessment (EIA) Directive (85/337/EEC) (as amended).	Noted. No action.
Chapter 28, Onshore Archaeology and Cultural Heritage	HE	December 2018	A number of phases of work have been completed to date in order to define and characterise the baseline conditions for the footprint of proposed development. This has included a Desk-Based Assessment (DBA), aerial photography and LIDAR	Noted. No action.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>surveys, a priority programme of geophysical survey work, and geoarchaeological monitoring of Ground Investigation works (Section 28.1, paragraph 5). We are pleased to see that the limitations of the approaches used to inform the baseline evidence are considered (paragraphs 66 & 67), and that it is stated that additional buried remains may be present that have not been identified through the approaches used to date. For example, magnetometry cannot readily identify waterlogged archaeological remains which if found would require specific recording, excavation and storage considerations to be utilised as well as the involvement of various specialists. It is also noted that intrusive (trial trench) evaluations will be carried out post-consent on the potential features identified as part of this work.</p>	
<p>Chapter 28, Onshore Archaeology and Cultural Heritage</p>	<p>HE</p>	<p>December 2018</p>	<p>In our response to the Scoping Application (letter June 2017, see Table 28.2 in Section 28.1) Historic England questioned the use of only one geophysics technique (magnetometry) to investigate the proposed footprint of the development onshore. The applicants have responded to this question with additional information (Table 28.2). We are satisfied that this technique forms the backbone of the survey carried out onshore, and that the need for any additional techniques will be considered on a case-by-case basis. However, we also note that no recommendations for further work have been made following the completion of the initial phase of priority geophysical survey work (Appendix 28.2).</p>	<p>Since the submission of the PEIR, an additional detailed magnetometry survey has been undertaken within the substation area and further informs this ES chapter (Appendix 28.8). The most appropriate methodology for archaeological geophysical survey on large linear schemes is the use of detailed magnetometry. The Applicant has committed to investigating further and alternative methodologies alongside additional magnetometer survey, where appropriate and warranted, based upon existing/future information in the post-consent stages of the project, as agreed with NCC HES and HE (i.e. as part of the initial</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				informative stages of mitigation). The application of any such methods will be included in a survey-specific WSI post-consent.
Chapter 28, Onshore Archaeology and Cultural Heritage	HE	December 2018	Section 28.7 discusses the potential direct and indirect impacts that may affect the heritage assets, which may include the physical damage and loss of archaeological remains, to changes to the setting of scheduled monuments and listed buildings. The potential impacts have also been summarised in Table 28.29 and 28.30 along with the proposed mitigation strategies that may be employed post-consent. The approaches summarised in these tables appear appropriate. It is our advice that the timetables needed to carry out these stages of work need to be considered carefully to allow the information generated at the evaluation stage to be reviewed so that it can be utilised to inform the subsequent phases of excavation and analysis. The timetables also need to be realistic to deal with the archaeology that may be present on site, factoring in additional time if complex and/or significant features are identified.	Reference to post-consent timeframes are included within the Outline WSI (document reference 8.5). The overarching practicalities regarding such timeframes are acknowledged and will inform subsequent survey-specific WSIs and mitigation related WSIs post-consent, as/where relevant.
Chapter 28, Onshore Archaeology and Cultural Heritage	HE	December 2018	It is noted that ground works associated with the project have the potential to directly impact on non-designated assets if an appropriate mitigation strategy is not employed. However, programmes of avoidance by means of route-refinement and micro-siting will primarily be utilised where possible (paragraph 130), with agreed measures being employed where heritage remains cannot be avoided (paragraph 131 and Tables 28.13 & 28.14). We are pleased to see that avoidance will form the centre of the proposed mitigation strategy. The approaches that will be used to evaluate and assess heritage assets that cannot be avoided are summarised in paragraph 144 and include archaeological trial trenching, set-piece excavation, strip, map and sample excavations and watching briefs.	Noted. No action.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 28, Onshore Archaeology and Cultural Heritage	HE	December 2018	Section 28.7.5 presents the potential impacts during the construction phase of works in terms of the direct and indirect impacts. We agree that the magnitude of effect of direct impacts on buried archaeological remains during the construction phase could range from negligible to high, and that additional assessments will be needed to define the appropriate mitigation strategy. As previously stated, known or suspected features of high heritage significance will be avoided where possible. However, it may not be possible to avoid some features. It is stated in paragraph 166 that where assets cannot be avoided additional mitigation methods will be employed post consent on a case-by-case basis, including geophysical surveys, trial trench evaluation and further assessments. The approaches used will be presented in an outline WSI post-consent and discussed with Historic England. We feel that this approach is sensible and appropriate, but as stated above, the timetables of any excavation and post-excavation works carried out post-consent will need to be carefully considered to allow sufficient time to review the evidence and incorporate the findings into the subsequent phases of assessment and should be set out in the ES.	As above, reference to post-consent timeframes are included within the Outline WSI (document reference 8.5). The overarching practicalities regarding such timeframes are acknowledged and will inform subsequent survey-specific WSIs and mitigation related WSIs post-consent, as/where relevant.
Chapter 28, Onshore Archaeology and Cultural Heritage	HE	December 2018	We agree that there is potential for previously unrecorded buried archaeological remains to exist in the footprint of the onshore project substation (paragraph 170), and that the area will be investigated further post-consent. We are also pleased that the potential moated site noted at the National Grid substation will be largely avoided, with the exception of the more peripheral looking ditches to the south of the main moated site (paragraph 172). It should be noted that ditches have the potential to preserve deposits conducive to organic preservation, such as wood, leather and palaeoenvironmental remains; this will need to be considered	The Outline WSI (document reference 8.5) sets out a broad mitigation strategy for post-consent geoarchaeological assessment and palaeoenvironmental survey. This approach will inform any subsequent post-consent survey-specific WSIs / mitigation related WSIs, as and where required.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			when developing the mitigation strategy for this area of the proposed development.	
Chapter 28, Onshore Archaeology and Cultural Heritage	HE	December 2018	We are pleased to see a discussion has been included regarding the impact that the proposed development may have on wetland deposits in terms of changes to hydrology and the desiccation of deposits that may preserve waterlogged archaeological remains (Section 28.7.5.4.1). A programme of geoarchaeological watching briefs has been carried out at key locations (Happisburgh landfall and the proposed trenchless crossing locations at Wooden Copse, North Walsham and Dilham Canal, Kings Beck and Wendling Beck, which demonstrated a negligible to minor adverse impact (paragraph 243). It is stated that any impacts will be mitigated through a programme of geoarchaeological assessment and palaeoenvironmental surveys, which will be established post-consent (paragraphs 244 & 248). This approach seems sensible and appropriate and should be provided for through the draft Development Consent Order.	Noted. As above, the Outline WSI (document reference 8.5) sets out a broad mitigation strategy for post-consent geoarchaeological assessment and palaeoenvironmental survey. This approach will inform any subsequent post-consent survey-specific WSIs / mitigation related WSIs, as and where required.
Chapter 28, Onshore Archaeology and Cultural Heritage	HE	December 2018	Appendix 28.2: Geophysics report (part 1) This document presents the results of the magnetometry survey that was carried out as part of the priority archaeological geophysics survey used to inform the baseline evidence for the footprint of the development. A total of 127 surveys were carried out that identified 20 distinct areas of clear archaeological activity as well as numerous other locations interpreted as being of possible archaeological potential. In general, the report covers the main points required within a geophysics report, but it does not include any recommendations for further work. For example, should any areas be surveyed using alternative techniques, either because ambiguous or a lack of information was obtained following the magnetometer survey or because it would help improve our understanding about the nature, extent and complexity of a site. Additional survey work may also aid the development of	The application of alternative geophysical survey techniques is considered in section 28.5.3, Appendix 28.8 and the Outline WSI (document reference 8.5).

