



Historic England

**PLANNING ACT 2008 (AS AMENDED) – SECTION 88 AND THE
INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010 (AS
AMENDED) - RULE 6**

**APPLICATION BY NORFOLK BOREAS LIMITED FOR AN ORDER GRANTING
DEVELOPMENT CONSENT FOR THE PROPOSED NORFOLK BOREAS
OFFSHORE WIND FARM**

APPLICATION REF: EN010087

SUBMISSION DATE: 10th DECEMBER 2019

**WRITTEN REPRESENTATION OF THE HISTORIC BUILDINGS AND MONUMENTS
COMMISSION FOR ENGLAND (HISTORIC ENGLAND)**



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Summary

- i This Written Representation reviews the Development Consent Order application made by Vattenfall for the proposed Norfolk Boreas Offshore Wind Farm. The submitted Development Consent Order (DCO) application includes an Environmental Statement produced to satisfy the requirements of Environmental Impact Assessment requirements as set out within the Environmental Impact Assessment (EIA) Directive 85/337/EEC, as amended by Directive 97/11/EC and delivered through the Infrastructure Planning (EIA) Regulations 2017. The Written Representation will also review other components of the submitted Development Consent Order (DCO) application as relevant to the historic environment.
- ii We understand from the submitted DCO application that the proposed Norfolk Boreas project comprises a 725 km² turbine array area located approximately 73km at its closest point from the East Anglia coastline. Electricity export cables will connect the offshore turbine array to a landfall location at Happisburgh South (Norfolk). We also understand that this application has adopted a project design envelope approach to describe a number of design options inclusive of minimum and maximum spatial and temporal elements and possible construction methodologies. We appreciate that this approach is used to determine the extent to which the project could impact the environment, but that the detailed design of the project could vary within this 'envelope' without invalidating the assessment or falling outside the scope and boundaries of the DCO. It is therefore important to consider how the characterisation of the existing environment described within this Environmental Statement (ES) includes mitigation measures so that any subsequent assessment programmes required to deliver this project (should consent be obtained) are adequately informed by archaeological objectives.
- iii We acknowledge the detail provided within this DCO application regarding how Vattenfall Wind Power Limited (VWPL) (the parent company of Norfolk Boreas Limited) is also developing Norfolk Vanguard, a 'sister project' to Norfolk Boreas, which subject to securing the necessary consents and permissions, is planned to be delivered ahead of the proposed Norfolk Boreas development. We appreciate that because these two developments are adjacent to each other, and both could use the Necton National Grid Substation (Norfolk), that a strategic approach has been taken to plan delivery of the associated transmission infrastructure for both projects to optimise the overall design and other efficiencies. However, we note the attention given to the possibility that the proposed Norfolk Vanguard project is not realised and therefore Norfolk Boreas will be planned in reference to:
 - Scenario 1 – Norfolk Vanguard proceeds to construction, and installs ducts and other shared enabling works for Norfolk Boreas; and
 - Scenario 2 – Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. Norfolk Boreas undertakes all works required as an independent project.



1. Introduction

- 1.1. The Historic Buildings and Monuments Commission for England (HBMCE), known as Historic England, is the Government's adviser on all aspects of the historic environment in England including historic buildings and areas, archaeology and historic landscape; and a duty to promote public understanding and enjoyment. HBMCE are an executive Non-Departmental Public body sponsored by the Department for Digital Culture, Media and Sport and we answer to Parliament through the Secretary of State for Digital Culture, Media and Sport. Our remit in conservation matters intersects with the policy responsibilities of a number of other government departments – particularly the Ministry of Housing, Communities and Local Government, with their responsibilities for land use planning matters. The National Heritage Act (2002) gave HBMCE responsibility for maritime archaeology in the English area of the UK Territorial Sea.
- 1.2. In our Section 56 Relevant Representation (dated 25th July 2019) we noted that the applicants had provided an Environmental Statement (ES), however we identified that this development has the potential to impact upon the historic environment, and that this impact could be significant in relation to a number of heritage receptors and in relation to EIA policy. We also stated that a number of specific points would be addressed in our full Written Representation in relation to the onshore and offshore sections of the submitted DCO.
- 1.3 This statement also aims to address the issue raised in the 'Examining Authority's Written Questions and Requests for Information' as issued by the Planning Inspectorate on 19th November 2019.

2. Comments in relation to Environmental Statement: Volume 1, Chapter 5 – Project Description (PINS Document Ref: 6.1.5)

- 2.1 We understand that the proposed development could include 90 to 180 wind turbines in the range of 10MW to 20MW in order to future proof the DCO to accommodate foreseeable advances in wind turbine technology. Plus two offshore electrical platforms, a service platform, two meteorological masts, two LiDAR platforms and two wave buoys together with a network of up to 740km of offshore cables (the identified worst case scenario).
- 2.2 The Norfolk Boreas project is planned to comprise a turbine array area located in the southern North Sea, approximately 73km from the coast of Norfolk. The offshore area is known include sand ridges with depths across the proposed development area between 20m and 42m below Lowest Astronomical Tide (LAT). Depths along the offshore cable corridor, close to the Norfolk Boreas site are



typically 40 to 50m below LAT with depths decrease towards the coast to 10m below LAT approximately 500m to 1,000m from the coast.

