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Cc: [REDACTED]
Subject: Local Impact Submission - Norfolk County Council
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FAO: Steven Parker
Norfolk Vanguard Case Team
National Infrastructure Planning
The Planning Inspectorate

Please find attached the County Council's Local Impact Report (LIR) comprising:

- (a) LIR (November 2018);
- (b) Appendix 1 Detailed Comments;
- (c) Appendix 2 Map 1
- (d) Appendix 3 Map 2
- (e) Appendix 4 Map 3;
- (f) Appendix 5 Map 4;
- (g) Appendix 6 PEIR Comments (November 2017).

Please could you acknowledge receipt of this email and documents attached.

Please note that the County Council is in active negotiation with the applicant (Vattenfall) on the technical issues raised in the attached documents and fully expects these to be resolved through the DCO process.

Kind regards

Stephen

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Norfolk County Council



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Local Impact Report

NorfolkVanguard Offshore Wind Farm and Onshore Supporting
Infrastructure – submitted Development Consent Order
Application

Identification No. 20012439

Evidence by Stephen Faulkner BA (Hons); MSc; DipTP; MRTPI
Principal Planner

November 2018

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Appendix 1 – Detailed Environmental; Highway; and Flood Risk Comments

Appendix 2 – Map 1 – Location of the proposed Hornsea Three Wind Farm

Appendix 3 – Map 2 – Proposed Landfall

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Appendix 6 – Norfolk County Council's Response to the Preliminary Environmental Information Report (PEIR) – November 2017

Norfolk County Council – Local Impact Report –

Norfolk Vanguard Offshore Wind Farm and Onshore Supporting Infrastructure – submitted application

November 2018

1. Introduction

- 1.1. This report sets out Norfolk County Council's position with regard to the submitted Development Consent Order (DCO) application made under section 56 of the Planning Act (2008).
- 1.2. The County Council is a statutory consultee given that the proposed development is a Nationally Significant Infrastructure Project (NSIP) under the above Act and is located both:
 - (a) Adjacent to the County – offshore Wind Farm located in the North Sea (see Map 1 – Appendix 2); and
 - (b) Within the County with regard to the supporting onshore grid connection infrastructure (see Map 2 Appendix 3).
- 1.3. The principal role of the County Council in responding to the above wind farm and ancillary onshore infrastructure application, is in respect of the Authority's statutory role as:
 - Highways Authority;
 - Minerals and Waste Planning Authority;
 - Lead Local Flood Authority; and
 - Public Health responsibilities.
- 1.4. In addition, the County Council have an advisory environmental role and economic development function, which has also fed into the response to the DCO application.
- 1.5. The issues raised below simply relate the County Council's statutory and advisory functions.

2. Background

- 2.1. The County Council recognises this as a DCO application for an offshore windfarm and onshore ancillary grid connection infrastructure in Norfolk, which will be determined by the Secretary of State for Business, Energy and Industrial Strategy. The application is defined as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008.
- 2.2. The County Council responded to the pre-application (Section 42 Consultation) version of this proposal in November 2017. At that time the County Council broadly supported the proposal subject to a number of detailed matters being resolved (see Appendix 6).
- 2.3. In the intervening period between the pre-application and submission of the Development Consent Order (DCO) application, the County Council has been working closely with Vattenfall (the applicant) on the issues previously raised and

many of these matters have now been addressed (or are in the process of being addressed) for example – the applicant has agreed:

- (a) To pursue a HVDC solution – which takes out the need for a booster relay station (approx. 10,000 sq.m) near the coast and reduces the cable corridor width from 100 to 45 m; However, the County Council recognise that the HVDC grid connection facility will be more visible (4 m higher at 19 m) than the HVAC proposal. NB Any landscape matters are a matter for the LPA;
- (b) County Council officers continue to work pro-actively with Vattenfall on securing real economic benefits for Norfolk (e.g. using Port at Great Yarmouth; and developing the skills sector);
- (c) Commitment in principle to establishing some form of Community Benefit fund;
- (d) Reduced disruption on businesses and the wider community during construction through choosing HVDC technology (i.e. no need for relay station and reducing cable corridor width from 100m to 45m), thereby reducing the potential disruption on communities and businesses; and
- (e) Agreement to compensate local land owners and the fishing community.