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			appropriate mitigation or avoidance strategies. We consider this a relevant matter for elaboration in any ES subsequently produced for this proposed project.	
Chapter 28, Onshore Archaeology and Cultural Heritage	HE	December 2018	Appendix 28.2: Geophysics report (part 1) Section 3.2 mentions Illustration 2 -43 that present the processed greyscale magnetometer data, interpretive illustrations and geology data, but these figures do not appear to have been included as part of the PEIR documents.	Noted. These figures are included within Appendix 28.2 and will be submitted as part of the DCO application.
Chapter 28, Onshore Archaeology and Cultural Heritage	HE	December 2018	Appendix 28.2: Geophysics report (part 1) Section 1.2 summarises the geology of the survey areas but does not mention the suitability of the chosen technique for the given geology. It is stated in Section 4 that the reliability of the results over alluvial and colluvial, and over glacial sand and gravels is less clear, and so it would be useful to include a statement with recommendations about whether additional techniques should be utilised to fill in any gaps within the survey and explained within the outline WSI prepared to accompany any subsequent application.	As above, the application of alternative geophysical survey techniques is considered in section 28.5.3, Appendix 28.8 and the Outline WSI (document reference 8.5).
Chapter 28, Onshore Archaeology and Cultural Heritage	HE	December 2018	Appendix 28.3: Geoarchaeological watching brief report: GI works (Phase 1) A programme of geoarchaeological monitoring of Ground Investigation works was employed at the landfall sites (L1A and L1B) at the coast and at seven crossing locations where the proposed cable route interests major transport routes or waterways where HDD methods will be utilised. The assessment identified glacial and early Pleistocene deposits in all of the sample locations. It was noted that CF-bF deposits were not encountered, but if present they would likely be [at] considerable depth. The results have been linked to the work of the Ancient Human Occupation of Britain project (AHOB), which has carried out a series of investigations in and around Happisburgh. We are pleased to see such detail included which help to place the results of the work into context.	Noted. No action.