- 2.3 We acknowledge the detail provided about the 'project design envelope' adopted for this proposed project regarding reasoned minimum and maximum extent for a number of key parameters and that the final design will lie between the minimum and the maximum extent of the consent sought. In particular we note that Norfolk Boreas has made the decision to deploy High Voltage Direct Current (HVDC) technology for the offshore and onshore export infrastructure for the project.
- 2.4 We also note that other HVDC export options for this project are under consideration, including an interconnector between Norfolk Vanguard and Norfolk Boreas, or even sharing of some export infrastructure between the two projects. Furthermore, if project interconnectors are used, only one offshore electrical platform would be required within the Norfolk Boreas array area and the number of export cable pairs would be reduced to one.
- 2.5 At the proposed landfall location cable ducts, under Scenario 1, would be installed during construction of Norfolk Vanguard and under Scenario 2 ducts would be installed as part of Norfolk Boreas. We note that cable installation at the coast will be delivered by Horizontal Directional Drilling (HDD). For the array area, we understand that foundation design considerations include the following (Table 5.3):
- Piled monopile;
 - Suction caisson monopile;
 - Piled tripod or quadropod;
 - Suction caisson tripod or quadropod;
 - Gravity Base; and
 - TetraBase
- 2.6 We note that section 5.4.1.1.4 (Norfolk Boreas site permanent footprint) identifies the worst case turbine foundation footprint to be 10MW gravity base foundations with scour protection. In consideration of the seabed preparation works required to facilitate placement of gravity base foundations we are minded to concur that this foundation option represents the possible worst case scenario in terms of potential disturbance of or even destruction of archaeological materials (vis. section 5.4.3.3). Section 5.4.2.2 (Installation process) explains that following the interpretation of geophysical survey data acquired in 2017, up to 30 UXO clearance operations could be required in the Norfolk Boreas turbine array area and 28 within the electricity export cable corridor.
- 2.7 In reference to cable installation methods (section 5.4.13) it is estimated that seabed depth of 3m will be required (paragraphs 213 and 224). However, it was



noted that there was no specific attention (or any other documentation cross-referencing) to demonstrate how these programmes will be fully informed by archaeological assessment practices or other mechanisms to be employed should any consented project encounter previously unknown archaeological materials. However, it was noted that section 5.6.2 (onshore cable route) describes how the 60km onshore cable route to Necton (Norfolk) is approximately 45m wide (to accommodate Norfolk Boreas and Norfolk Vanguard) and has been refined and routed to minimise potential impacts to (sensitive) archaeological features.

- 2.8 Section 5.6.3 (Onshore project substation) mentions that prior to construction that archaeological surveys and studies will be undertaken to deliver agreed mitigation measures with Historic England and the relevant local authorities. This would seem to address matters such as identified within section 5.7 (Onshore under scenario 2) and that before construction works begin how surveys and studies will be undertaken to inform the final detailed design inclusive of archaeological assessments.
- 2.9 It is a particularly relevant matter that pre-construction surveys are designed in conjunction with any Retained Archaeologist and Archaeological Curator so that survey specifications and plans can be designed in accordance with an agreed archaeological Written Scheme of Investigation (WSI) Onshore and Offshore to be produced from the respective outline WSIs Onshore and Offshore (PINS document references: 8.5 and 8.6). This is to ensure the collection of sufficient quantity and adequate quality data for archaeological analysis and thereby inform delivery of mitigation measures for archaeological receptors. However, the In Principle Monitoring Plan will require revision to facilitate such efficient and coordinated action.

3. Environmental Statement: Volume 1, Chapter 6 – EIA Methodology (PINS Document Reference 6.1.6)

- 3.1 We are aware of the requirements for an EIA exercise to be completed for this proposed development, in particular that it is the purpose of an ES (paragraph 9) “...to inform the decision-maker, stakeholders and all interested parties of any significant environmental issues that may result from the project during its construction, operation and (where relevant) decommissioning.”
- 3.2 We acknowledge the detail provided regarding action to characterise the proposed development areas (onshore and offshore) and that the Applicant has adopted a design envelop approach (as set out in section 6.4). We appreciate that the use of this approach allows the Applicant to consider the possible maximum extent of the consent sought and likely environmental impacts that could occur in reference to



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two possible delivery scenarios, as explained within Chapter 5 (Project description), and the different implications of these two scenarios for either onshore or offshore assessment exercises.

- 3.3 Section 6.5.2 (Royal HaskoningDHV as competent experts) we appreciate that the Infrastructure Planning (EIA) Regulations 2017 now requires this information to be provided and we are satisfied by the detail contained within the ES which addresses matters as relevant to the historic environment for which Historic England has responsibility. Table 6.3 within section 6.6 (Information for inclusion in Environmental Statements) is helpful regarding factors specified in EIA Regulations (2017) as likely to be significantly affected by the development and therefore inclusive of cultural heritage, architectural, archaeology and landscape.

4. Environmental Statement: Volume 1, Chapter 8 – Marine Geology, Oceanography and Physical Processes – PINS Document Reference: 6.1.8

- 4.1 We are aware that under the proposed scenarios described within this ES that the assessment presented to us includes interconnector cables between the Norfolk Boreas and Norfolk Vanguard projects. However, if Norfolk Vanguard does not proceed then these interconnector cables will not be required.
- 4.2 Section 8.5.2 (data sources) provides a useful summary of the programme of survey acquisition conducted to date (paragraph 46) and the assessment exercises which are on-going (vis. seabed mobility). We add that this particular study should also support archaeological characterisation and the likelihood of presently unknown materials of archaeological interest becoming exposed within the proposed development areas or known sites becoming buried. Table 8.9 (data sources) contains a helpful summary regarding data generated from surveys conducted to date and we note that the use of terms such as 'High' associated with (data) confidence.
- 4.3 The description provided of the existing environment (section 8.6) is helpful such that the development area can be characterised as a bathymetry of between 20m and 42m below LAT. We also note that the seabed of the proposed development area (array, cable corridor and possible interconnector corridor) is characterised by sandbank systems of various scales including sandbanks within the array area orientated north-south and range in height about the surrounding seabed by between 9 and 14 metres. We also note the detail provided in paragraph 58 and 59 regarding the identification within the array area of a relic channel and levee system part of a prehistoric tidal channel and attributed to the Brown Bank formation. Section 8.6.10 provides spatial and temporal analysis of change in the Haisborough Sandbank system and that this system is highly dynamic. We draw