3. The Proposal – Development Consent Order Application

3.1. The County Council has assessed the proposal on the following basis:

3.2. **(a) Key Offshore Infrastructure**

Location and Distance Offshore	:	Located in two distinct areas approximately 47 and 70 km respectively off the Norfolk coast (see Map 1 (Appendix 2) attached).
Total Site Area		592 sq.km. in two separate areas: East 297 sq.km. and West 295 sq.km.
Proposed Capacity	:	Installed capacity of 1.8 Giga-Watt (sufficient to supply 1.3 million households with electricity).
Number and size of turbines	:	Range between 90 x 20 MW to 200 x 9 MW turbines with a maximum tip height of up to 350 m.
Offshore works	:	Interconnector Cables and foundations:
	:	Up to four cables to landfall totalling 400 km (length of export cables).
	:	Up to 2 Offshore electrical (sub-station) platforms; Maximum height 100m; footprint 75 m x 100m;
	:	Up to 2 Offshore Accommodation platforms; Maximum height 100m; footprint 75 m x 100m;

(b) Key Onshore Work

Landfall Location	:	Immediately south of Happisburgh (0.25 km zone identified - see Map 2 (Appendix 3) attached) – all associated infrastructure will be located underground. The offshore cable will come ashore using Horizontal Directional Drilling (HDD) and duct installation under the cliff. Temporary works compound 60 m x 50 m and
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		access track would be needed. Duration 14 – 20 weeks
Cable route		Buried cable route between Happisburgh and grid connection at Necton Substation – approximately 60 km (See Map 3 (Appendix 4) attached). Between 2 – 4 cable trenches (trench width 1-2 m) will be required along an identified 45 m temporary corridor. The corridor width is sufficient to accommodate both the Vanguard and Boreas projects in one duct laying operation. Once both cables installed a 20 m corridor required for permanent easement. Duration 24 months
		The above cable route works would be sufficient to facilitate both the Vanguard and Boreas Projects and forms part of the Vanguard DCO application.
Necton - National Grid Sub-station (Extension)	:	The existing Necton National Grid substation (140 m x 145 m = 20,300) would require an extension to accommodate the Norfolk Vanguard and Norfolk Boreas connection points (see Map 4 (Appendix 5) attached): <ul style="list-style-type: none"> • 340 m x 150 m = 51,000 sq.m.(less the existing operational site 140 m x 150 m = 21,000) = 30,000 sq.m. • Maximum height 15 m. The extension would take the existing sub-station from 20,300 sq.m. to over 50,000 sq.m. (more than doubling the size). Duration 24 – 30 months
Necton - New Sub-station Vanguard Project HVDC Convertor	:	A new onshore substation will be required with a total maximum land requirement for the HVDC convertor station to the perimeter fence of 250m x 300m (75,000 sq.m.); Maximum height of building 19 m (HVDC); Tallest Structure height 25 m – lightening Protection Masts. Plus temporary construction area 200 m x 100 m (20,000 sq.m.) to accommodate offices; car parking; workshops and storage areas; The proposed substation will be located near to the Necton National Grid Substation – see Map attached Duration – 24 -30 months
Overhead Line Modifications	:	Two new overhead line towers would be required in close proximity to the existing corner tower (to the north east of the existing Necton substation) with a maximum height of 55m. The existing corner tower would be demolished such that the net new number of towers is one. The above overhead line works would be sufficient to