Table 1.22 Feedback related to Landscape and Visual Impact Assessment (Chapter 29 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 29, Landscape and Visual Impact Assessment	Norfolk County Council	November 2018	<i>'We note the "layering" approach which is being employed of proposed hedge, nurse woodland and core woodland, and when combined with existing vegetation and landscaping is likely to create a more natural appearance than large blocks of woodland would otherwise create. Whilst removal of vegetation is not explicitly depicted on the plans, there are areas of replacement hedge shown which are minimal.'</i>	Hedgerows which are temporarily removed to enable the construction of the project will be reinstated where possible. Mitigation planting around the onshore project substation and National Grid substation extension would result in a substantial net increase, despite small area of vegetation removal.
Chapter 29, Landscape and Visual Impact Assessment	Norfolk County Council	November 2018	<i>'It is noted that the LVIA has been carried out using methodology by OPEN which accords with the Landscape Institute GLVIA 3 guidance. Where the OPEN methodology diverges from the GLVIA 3 guidance, reasoned justification has been given. This is namely in choosing not to combine the magnitude of change rating for the size or scale of effect, its geographical extent and its duration and reversibility. The choice to not combine seems appropriate for the proposals and is well justified in the methodology. The study area has been defined as 3km radius from the outer edge of the onshore project substation and a 500m strip either side of the cable route and associated access and mobilisation areas. This appears a suitable study area and will be effective in assessing the potential landscape and visual impacts.'</i>	Noted.
Chapter 29, Landscape and Visual Impact Assessment	Norfolk County Council	November 2018	<i>'It is understood that two proposals are being considered for the EIA, the first where Norfolk Vanguard proceeds to construction and therefore Norfolk Boreas is able to use infrastructure already installed, and a second where Norfolk Vanguard does not progress and therefore Norfolk Boreas will need to undertake all works as required. The assessment also considers the Cumulative Impacts of potential other projects including the National Grid substation extension and</i>	Noted.

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p><i>the Hornsea Project.</i></p> <p><i>The viewpoint assessment includes a number of visualisations which accord with SNH's Visual Representation of Wind Farms Version 2.2 2017, which is endorsed by the Landscape Institute and considered the preferable guidance.'</i></p>	
Chapter 29, Landscape and Visual Impact Assessment	North Norfolk District Council	November 2018	<p><i>'In respect of relevant Local Policy and material planning considerations, in 2018 North Norfolk District Council commissioned two new studies:</i></p> <p><i>a) revised Landscape Character Assessment (LCA); and</i></p> <p><i>b) a new Landscape Sensitivity Assessment (LSA) (with particularly reference to renewable energy and low carbon development).</i></p> <p><i>Both of these documents have been published in final form and represent the most up to date and accurate assessment, based on current best practice. Public consultation on these documents is expected to take place in Feb/Mar 2019 with adoption as SPD in Spring/Summer 2019.</i></p> <p><i>Whilst NNDC recognise that much of the work from the Vanguard proposal will likely inform Boreas, reference within the PEIR to the older NNDC Landscape Character Assessment document should be cross referenced against the new LCA and LSA and, if/where there is conflict, then the most up to date evidence should be used to inform the assessment of impacts on landscape character and visual impacts within North Norfolk and to inform appropriate mitigation strategies.'</i></p>	The new LCA and LSA documents are referenced at section 29.6.2 and in Appendix 29.2 Existing Environment. The onshore cable route is the only component of the project that would occur within the North Norfolk District and owing to the relatively small scale of the construction works, even considering Scenario 2, the change would not be of sufficient magnitude to redefine the character of the landscape character areas which the onshore cable route passes through. In terms of mitigation, the majority of hedgerows removed would be replaced the first winter after construction.
Chapter 29, Landscape and Visual Impact Assessment	North Norfolk District Council	November 2018	<p><i>'Consideration will also need to be given to the timing of enhancement/mitigation works, linked to the two different scenarios in relation to the Vanguard windfarm.'</i></p>	In respect of Scenario 1, the implementation of the Norfolk Vanguard and Norfolk Boreas mitigation planting would be phased following an integrated approach