attention to this matter in consideration of the potential for mobile sandbank systems to conceal presently unknown archaeological materials. We note that this is a matter also addressed through Appendix 5.3 (UXO Report) within section 3.1 (UXO Burial Processes) and the Outline Archaeological Written Scheme of Investigation (Offshore) in paragraph 28.

5. Comments in relation to Environmental Statement: Volume 1, Chapter 17 – Offshore and Intertidal Archaeology and Cultural Heritage (PINS Document Reference: 6.1.17)

- 5.1 In general, we are content with the information as presented regarding this proposed development such that the ES establishes baseline conditions for the historic environment as might be encountered within the intertidal zone at the electricity export cable landfall location and within the offshore cable corridor. This chapter also assesses the potential impacts to offshore and intertidal archaeological receptors from the proposed project and explains the options for embedded mitigation.
- 5.2 We concur with the approach described within section 17.4.2 (Historic Seascape Character) and the use of narrative to describe historic character and its ability to accommodate change arising from the proposed project; this approach is expanded on in section 17.6.4 and an assessment of the capacity to accommodate change is summarised in Tables 17.19 and 17.20. However, this section also addresses the concept of ‘setting’ and we acknowledge consideration of this matter, especially in reference to the shipwrecks present in the proposed development area. In particular, we note that paragraph 207 discusses how during “...construction, activities associated with the installation of the wind farm infrastructure will result in a temporary disturbance to the setting of these military wrecks.” On this point we consider it relevant that attention is directed at the longevity of the proposed development (“anticipated design life”) when operational (see Chapter 5, Table 5.3) such that 30 years should be considered as an extended period of time for which the implication of setting merits attention, as discussed within section 17.7.7.4. Furthermore, the attention given to Cumulative Impact Assessment (section 17.4.3) is noted in reference to adjacent offshore wind farm developments, both proposed and actual, and referral to published guidance, where available. However, this is a matter of increasing relevance in terms of the development of a methodological approach to adequately and appropriately assess the complex nature and magnitude of contemporary seabed development programmes.
- 5.3 We have previously commented on the need to consider the line spacing used for the marine geophysical surveys (our letter dated 7th December 2018, Our Ref:



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UKCS/Boreas/PIER), as the spacing cited in Table 17.7 are generally much larger than is recommended within: *Marine Geophysics Data Acquisition, Processing and Interpretation Guidance Notes* (published by English Heritage, 2013 – product code: 51811), which may result in some features of archaeological interest not being identified. We note the geophysics surveys carried out to date and the determination of data quality is very helpful regarding the completed preliminary surveys and that further higher resolution and full coverage surveys are planned for later on in the development process. We also acknowledge the detail provided in section 17.5.3 (Assumptions and limitations) and the response to the comments we submitted previously (paragraph 57 and 58) regarding survey resolution. It would therefore be appropriate to have further discussion as part of the consultation to prepare any post-consent archaeological WSI (Offshore), should permission be secured for this proposed project. Such discussion should include suitability of survey data acquired to date to provide baseline characterisation and the appropriate survey resolution in relation to the above referenced guidance for further survey campaigns. We add that sufficient detail is an important component of any subsequent Method Statements to address specific survey objectives (as alluded to in paragraph 60).

- 5.4 Section 17.6.1 discusses the potential for Late Palaeolithic and Holocene archaeological remains to be discovered, including channels and buried land surfaces, which is an important detail to include. The potential of these layers have also been investigated further using geoarchaeological assessments (e.g. paragraphs 72 and 81 and Appendices 17.5-17.8) including the application of Optically Stimulated Luminescence (OSL) dating. The information from these assessments has not only added to our understanding of these archaeological periods (see Appendix 17.8), but will also be of value for the design of the proposed development. In particular, the discovery of a terrestrial peat deposit in Unit 7 that covers 85 km² and representing a time period of 3,500 years from the Late Devensian to the Early Holocene and should be considered one of the most significant finds in UK submerged landscape research in recent years (paragraphs 91-95 and Appendix 17.8).
- 5.5 Section 17.6.2 (maritime and aviation archaeology), Table 17.11 summarises the seabed features of archaeological potential identified following the geophysical survey work within the study area. A total of 1,373 features have been categorised as “A2” (defined as “features/remains of uncertain origin of possible archaeological interest”) and 43 features determined to be “A1” (“archaeological interest”) within the overall proposed development envelope. It is noted that a programme of further investigation and avoidance will be employed to mitigate any damage to these features (as proposed in Section 17.7.2 and the Outline WSI (Offshore) PINs Document Ref: 8.6). We also acknowledge the attention given to differentiating between records of losses, contemporary and historic and thereby



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determining whether historic environment interest could be present (e.g. as clearly explained in paragraph 113).