		facilitate both the Vanguard and Boreas Projects and forms part of the Vanguard application.
	:	Duration: Construction time approximately 24 - 30 months for sub-station and pylon work (this includes groundworks and civil construction elements).
Ancillary Works (pre-construction works)	:	<p>The onshore work will require, <i>inter alia</i>:</p> <p>Construction compounds – i.e. support buildings private road and hard standing;</p> <p>Construction of temporary haul roads and access tracks along the onshore cable route;</p> <p>Archaeological and ground investigation;</p> <p>Improvements to highway verges;</p> <p>Highway and private access roads;</p> <p>Works to move sewers, drains; and cables;</p> <p>Works affecting non-navigable rivers, streams or water courses;</p> <p>Landscaping and other works to mitigate any adverse effects of the construction; operation, maintenance or decommissioning of the project including ecological monitoring and mitigation works.</p> <p>Duration: 24 months (2020 -2021)</p>
Indicative Construction Programme		
Landfall duct installation	:	2022 - 2023
Pre-construction works	:	2020 - 2021
Cable – duct installation	:	2022 - 2023
Cable – pull	:	2024 - 2025
Substation installation	:	2024 - 2025

4. Local Impacts

- 4.1. This section of the report assesses the Environmental Statement (ES) and other supporting documentation in respect of the County Council's key functions and sets out the Authority's proposed response / comments. The response largely relates to the onshore infrastructure required to connect the electricity generated to the National Grid. Appendix 1 provides more detailed comments and proposed planning conditions / requirements the County Council would like attaching to any DCO. It should be noted that discussions are on-going with the applicant with regard to over-coming any technical issues.

Overview

- 4.2. The proposal has a maximum installed capacity of 1.8 Giga Watts (1,800 MW) of electricity, sufficient to power approximately 1.3 million households (i.e. this represents more than three times as many dwellings in Norfolk (2011)). Current operational offshore capacity in the UK is just over 4 GW (2015), therefore if consented the Vanguard proposal would potentially increase the UK's installed

capacity by 33%.

- 4.3. The proposal will generate thirty times more energy than the Scroby Sands wind farm (60 MW) and more than five and half times more energy than the Sheringham Shoal wind farm (317 MW). As such the proposal would make a significant contribution to the Government's Renewable Energy targets and objectives (see Section 5 below).

Comment

- 4.4. The principle of this offshore renewable energy proposal is supported as it is consistent with national renewable energy targets and objectives, subject to the detailed comments below being satisfactorily resolved with the applicant.

Grid Connection Issues

- 4.5. Since considering the pre-application version of the above proposal, the applicant has now opted to pursue a High Voltage Direct Current (HVDC) solution in respect of its cabling route and grid connection infrastructure. The advantages of using HVDC for transmission purposes is that it:
- (a) removes the need for a HVAC Cable Relay Station (CRS), which would be required near the villages of Ridlington and East Ruston; and
 - (b) narrows the cable width corridor from 100 m to 45 m (with 20 m easement on completion) along the 60 km route.
- 4.6. Grid connection is proposed at Necton and would involve, as indicated above, a significant extension to the existing sub-station taking it from just over 20,000 sq.m to over 50,000 sq.m. In addition there would be the need for a new HVDC convertor substation for the Vanguard project comprising a further 75,000 sq.m. There would also be a need for up-grading the power lines comprising a new tower. It is recognised that the proposed HVDC convertor station will be more visible structure than a HVAC substation and will stand 4 m higher than a comparable HVAC substation at 19 m.
- 4.7. **Comment** - the County Council welcomes the decision by Vattenfall to pursue a HVDC solution which removes the need for additional onshore infrastructure (cable relay station) in North Norfolk and reduces the potential environmental impact associated with the cable route by narrowing the cable corridor from 100m to 45 m.

Electricity Supply Issues

- 4.8. County Council officers have been in discussion with Vattenfall and other potential offshore windfarm developers regarding the potential for electricity generated from these proposals to be used within the local distribution networks (132 kv and below) i.e. to assist where there are electricity deficits. These discussions have also involved National Grid who have made a formal and legally binding grid connection "offer" to Vattenfall.
- 4.9. National Grid have indicated that the onshore cables from the wind farms will ultimately belong to a future Offshore Transmission Operator (OFTO). In such circumstances, where the main connection point for the OFTO system is at a transmission substation (National Grid), the regulatory arrangements governing OFTO infrastructure do not provide for secondary interconnection between the OFTO system and a local distribution network operator (DNO) (i.e. UK Power Networks). In other words there is no opportunity of "tapping" into the transmission cables and feeding into the local electricity transmission network.