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				with advanced planting established where practicable.
Chapter 29, Landscape and Visual Impact Assessment	Natural England	November 2018	<i>'Seek confirmation that there will be no temporary closures of ECP (England Coastal Path) during construction, operation or decommissioning.'</i>	There will be no temporary closure of the Coastal Path.
Chapter 29, Landscape and Visual Impact Assessment	National Grid	November 2018	<i>'If a landscaping scheme is proposed as part of the proposal, we request that only slow and low growing species of trees and shrubs are planted beneath and adjacent to the existing overhead line to reduce the risk of growth to a height which compromises statutory safety clearances.'</i>	All mitigation planting has been kept clear of the wayleaves associated with the existing overhead lines and overhead line modification works.

Table 1.23 Feedback related to Tourism and Recreation (Chapter 30 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 30, Tourism and Recreation	Norfolk County Council (NCC)	November 2018	This chapter of the PEIR describes appropriate mitigation for impacts on PRoWs. As with the Vanguard project, mitigation for potential impacts will be addressed through and Outline Code of Construction Practice which will be agreed in consultation with NCC and all relevant stakeholders as part of the final Development Consent Order (DCO) submission.	Public Rights of Way (PRoWs) and associated mitigation measures as presented at PEIR are included in section 30.7.4.4

Table 1.24 Feedback related to Socio-Economics (Chapter 31 of ES)

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
Chapter 31, Socio-Economics	Norfolk County Council	November 2018,	There are potentially significant economic benefits that may arise from the Boreas proposal in terms of: <ul style="list-style-type: none"> • Local employment creation; • Business sectors affected by construction; and 	More information will be published on the Applicant's approach to operations and maintenance once a number of contributing factors are realised, these include a positive

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<ul style="list-style-type: none"> Operations and Maintenance (O&M) of the wind turbines. <p>2.17. County Council officers have had good engagement with Vattenfall in terms of maximising the wider economic benefits from the project. The County Council fully expect and would support the longer term operations and maintenance benefits to be experienced locally. In addition the County Council would be keen for the project to enable/encourage manufacturing to be attracted to Norfolk. Discussion to date with Vattenfall would suggest that they are looking to develop not just an O&M presence in the County but also a manufacturing base. The PEIR suggests that the Norfolk Boreas and Norfolk Vanguard projects will in total create up to 481 jobs during construction and up to 175 jobs during operation.</p>	<p>DCO consent decision; contract for difference (CfD) award; final investment decision (FID); other regulatory or planning considerations and further engagement with the logistics supply chain.</p>
Chapter 31, Socio-Economics	Norfolk County Council	November 2018,	<p>The County Council strongly welcome, on economic development grounds and supporting the Norfolk economy Vattenfall's decision to use the Port facilities at Great Yarmouth for:</p> <ul style="list-style-type: none"> Construction; assembly and manufacture of windfarm components; and <p>Operations and maintenance.</p>	<p>As above, more information will be published on the Applicant's approach to operations and maintenance once a number of contributing factors are realised.</p>
Chapter 31, Socio-Economics	Norfolk County Council	November 2018,	<p>It is felt that the given the scale of this proposal and potential disruption it may cause to local communities and business that there should be suitable local community benefits arising and appropriate compensation for local businesses.</p>	<p>Only mitigation which addresses impacts directly associated with the Project should be considered in the planning and DCO process; therefore, wider community benefits should not be taken into account.</p> <p>The mitigation measures (described in sections 31.7.1 and 31.7.2) will avoid or reduce residual adverse</p>