- 5.6 It was noted that the determination of A1 anomalies included sites which had high magnetic amplitude, but are not necessarily visible on the seabed (i.e. buried remains). Paragraph 104 identifies the steam paddle schooner *Seagull* and the steam screw barque *Xanthe* within the electricity export cable corridor and both of these wrecks are now scheduled under the Ancient Monuments and Archaeological Areas Act 1979, further detail on this statutory protected status is as follows:
- The *Seagull* – <https://historicengland.org.uk/listing/the-list/list-entry/1464587>
 - *Xanthe* – <https://historicengland.org.uk/listing/the-list/list-entry/1464597>
- 5.7 Although no crashed aircraft sites have been identified at this stage important acknowledgment is included in paragraph 115 that such material might be present, but buried within the contemporary seabed and that all military crash sites are automatically afforded designated status as ‘protected places’ under the Protection of Military Remains Act 1986. Furthermore, the UXO Report (Environmental Statement, Volume 3; Appendix 5.3 – PINS Document reference 6.3.5.3), in Section 2.8 (Military related shipwreck) contains useful information in Table 2.8 for corroboration with the detail provided within this chapter. For example, in reference to shipwreck as identified with the proposed seabed development area (array area and electricity export cable corridor).
- 5.8 Section 17.6.3 (Intertidal archaeology) explains that the proposed project plans to use HDD to pass beneath the beach at Happisburgh, but that the assessment of archaeological potential within the intertidal zone is included for completeness. We also acknowledge the detail in paragraph 130 that geo-archaeological assessment of onshore cores concluded that the particularly interesting Cromer-Forest-Beds occur here at significant depth and therefore it was unlikely that the proposed HDD would encounter in-situ Palaeolithic archaeological material.
- 5.9 It is noted that there will be direct and indirect impacts to the historic environment if the proposed development is consented (Section 17.7 – potential impacts), including changes to the hydrodynamic and sedimentary processes that may expose or bury archaeological remains (paragraph 150). Section 17.7.2 discusses the embedded mitigation that has been incorporated into the project that will limit the impacts as far as possible. We hereby concur with the commitment that the ‘full’ WSI will be produced in consultation with Historic England (vis. paragraph 158). We also note the attention given to the use of Archaeological Exclusion Zones (AEZs), but will also include avoidance, micro-siting of features and further investigations where necessary as detailed within the conditions of the project’s DCO (including deemed Marine Licences), as per paragraph 156. We are pleased



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to see that AEZs will form the primary mitigation approach, and that A2s will be further assessed if they cannot be avoided by micro-siting. Furthermore, we concur with the detail provided in section 17.7.4 (worst case scenario), as set out in Table 17.16 which can be summarised as a strategy of avoidance (throughout project lifespan) and micro-siting prior to construction.

- 5.10 A strategy is presented in Section 17.7.5 (paragraph 173) to assess the heritage significance of each heritage asset, which states that each 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 17.17.
- 5.11 Section 17.7.6 (potential impacts during construction) summarises the strategy that may be employed to avoid (paragraphs 177 and 178) or investigate the A2 anomalies (paragraphs 181 and 182), namely high resolution geophysics surveys, as well as the approaches that may be used if the anomalies cannot be avoided (ROV or diver surveys and the recording of features prior to removal). We therefore offer the comment that every effort and planning mechanism applicable to this project promotes coordination, for example, the UXO Report (as referenced above) in section 7.3.2 (Stage 2: UXO inspection) explains the use of diver or Remotely Operated Vehicle (ROV) and assist UXO identification. We are also pleased to see that the methods will be developed in consultation with Historic England through any post-consent secured archaeological WSI. Section 17.7.6.1 (direct impacts to known heritage assets) 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 (paragraph 181). It is noted thought that AEZs will not be recommended for A2 anomalies, although the position of the anomalies will be avoided through a scheme of micro-siting (as described in paragraph 181). If the anomalies cannot be avoided then they will be investigated and recorded further prior to removal (paragraph 182).
- 5.12 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 190) of particular importance in consideration of palaeo-environmental evidence already known to exist in this location as possibly representing the last land bridge between Britain and continental Europe;
 - the further examination of geotechnical and geophysical data (paragraphs 191 and 192);



- the development of a Protocol for Archaeological Discoveries (paragraph 194); and
- receiving prompt archaeological advice in the event of any discoveries (paragraph 193).

We agree with this approach, but it is important that any archaeological WSI produced post-consent (should permission be secured) addresses the technical specifications of subsequent geophysical survey work. For example, consideration of the scale of the archaeological features or other anomalies of possible archaeological interest to be investigated and the resolution required to understand them in sufficient detail. We therefore are minded to concur with the conclusion offered in paragraph 198 that residual impact is assessed as “minor adverse”.

- 5.13 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 the potential to raise the seabed elevation (Section 17.7.6.3, paragraph 200). This has been classified as a beneficial effect upon archaeological receptors. We agree that such sediment deposition could be classified as a beneficial effect upon archaeological receptors.
- 5.14 Section 17.7.6.5 discusses the potential impact of bentonite fluid outbreak occurring during the HDD process on heritage assets. It is therefore noted that because the Cromer Forest Bed deposits were not recorded within the top 20m below ground level and are expected to occur beneath the HDD target depths. We therefore agree that the potential for drilling fluid outbreak to impact on archaeological materials is negligible (paragraph 210).
- 5.16 Section 17.8 (Cumulative impact) – we note the narrative approach adopted (plus the detail contained within Table 17.21) in recognition of the number of offshore developments within the southern North Sea. We also support the initiative taken by Norfolk Boreas Ltd and their commitment to making data available from this proposed project for a wider strategic study of palaeo-environmental evidence (as demonstrated by the seabed developments highlighted in paragraph 246). We are also minded to concur with the assessment detailed in section 17.8.1 in regard to palaeolandscapes, maritime and aviation finds and section 18.8.2 (historic seascape character).