Comments

- 4.10. It is felt that Vattenfall should work with National Grid and UK Power Networks to consider options regarding the potential to feed electricity into the local transmission networks.

In addition the County Council will continue to work with the Local Enterprise Partnership (LEP) through the TRI - Local Energy Strategy (endorsed by this Committee in July 2018), in order to lobby central government to make legislative changes to overcome the obstacles to secondary inter-connection raised above.

Socio-Economic Issues

- 4.11. There are potentially significant economic benefits that may arise from the Vanguard proposal in terms of:
- Local employment creation;
 - Business sectors affected by construction; and
 - Operations and Maintenance (O&M) of the wind turbines.
- 4.12. The ES indicates that the project could create up to 1,063 jobs during construction (463 offshore and 600 onshore) and up to 294 during the operation and maintenance stage (longer term). The ES indicates that “.. there is the potential for major long-term benefits to the region due to increased employment across the supply chain serving the offshore wind industry”.
- 4.13. The County Council's Economic Development team has enjoyed regular, constructive dialogue with many members of the Vattenfall team. The company is engaging with local supply chain companies and seems keen to ensure that local businesses can benefit as far as possible from a wide range of contracts as they emerge. The company also shares the County Council's ambition to attract new investment into the area, in particular new manufacturing capacity and has been working with County Council's Economic Development Team in a number of areas. The company has an excellent relationship with Gt Yarmouth Port, which hopefully will lead to its use both during the construction phase and later in respect of operations and maintenance (O&M).
- 4.14. It is understood that Vattenfall has signed a Memorandum of Understanding with Peel Ports Great Yarmouth in 2017 to explore locating the Swedish energy group's operations base at the East Anglian facility. Vattenfall and Peel Ports, have subsequently agreed to reserve space at Great Yarmouth harbour to site an operations base for the major offshore wind farm.

Vattenfall expect to employ up to 150 skilled, local technicians to maintain their projects for a minimum of 25-years.

- 4.15. The County Council is working with all energy companies and the New Anglia LEP to promote this sector and develop a Skills Strategy for the types of skills required for young people in schools and colleges, as well as enabling more of the existing workforce, with adaptable core skills to migrate. In addition the County Council would like to see:
- Apprenticeships,
 - Work experience; and
 - Internship opportunities at an appropriate stage.
- 4.16. The County Council is working with Vattenfall to further develop the above Strategy and ensure that there is a skills legacy to the project.

Comments

- 4.17. The County Council continues to work pro-actively with Vattenfall to demonstrate the economic benefits of using the Port facilities at Great Yarmouth for:
- Construction, marshalling and assembly;
 - Encouraging investment by companies involved in the manufacture of

- windfarm components; and
- Operations and maintenance.

The County Council also continues to work with the applicant to develop the creation of apprenticeships; work experience; and internships.

Wider Community Issues and Impact on Business

- 4.18. The applicant has indicated that they are “.. committed to exploring options for delivering a provision for communities, with the aim of recognising hosts and accounting for change, where benefits acknowledge and address tangible local change. The form of the benefit and its purpose will be explored with relevant stakeholders at the appropriate time, separate to the Development Consent Order process.”

Such provision could make a valuable contribution to the local area, by supporting projects such as community building improvements and recreation facilities, conservation and wildlife projects etc.

- 4.19. The potential impact and disruption caused to local businesses is most likely to occur during the construction phases. As indicated above the amount of onshore works has been reduced as a result of the Vattenfall committing to transmitting the electricity produced using HVDC technology this avoiding the need for a cable relay station in North Norfolk and reducing the cable corridor width. This will in part reduce the potential impact on businesses in the area.
- 4.20. It is understood that Vattenfall will compensate landowners who are directly affected by the cable route through their land. Compensation is paid for the freehold depreciation of the land affected by the easement and for all reasonable and substantiated losses arising from construction of the project.