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
				effects on the socio-economic receptors to non-significant levels, as summarised in Table 31.54. Continued efforts to address wider benefits will be undertaken separately and outside of the DCO process.
Chapter 31, Socio-Economics	Norfolk County Council	November 2018,	<p>"Vattenfall should set out clearly in the following application stage (Section 56 submission) and the accompanying Environmental Statement (ES):</p> <p>a) how local communities impacted by the onshore construction (e.g. Cable Route, CRS and Substation) can have such impacts mitigated; and</p> <p>(b) the need for a "local community fund" to assist the wider community affected by the proposal."</p>	<p>Mitigation is considered in section 31.7.1 and additional enhancements throughout section 31.7.</p> <p>A Community Benefit Fund or equivalent, is not a material planning condition, as it does not deliver mitigation in relation to specific project impacts and therefore, it is not a relevant consideration of the DCO process.</p>
Chapter 31, Socio-Economics	Norfolk County Council	November 2018,	Vattenfall should, given the potentially long timescales for construction address the cumulative impact/s on local businesses and communities and provide appropriate compensation for those businesses and communities adversely affected by the construction works.	<p>Only mitigation which addresses impacts directly associated with the project should be considered in the planning and DCO process. Cumulative impacts are considered in section 31.8 and with the application of best working practices, cumulative, effects on the socio-economic receptors are at non-significant levels.</p>
Chapter 31, Socio-Economics	N2RS	November 2018,	"As you know N2RS is in favour of an HVDC transmission system for both Norfolk Vanguard and Norfolk Boreas and as such the design for both these projects is acceptable,	Only mitigation which addresses impacts directly associated with the Project should be considered in

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant and where addressed in the ES (doc 6.1)
			<p>provided there is absolutely no deviation from this commitment.</p> <p>However we would like to make a few points – also made for Vanguard:</p> <p>a) We support the village of Ridlington’s requests in terms of location and lighting of the mobilisation compound to the east of Ridlington village.</p> <p>Due regard should be given to homes and businesses which are still directly affected by the wider plans - and loss in property value and quality of life should be taken into account. It should not fall upon individuals to bear the brunt of schemes like this and those affected must be properly compensated. This would include owners of holiday businesses who will lose trade during construction and possibly suffer longer-term loss of reputation. It is a concern that construction of the cable route at and near landfall might take place in the summer months when it is least convenient and conducive to that industry."</p>	<p>the planning and DCO process; The mitigation measures (described in sections 31.7.1 and 31.7.2) will avoid or reduce residual adverse effects on the socio-economic receptors to non-significant levels, as summarised in Table 31.54.</p>
Chapter 31, Socio-Economics	Norfolk County Council	November 2018	<p>Vattenfall should, given the potentially long timescales for construction address the cumulative impact/s on local businesses and communities and provide appropriate compensation for those businesses and communities adversely affected by the construction works.</p>	<p>Mitigation is considered in section 31.7.1 and additional enhancements are addressed in section 31.7.2. A Community Benefit Fund or equivalent, is not a material planning condition, as it does not deliver mitigation in relation to specific project impacts and therefore, it is not a relevant consideration of the DCO process.</p>

Table 1.25 Feedback related to the Consultation

Issue Topic	Consultee	Date	Stakeholder Comment	Regard had by the Applicant
Consultation	Great Yarmouth Borough Council	December 2018	Lastly, the Council is also satisfied that all the affected Local Authorities and other relevant stakeholders have been regularly consulted on the location and proposed route of the infrastructure as guided by the Statement of Community Consultation (SoCC).	Noted.
Consultation	National Farmers Union	December 2018	There have been some discussions with landowners with regard to access points across holdings from the road network to the onshore cable route corridor for Vanguard and it is understood that the same access points will be used for Boreas. Further negotiations with landowners are required as some access points are not viable. There have been no discussions or details of how landowners will be able to cross the working corridor to gain access to their other land if it has been land locked due to the presence of the corridor. Further consultation is required.	Careful consideration has been given to the location of infrastructure associated with the Project and possible impacts it may have. The Applicant will continue to hold discussions with landowners and nearby properties to minimise any impacts from the Project where possible, details of this ongoing engagement with landowners is covered in Chapter 28 of the Consultation Report (DCO Document 5.1).
Consultation	Norwegian Environment Agency	December 2018	We would anyway like to confirm that there are no comments to the project from Norway.	Noted.
Consultation	Rijkswaterstaat	December 2018	First my compliments for the structured and comprehensive analysis. For this moment, I will you give a reaction on shipping and navigation (Chapter 15). Due to absence of Mr de Vrees, a further reaction with regard to sea mammals and ornithology can be expected towards the end of this year.	Noted.