6. Environmental Statement, Volume 1, Chapter 28 – Onshore Archaeology and Cultural Heritage – PINs Document Reference: 6.1.28)

- 6.1 In our response to the EIA Scoping Report (our letter dated 6th June 2017 to the Planning Inspectorate, 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 responded to this question with additional information (PEIR, Table 28.2) and we were happy that the need for any additional techniques will be considered on a case-by-case basis and that additional work will be undertaken post-consent (Section 28.7.5.5.1, paragraph 174; Document 8.5, Section 5.1, paragraph 72). The Outline Written Scheme of Investigation (OWSI) states that 80% of the area outlined as priority survey areas have been completed to date, and the remaining 20% will be completed post-consent, either as part of the Norfolk Vanguard development (Scenario 1) or as part of the Norfolk Boreas (Scenario 2) development (Document 8.5, Section 5.1, paragraphs 67, 69 and 70). We are pleased to see that there is a commitment to complete this work to ensure that the archaeological potential of the development area is assessed (paragraph 70).
- 6.2 As stated in our letter (dated 7th December 2018, Our Ref UKCS/Boreas/PEIR), we felt that the strategies proposed to mitigate the direct and indirect impacts that the development may have on heritage assets (Section 28.7, Tables 28.31 and 28.32) were appropriate. We were pleased to see that programmes of avoidance, route-refinement and micro-siting form the core of the mitigation strategy (paragraph 138), with agreed measures in place for the heritage remains that cannot be avoided, such as the use of geophysical surveys and intrusive investigations (paragraphs 139, 151, 152 and 174). We advised that timetables needed to carry out these stages of work should be carefully considered to allow the information generated at the evaluation stage to be reviewed, so that it could be utilised to inform the subsequent phases of excavation and analysis. We also cautioned that the timetables 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 were identified. It has been stated in Section 28.7.2.2.3 that the project will ensure that adequate time is built into the overall programme to allow for the encountering of previously unknown remains, in order that they can be properly assessed pre-construction and appropriate mitigation approaches adopted, where required. We are pleased to see the addition of this detail within the ES, which has been elaborated on within the onshore Outline WSI (Document 8.5, Section 3.1).
- 6.3 We agree that there is potential for previously unrecorded buried archaeological remains to exist in the footprint of the onshore project substation (paragraph 178), and that the area will be investigated further post-consent. We are 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 180). It should be noted that ditches have the potential to preserve deposits conducive to organic preservation, such as wood, leather and palaeo-environmental remains; this will need to be considered when developing the mitigation strategy for this area of the proposed development. We are also pleased to see that a precautionary approach will be adopted for groundworks required for link box installation (paragraph 190), which would fall under the archaeological reporting protocol.

- 6.4 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 255). It is stated that any impacts will be mitigated through a programme of geoarchaeological assessment and palaeo-environmental surveys, which will be established post-consent (paragraphs 256 and 260). This approach seems sensible and appropriate and should be provided for through the draft DCO. We defer to Norfolk County Council (as the local curatorial body) to provide detailed comment on the specific wording for inclusion within the draft DCO.
- 6.5 We are pleased to see the discussion of how drilling fluid break out during the HDD process could impact on any buried archaeological remains (Section 28.7.5.5.1) and the potential for this to occur. We acknowledge that the geoarchaeological works have demonstrated that Cromer Forest Bed deposits associated with potential Palaeolithic archaeology are expected to occur at depths below HDD target depth and it is therefore unlikely that they will be affected.
- 6.6 As previously discussed by the Applicant we acknowledge the two scenarios for delivery - one where the proposed development would be preceded by the Vanguard's development or the second scenario where Boreas would proceed alone. Given our position has already been agreed with regards to Norfolk Vanguard we do not have any further, in principle, concerns with regards to the proposed Norfolk Boreas project. We have checked the submitted documents and confirmed the main onshore archaeology ES chapter is virtually the same as Norfolk Vanguard, the geophysical survey is the same, the photomontages and setting assessment is the same and it does include the minor upgrade to the impact upon the significance of Braddenham Church (development within its setting) that was made during the Norfolk Vanguard examination. We therefore have no further comment or other advice to offer.



7. Environmental Statement: Volume 3, Appendix 17.2: Archaeological assessment of geophysical data (offshore)

7.1 We commented on the detail of this document in our letter, dated 21st May 2018 (Our Ref: OWF/Vattenfall/Boreas), directed to Royal HaskoningDHV, the consultants acting on behalf of the Developer. The document was amended prior to submission of the Preliminary Environmental Information Report (PEIR), but there are no substantive changes that we can identify in the document submitted within this application that merit our attention. We therefore continue to support the recommendations for further archaeological involvement in survey data acquisition.

8. Environmental Statement: Volume 3, Appendix 17.3: Geophysical Addendum (offshore)

8.1 This report reviews the existing geophysical anomalies of archaeological potential within the Additional Area of the Norfolk Boreas development offshore. A total of five anomalies were identified, which were all classified as A2 anomalies. As per the strategy described above, AEZs were not assigned to features classified as A2, with avoidance being utilised as the main mitigation strategy as well as the use of a Protocol for Archaeological Discoveries.

8.2 It should be noted that the line spacing used for some of the surveys included in this report (Section 2.2.3 and 2.2.4) exceed the limits discussed within the Historic England *Marine Geophysics Data Acquisition, Processing and Interpretation* guidance (published 2013). It is therefore possible that features of archaeological interest may not be resolved to a point that they can be adequately interpreted. It is also noted within the report that there is an area along the central section of the Additional Area which was not covered by data and there is therefore no geophysical data in this area (Section 2.4.3). It is concluded that it cannot be guaranteed that there are no anomalies of archaeological potential within these areas, but that as a pipeline already runs through this area it is possible that any archaeological features have already been disturbed. We therefore agree with the conclusions that a reporting protocol should be in place to ensure any discoveries are recorded and investigated.