Comment

- 4.21. The County Council welcomes the commitment towards establishing some form of community benefit and would ask Vattenfall to ensure all stakeholders/communities are made aware of such funds and have the opportunity to make appropriate bids.
- 4.22. The reduction in the potential impacts and disruption to business as a consequence of using HVDC technology is welcomed, however, it is felt that Vattenfall should commit to providing appropriate compensation for businesses and communities adversely affected by the construction works.

Commercial Fishing

- 4.23. 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).
- 4.24. The ES 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 principally comprises:
- Local UK Static gear Fishing potting by UK vessels (i.e. for brown crab, lobster and Whelk);
 - Dutch Vessels undertaking trawling
- 4.25. The impacts arising are most likely during construction leading to temporary loss, or restricted access to fishing grounds and leading to increased steaming times to alternative fishing grounds. However, the ES concludes that the impacts will largely be negligible in the longer term.

- 4.26. The ES also points out that the impact on commercial fishing has been reduced as a consequence of:
- (a) Reducing the number of turbines to a maximum of 200; and
 - (b) Committing to using HVDC technology which uses fewer cable (on the seabed) thus reducing potential snagging issues of fishing gear.
- 4.27. In terms of mitigation and minimising impact, the applicant has indicated that they will, include, for example:
- The provision of timely notices to mariners and the fishing community on any proposed works;
 - Undertaking appropriate liaison with all relevant fishing interests; and
 - Ensuring the layout of the windfarm minimises any future disruption to fishing in the area.

Comment

- 4.28. The County welcomes the revised/amended design of the above proposal and mitigation measures set out in the applicant's ES. However, where there is likely to be a demonstrable impact (i.e. during: construction; operation and/or decommissioning) on commercial fishing affecting communities in Norfolk, it is considered that Vattenfall should provide appropriate compensation (i.e. disturbance payments) to those fishing businesses affected. It is understood that Vattenfall are prepared to provide compensation in appropriate circumstances.

Local Highway - key Issues

- 4.29. Detailed discussions and negotiations are on-going throughout the application process particularly in respect of any temporary road closures; construction traffic management plans; and other travel related planning. Notwithstanding these ongoing discussions officers have assessed the traffic implications arising from all of the following:- the landfall area; onshore cable corridor; connection to the National Grid; compounds; storage areas; and construction accesses – as used by (and / or affected by) construction; operational and decommissioning traffic.
- 4.30. The key issue for the County Council as Highway Authority is in relation to the proposed use of the former Oulton Airfield as the main work compound. The main compound for the project is located on the former Oulton Airfield and seeks to utilise an access and HGV route which the Planning Inspectorate identified in 2014 as being unsuitable for HGV's to use (PINS Appeal ref – APP/K2610/A/14/2212257).

Local Highway Comment

- 4.31. It is felt that the applicant needs to find a different site for their main compound. However, if they wish to pursue their chosen site then they will need to:
- (i) provide a scheme of temporary off-site highway improvement works comprising carriageway widening along the entire route from the compound to the main road. Details need to be provided setting out how the works will be maintained during the project and also the mechanism to re-instate the land upon completion. In addition -
 - (ii) demonstrate that such a scheme is capable of overcoming the issues previously identified by PINS.

In the meantime a **holding objection** on highway safety grounds has been raised to the inclusion of this site.

Wider Strategic Highway Issues

- 4.32. An onshore substation will be required. The intention is to extend the Necton

substation in an east west direction with vehicular access provided from the A47(T). Traffic assessments for the A47(T) are issues for Highways England to comment upon and not the County Council. Nevertheless the County Council has expressed concern with regard to the proposed access arrangements and has suggested that as a minimum, a full right turn lane be provided from the A47(T). An alternative access strategy from the A47(T) has also been proposed by the applicant, however the County Council has again raised safety concerns. Ultimately, access to the A47(T) for the proposed new substation is a matter for Highways England to assess and the County Council can only inform them of our concerns.