9. Environmental Statement: Volume 3, Appendix: 17.4: Marine Archaeology Technical Report; and Appendices 17.5, 17.6 and 17.7: Stages 1, 2 and 3 Geoarchaeological Reports

9.1 We have previously commented on these documents (our letter dated 7th December 2018 in response to the PEIR consultation exercise). We note that no amendment has been made to any of the above referenced documents. We therefore encourage the Applicant to complete the deposit of any agreed Technical Report with the National Record of the Historic Environment (NRHE) and relevant local HER (where applicable), by submitting a Historic England OASIS (Online AccesS to the Index of archaeological investigationS') form with a digital copy of the report. We note that such action is detailed within the outline WSI (Offshore), in section 9.1, paragraph 55 in reference to archaeological technical reporting to be completed in support of any final Offshore WSI. The important matter to be captured here is to ensure the successful completion of mitigation measures at the appropriate and agreed stage of analysis. We hereby acknowledge the point made by the Applicant within the Statement of Common Ground prepared in consultation with HBMCE regarding geoarchaeological analysis already completed.

10. Environmental Statement: Volume 3, Appendix 17.8: Stage 4 Geoarchaeological Report

10.1 The results of the previous geoarchaeological assessments highlighted the potential significance of Unit 5 (Upper Brown Bank, Middle to Upper Palaeolithic) and Unit 7 (Elbow Formation, late Upper Palaeolithic to Mesolithic). These two units were prioritised for additional assessments, the results of which have been presented in this appendix. The results of this work have added significantly to our understanding of these archaeological periods. In particular, 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 could be considered to be one of the most significant finds in UK submerged landscape research in recent years.

10.2 The report is very thorough and sets out clear aims, objectives and research questions addressed through the work. The methods and techniques used to investigate the deposits were clearly stated, and included the additional detail requested (our letter dated 7th December 2018) regarding the sampling of cores for OSL dating (Section 4.6) and their analysis (Section 5.6). We are also pleased to see that Bayesian modelling was utilised to investigate the sampled sequence of dates (Section 5.5.3). We agree with the conclusions made in the report as well as the recommendations to publish the results of the work in peer reviewed



journals. We also refer you to the comment made in paragraph 9.1 (above) and the deposit of completed archaeological Technical Reports through OASIS.

11. Comments on the draft Development Consent Order. PINS Document reference 3.1 (Version 1, dated June 2019)

11.1 Schedules 9, 10, 11 and 12; Deemed Licences under the 2009 Act – Generation Assets and Transmission Assets. Part 1 (Interpretation) – amend as follows:
Article 4 – the address for returns and correspondence for HBMCE is:

Historic England
Cannon Bridge House
25 Dowgate Hill
London EC4R 2YA

11.2 Schedules 9 and 10 (Generation Assets); 11 and 12 (Transmission Assets); and 13 (Project Interconnector assets) Deemed Marine Licences under the 2009 Act – and. Part 4 (Conditions) provides for the preparation of an archaeological written scheme of investigation, as provided through:

- Schedule 9 and 10, Article 14(1)(h)(i-viii);
- Schedule 11 and 12, Article 9(1)(h); and
- Schedule 13, Article 7(1)(g)

We hereby concur with the provisions stipulated for how an archaeological WSI should be produce in consultation with the HBMCE as the statutory historic body. Furthermore, it is apparent to us that given the proposed methodology for the use of HDD to take the electricity export cables from below Mean Low Water Springs that there will not be any foreshore intrusive works conducted. However, we appreciate that the spatial extent of the archaeological WSI should match that of Marine Licensing control and therefore the above referenced Schedules should state “...the offshore Order limits seaward of Mean High Water Springs...”

11.3 Schedules 9 and 10 in Condition 15(3); Schedules 11 and 12 in Condition 10(3); and Schedule 13 in Condition 8(3) set a timeframe for submission to the Marine Management Organisation for approval of documentation described as inclusive of any “...protocol or scheme...” which we consider to be inclusive of any archaeological Written Scheme of Investigation and any reporting and recording protocol, as provided for through the above referenced (draft deemed Marine Licence) conditions. We hereby accept the stipulated provision that approval should be at least four months prior to the intended commencement of licensed activities, unless otherwise agreed in writing by the Marine Management Organisation.



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- 11.4 We welcome the provision made within the draft deemed Marine Licences within Condition 14(2) for Schedules 9 and 10 and; Condition 9(2) for Schedules 11 and 12; and Condition 7(2) for Schedule 13 that pre-commencement surveys, archaeological investigations and material operations, which involve intrusive seabed works, should only take place in accordance with a specific WSI which is itself in accordance with the details set out in the outline WSI (Offshore), and which has been submitted to and approved by the MMO In consultation with the statutory historic body.
- 11.5 As we stated at the Issue Specific Hearing (13th November 2019) we support the inclusion of these conditions (as referenced in the paragraph above) to address surveys and associated archaeological analysis and interpretation as might occur post-consent, but before the formal commencement of the project (as defined within the Development Consent Order, Part 1). Therefore in reference to the proposed obligation that the Consent Holder produces a “specific Written Scheme of Investigation” we appreciate that such a document would directly assist programmes of survey data acquisition before the project commences. We therefore acknowledge that pre-commencement surveys might be subject to Marine Licence exemption and that the Outline Written Scheme of Investigation submitted at the time of examination provides the appropriate and relevant documentation to guide such works.