- 4.33. Highways England have announced a preferred route for dualling the A47(T) between Easton and North Tuddenham. Proposals for the dualling of the A47 (T) will follow the same NSIP procedures as the above application. It is understood that formal pre-application work on the A47 dualling will commence later in the year. While there are no immediate plans to dual the A47(T) in the Necton area, it is felt that the above proposal should not fetter any long terms possibilities for the dualling of the A47 in the area.
- 4.34. The applicant will need to liaise with both Highways England and Norfolk County Council (as LHA) to ensure that the planned cable route does not fetter any future major road plans in the area and cause additional costs and/or delay to such road schemes.

Strategic Highways Comments

- 4.35. (a) Vattenfall need to satisfy Highways England with regard to the safety of their proposed access at Necton onto the A47(T). Impact upon driver delay along the trunk road network will also be assessed by Highways England.
- (b) Vattenfall should work closely with Highways England and Norfolk County Council (Highway Authority) to ensure the proposed cable route does not fetter any future plans for the dualling of the A47(T);
- (c) Vattenfall are asked to ensure that their underground Cable Route does not fetter any future highway improvement schemes in Norfolk and that where any reinforcement or diversion is needed to the cable route as a result of such highway works, that Vattenfall will be responsible for any upgrades or diversion of the cables and will fully meet the costs of these works.

Minerals and Waste

- 4.36. Norfolk County Council in its capacity as the Minerals and Waste Planning Authority has been involved in discussions with the applicant; 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.
- 4.37. The Mineral Planning Authority considers that Chapter 19 of the Environmental Statement correctly assesses the magnitude, sensitivity and significance of the effect of the project on Mineral Safeguarding Areas. The further mitigation suggested, in the ES is considered likely to be effective. The Outline Construction Code of Practice, which will form part of the DCO requirements, states that a Site and Excavated Waste Management Plan will be drawn up, and that this will set out how material from excavations will be reused and recycled, where practicable.

Comment

- 4.38. Norfolk County Council in its capacity as the Minerals and Waste Planning Authority does not object to the Proposed Vanguard Wind Power Project provided that the applicant continues to work with Norfolk County Council regarding the mitigation of impacts on the Mineral Safeguarding Areas.

Flood and Drainage Issues and Comments

- 4.39. The applicant has provided supporting documents for the DCO application addressing local flood risk issues and surface water drainage issues. Chapter 20 of the ES (Water Resources and Flood Risk) considers the potential impacts of the proposal on water resources and flood risk. The chapter includes a flood risk assessment and provides an overview of the existing baseline where the onshore project area is proposed, followed by an assessment of the potential impacts and associated mitigation for the construction, operation and decommissioning of the project. The assessment also considers cumulative impacts of other proposed projects. This chapter has been considered in conjunction with Chapter 19 of the ES (Ground Conditions and Contamination).
- 4.40. The ES identifies two key groups of impacts for the purpose of defining impact significance:
- Water resources, (these are potential effects on the physical (including hydrology and geomorphology), biological or chemical character of surface waters or groundwater, potentially impacting on secondary receptors such as wetlands or abstractions, and Water Framework Directive water body status); and
 - Flood risk (these are the potential impacts of the project on site drainage, conveyance and surface water flooding). The potential for cumulative effects has been considered for the construction, operation and decommissioning of the onshore project area cumulatively with the offshore project area as well as with other onshore projects.