12. Comments in relation to the Outline Written Scheme of Investigation (Onshore). PINS Document reference 8.5

- 12.1 We acknowledge that this document represents an outline strategy only and that additional specific WSI will be developed post-consent (Section 4, paragraph 50), should consent be obtained. We also acknowledge that the features identified as potentially being present as sub-surface remains within the onshore project area for both Norfolk Vanguard and Norfolk Boreas have not to date been ground-truthed through intrusive (e.g. trial trenching) evaluation approaches. This work will be carried out in the post-consent stages of the project as part of the initial informative stages of the mitigation (Section 2.2, paragraph 41). It is noted that the programme and timetabling of archaeological work will be subject to appropriate consideration to ensure investigative work is carried out in a timely and efficient manner (Section 3.1, paragraph 48). This approach has been agreed with Norfolk County Council Historic Environment Services and with HBMCE, but it should be noted that this approach carries an element of risk; a flexible timetable is needed to accommodate the potential discovery of previously unknown remains.
- 12.2 Section 4 presents the staged approach of the mitigation work that will be followed post-consent (paragraph 51) and includes additional geophysical survey work,



metal detecting and field walking surveys, and targeted intrusive investigations. The approaches cited appear to be sensible and appropriate, although it is acknowledged that part of this work may be carried out as part of the Norfolk Vanguard development if this project is consented first, referred to as Scenario 1 (paragraph 52).

- 12.3 It is stated that the programme of trial trenching will be undertaken post consent, and will target primarily potential archaeological anomalies identified following the analysis of the geophysical survey data, as well as apparent blank areas, an approach which we support (paragraph 81).
- 12.4 Section 6.2 discusses the Strip, Map and Sample methodology that will be followed. It is stated that the topsoil and subsoil will be removed ('stripped') under direct archaeological control and supervision and that the archaeology will then be planned and excavated (paragraphs 101 and 103). It is not clear from the information provided if this means that the planning and excavation will take place immediately after the site has been stripped. If the site is to remain open for a short time before the excavation takes place then a time limit should be agreed with Norfolk County Council Historic Environment Services; the exposure of sites to the elements can result in the damage and/or loss of materials and deposits through weathering and bioturbation. The stripping and evaluation of the sites therefore need to be carefully timetabled to ensure that archaeology is not negatively impacted.
- 12.5 It is noted in Section 6.3 (Archaeological Monitoring/Watching Brief) that a contingency is to be included in the works programme to allow investigation and recording of archaeological remains that may be identified, disturbed or destroyed. It is noted that as some of the evaluation work will not take place until after the project has been consented that there are risks that previously unknown archaeological remains may be identified (paragraph 106). The work schedules will therefore need to allow for the flexibility to investigate any sites discovered appropriately.
- 12.6 Section 6.4 discusses the possibility that some sites may be preserved in situ where necessary and appropriate, but this will be considered on a case by case basis. We would recommend that the Historic England document *Preservation of Archaeological Remains* (2016) is consulted to help guide the decision making process about whether a site should and could be preserved in situ, and the sort of information required when making these decisions.
- 12.7 We are pleased to see that a protocol for archaeological discoveries has been developed for occasions where archaeological remains are discovered where an archaeologist is not present (Section 7). We are also pleased to see that elements of training have been included as part of this protocol to ensure that staff and contractors are aware of their responsibilities under the protocol (paragraph 135).



- 12.8 Section 11 presents the mitigation works that will be carried out as part of the archaeological monitoring/watching brief investigations. The majority of the presented strategy appears to be sensible and appropriate, but we offer the following comments to clarify aspects of the approach. We would recommend that some flexibility should be afforded to the sampling of features such as postholes. It is stated in Section 11.5 (paragraph 21) that postholes will be half-section (50%), but if the posthole is relatively small then it may be more appropriate to excavate 100% of the feature. We would also recommend that the option to collect spatially distinct samples from any structures is included, as this may allow the way that the structures were used and organised to be investigated (Section 11.5, paragraph 24). Finally, we would also recommend that discrete samples are collected from any graves (Section 11.5, paragraph 26 & Section 11.9, paragraph 59), following the approaches discussed within section 3 of the Historic England document *The Role of the Human Osteologist in Archaeological Fieldwork Projects* (2018).
- 12.9 It is stated in paragraph 48 that all retained artefacts will be washed; if the artefacts preserve evidence of organic residues then we would recommend that the advice provided in the Historic England document *Organic Residue Analysis and Archaeology* (2017), is referred to, and in particular the information regarding sampling (Historic England 2017, see section 5.2.2.3).
- 12.10 It is stated in paragraph 58 that all environmental samples will be processed as appropriate. We would recommend that his work is carried out in a timely manner to ensure that the remains are stabilised and to reduce the risk of their degradation.

13. Comments in relation to the Outline Written Scheme of Investigation (Offshore). PINS Document Reference: 8.6

- 13.1 We acknowledge that this document represents an outline scheme and that a project specific WSI will be developed post-consent (should permission be obtained). We also appreciate that there are edits that will be required to ensure the correct deemed Marine Licence conditions are referenced (vis. Introduction, paragraph 3). We also offer the comment that the statement made in paragraph 5 will require revision in any final version of the WSI produced to capture the fact that once agreed with the MMO any matters to do with updates will be addressed through task-specific Method Statements produced from the agreed and finalised WSI and captured accordingly within any archaeological Technical Reports subsequently produced.
- 13.2 We also offer the comment, in reference to Chapter 4 (Approach) that the detail contained within the Outline Offshore WSI should be sufficient to address matters as relevant to any works that occur prior to formal commencement of the project (should consent be obtained.)



- 13.3 In general, the outline WSI presented in the DCO application is sensible and appropriate and includes references to the principal guidance documents that we would expect to see. The detail provided in section 5.1 (seabed prehistory) is clear and well presented as demonstrated by Table 1; this also provides a useful mechanism to cross reference between Chapter 8 (marine geology) and Chapter 28 (marine archaeology). Table 4 (summary of A1 anomalies) includes a note regarding the wreck of the *Seagull* and we confirm that this wreck and the wreck of the *Xanthe* are now scheduled monuments (as explained within paragraph 5.6 of this Written Representation).
- 13.4 Chapter 6 (Impact Assessment Summary), Table 6 details matters to do with magnitude (of impact), significance, (proposed) mitigation and (assumed) residual impact. We are pleased to see that primary mitigation focuses on avoidance, as detailed within Chapter 7 (committed mitigation measures). However, we note that the provisions within the draft DCO (as summarised in paragraph 11.4 within this Written Representation) contains the necessary provisions to deliver an archaeological WSI, but that they do not specifically address the detail provided in section 7.1 (embedded mitigation), for example, the spatial extent of Archaeological Exclusion Zones (AEZs). It is therefore necessary for any archaeological WSI produced post consent (should permission be obtained) to include an amended version of this section to explain the specific matters stated within any final DCO and the actions to be taken, through application of the WSI, to deliver those conditions.
- 13.5 The attention given to additional survey and analysis work to investigate potential features of archaeological interest is important particularly in reference to the assessment of survey data utilised to date, as described within sections 9.4 and 9.6. However, attention will be necessary in any post-consent WSI to ensure reporting objectives are clearly understood by all parties with particular reference to any sites discovered which could be considered to be heritage assets.
- 13.5 Section 9.5 (Marine geoarchaeological investigations) requires particular attention to support its effective implementation in reference to the identification of relevant published research frameworks to inform any subsequent programmes of analysis.
- 13.6 Section 9.7 (archaeological watching brief), mentions clearance operations and that a watching brief might be necessary. Chapter 5 (section 5.4.13) is clear regarding the requirement for pre-lay grapnel runs and pre-sweeping and therefore this section of the outline archaeological WSI will require attention post-consent (should permission be obtained) to be informed by a risk assessment exercise to determine whether or not on board supervision will be required (as



relevant to array area, electricity export cable corridor and interconnects search area) with the detail of how any on board watching brief might be delivered through an accompanying Method Statement.

- 13.7 Chapter 7 (monitoring) discusses the possibility of revision of the final Offshore WSI. The text used here must be clear that the provisions for the production of a WSI post-consent (should permission be obtained) should be aligned with the detail of any DCO (including deemed Marine Licences) secured for this proposed project. In particular that any final Offshore WSI is produced in consultation with HBMCE, but is formally agreed with the MMO to discharge a specific consent requirement. However, it is possible that analysis and assessment programmes generated by the delivery of the final and agreed Offshore WSI through accompanying Method Statements will produce new information. It is therefore an important matter that such information is captured accordingly, which we consider to be the role of any archaeological Technical Reports generated by completed phases of works or other agreed programmes of analysis.

14. Comments on the In Principle Monitoring Plan (offshore). PINS Document reference: 8.12

- 14.1 We note that the In Principle Monitoring Plan (IPMP) was prepared following consultation with the MMO and relevant Statutory Nature Conservation Bodies (SNCBs). We understand that the IPMP is designed to assist delivery of identified monitoring measures, as required by the conditions contained within the draft deemed Marine Licences (dMLs).
- 14.2 Table 4.6 (In principle monitoring proposed – Offshore archaeology and cultural heritage) explains that the Norfolk Boreas Ltd. will produce an updated archaeological WSI (Offshore) at least four months prior to the intended start of construction. However, it is important to draw attention to the provision made within the draft dMLs (Condition 14(2) for Schedules 9 and 10; Condition 9(2) for Schedules 11 and 12; and Condition 7(2) for Schedule 13 regarding production of a WSI to inform pre-commencement surveys. We therefore offer a cross reference to this requirement with the detail provided in Table 4.1 (vis. changes in seabed topography etc.), whereby the: “Scope for surveys and programmes and methodologies for the purposes of monitoring shall be submitted to the MMO for written approval at least four months prior to the commencement of any survey works”.
- 14.3 Therefore, in consideration of the above detail regarding the importance of pre-construction surveys within the proposed Order limits and the action taken by the Applicant to address such matters, we request that any revision of the IPMP



makes this matter clear within Table 4.6 (and Appendix 1) that the WSI is to be produced at least four months prior to the commencement of any survey works. It is only through such effective coordination will it be possible to investigate and identify seabed features of known and potential archaeological interest. Furthermore, such collaborative data gathering and coordinated data processing should enable in-situ protection through use of AEZ to be in place before construction starts and the production of a WSI to address such matters as might be encountered during construction (e.g. engineering micro-siting requirements), operation and decommissioning.

- 14.4 We also offer the observation that the following statement made in sub-section 4.10.1 (Conclusions of the Environmental Statement): “For the project alone the effects that have been assessed are anticipated to be minor adverse or negligible on the basis of embedded mitigation” is based only on those elements of the historic environment found or anticipated at the time of preparing the ES and the assumption that proposed embedded mitigation strategies can be delivered in the absence of final design details at the time of application submission.



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