Comment

- 4.41. The LLFA welcomes that sustainable drainage systems (SuDS) have been proposed for the project where permanent above ground infrastructure is proposed to mitigate against additional impermeable surfaces creating an additional risk of flooding. The LLFA have considered the submitted documents and are pleased to see that strategies have been supplied for the sub-station and the National Grid sub-station extension study areas. The cable corridor has not been considered in the post construction drainage strategy due to the fact that the cable would be below ground and reinstatement to pre-development state would mitigate the potential for increased runoff.
- 4.42. It is noted that Greenfield run-off rates and volumes have as yet to be agreed with the LLFA. This will need to be considered during detailed design stage.
- 4.43. It should be noted that where ordinary watercourses are to be crossed by open cut, or any other temporary works are proposed as part of this project are likely to affect flows in an ordinary watercourse, then the applicant would need the approval of Norfolk County Council. The County Council would appreciate early consultation on the number of such crossings of Ordinary Watercourses and the required timeframes for approval. This will enable the team to have adequate staffing resources in place to ensure approvals are not unduly delayed and for and issues to be identified. It should also be noted that other ordinary watercourse crossings would need consent approval from the relevant Internal

Drainage Board (IDB). In line with good practice, Norfolk County Council seeks to avoid culverting, and its consent for such works will not normally be granted except as a means of access. Such approvals are separate from planning and temporary mitigation methods may be required while cable laying is undertaken.

- 4.44. Norfolk County Council appreciates that these are initial drainage proposals, however, ideally these matters above (covering infiltration testing and drainage design) should be clarified prior to determination, to ensure that the site has a deliverable surface water drainage strategy. In particular there is no maintenance or management strategy supplied with the application and the LLFA have had to assume that the applicant will take responsibility for maintaining the drainage for the lifetime of development. The LLFA recognise this is a strategic application and is being determined by the Secretary of State as the Planning Authority and to ensure the best possible drainage strategy is developed Norfolk County Council would ask that the attached condition / requirement (see Appendix 1) is integrated into any final DCO consent. Additional technical LLFA will be sent under delegated officer powers to the Planning Inspectorate along with the above comments.

Landscape

- 4.45. County Council officers have attended an Expert Topic Group led by the applicant relating to Landscape and Visual Impact Assessment (LVIA) work.
- 4.46. It is noted that the LVIA has been conducted using the Guidelines for Landscape and Visual Impact Assessment (GLVIA) 3rd Edition and other industry best practice guidance. The visualisations; photomontages; and 3D model views are useful in viewing the likely effects of the proposed development and change over time. When viewed in conjunction with the ZTVs (Zone of Theoretical Visibility) photomontages, these give a clear demonstration of the impacts of the Substation and the National Grid Substation Extension, as well enabling an assessment of the mitigation landscaping.

Comment

- 4.47. It should be noted that landscape issues are ultimately a matter for Breckland District Council to comment on as the Local Planning Authority with their own adopted Local Plan policies covering landscape and other environmental matters.
- 4.48. While it is accepted that the onshore elements of Norfolk Vanguard have the potential to impact the landscape and visual amenity, measures have been “designed-in” to minimise these impacts. It is also noted that the location chosen has been selected to minimise visual impact, particularly in relation to the Substation and the National Grid Substation Extension, where existing vegetation and landform have been used to intercept views.
- 4.49. The decision by Vattenfall to pursue a HVDC option in terms of its cable route has, as indicated above, taken away the need for a cable relay station / booster station close to the Norfolk Coast (near Happisburgh). This option is welcomed in terms of minimising the impacts of this development on the landscape in North Norfolk. However, the County Council recognises that the proposed HVDC substation will be more visible than the comparable HVAC substation and will stand 4m higher than a HVAC substation at 19 m.

Public Health

- 4.50. The County Council would expect detailed matters relating to, for example construction noise; local environmental health; and any other potential

contamination issue, to be addressed by the relevant District Councils and/or other statutory body such the Environment Agency. Providing the District Councils are satisfied with the proposal in relation to the above matters, the County Council would not wish to raise any public health concerns at this time.

Discharge of Requirements

- 4.51. As part of the application process there will be a need for a series of planning requirements attached to the final consent (Development Consent Order) covering a range of detailed matters. In the event that the DCO is consented these planning “requirements”, will ultimately need to be discharged as the development progresses. The discharge of requirements is normally undertaken by the determining authority (i.e. local planning authority - LPAs) for non-NSIP schemes. For NSIP schemes there is the potential for the discharge of conditions/requirements to be undertaken by either the District Councils (LPAs) and/or the County Council.

Comment

- 4.52. There are ongoing discussions with the applicant and the District Councils affected by this scheme as to how best the discharge of requirements should be undertaken. One option might be that there is a single “lead” Authority discharging the requirements. An alternative option would be that each local authority discharges those requirements within their respective area / statutory remit. It is understood that the applicant is prepared to fund the above “discharging” work given the significant resource implication. The discharge of requirements and their funding is expected to be covered through a Planning Performance Agreement (PPA).

5. Further Comments / Impacts

- 5.1. The County Council’s Environment Development and Transport Committee in addition to agreeing the above comments also agreed the following:

Hedgerow – The County Council would ask that maximum possible replanting / mitigation of hedgerows is undertaken after works are carried out in respect of the cable route and any other onshore development resulting in the potential removal of hedgerow.

Coastal Erosion – The County Council would ask that sufficient safeguards and mitigation measures are put in place where the offshore cable route makes landfall to the south of Happisburgh (as a planning requirement), in order to ensure the onshore infrastructure does not exacerbate existing coastal erosion in the area.

Highways Access - The County Council will address all local highway issues arising from construction by seeking suitable planning requirements (conditions), in particular with regard to updating the outline Construction Traffic Management Plans. In addition the County Council will expect the developer to:

- (A) enter into a legal agreement with the Highway Authority to ensure any damage is rectified;
- (B) set up local stakeholder involvement group/s to enable any traffic issues arising during the construction phase to be discussed and resolved.

6. Conclusion

- 6.1. Norfolk County Council fully supports the principal of offshore wind energy,

which is consistent with national policies on energy particular in respect of:

- Reducing greenhouses;
- Providing energy security; and
- Maximising economic opportunities.

6.2. The above report and supporting appendices, however, show that while the County Council supports the broad principal of this development proposal, there are a number of issues directly affecting the Authority which need to be resolved as part of the DCO process. In particular there are:

6.3. **Highway issues** – There are access issues in relation to the main works compound at Oulton and until this issue is resolved there is a holding highway objection;

Flood Risk and drainage issues – the need for: infiltration testing, further design modelling; design drainage structures; and maintenance and management plan. These issues can be resolved through a planning requirement attached to the DCO;

Archaeological issues – issues need to be resolved involving further investigative works. These issues can be addressed through a planning requirement attached to the DCO.

6.4. In addition to these direct planning issues there are wider strategic matters which need to be addressed and explored through the DCO process in order to maximise the potential socio-economic benefits, including:

- (a) Wider consideration to the need and possibility for secondary interconnection, which would allow for electricity generated from the offshore wind farm to be used within the local distribution networks along the cable route;
- (b) Economic benefits – use of ports in Norfolk:
 - During the construction and assembly phase;
 - As a location for basing operation and maintenance facilities; and
 - As venues for seeking to attract manufacturing investment.

6.5. The County Council continues to work with Vattenfall in order to resolve the above issues.

Response to Norfolk Vanguard DCO Application - Detailed Environmental, Highway and Flood Risk Comments

Public Rights of Way

- 1.1. It is noted that the onshore cable route intersects with Public Rights of Way (PRoW), including National and County Trails, at 45 locations. Mitigation for impacts on users of the PRoW network is in the form of embedded ('designed-in') mitigation and method statements.

Comment

- 1.2. Norfolk County Council welcomes the use of HDD underneath some of the particularly heavily-used recreational routes (long-distance trails), particularly at landfall where the cables will intersect with the England Coast Path. HDD is also proposed for cable-laying across two further Trails managed by Norfolk Trails, namely Marriott's Way (twice) and Paston Way (both these sites are also designated County Wildlife Sites at the crossing points). This approach should result in negligible disruption to users of these Trails. It is noted that HDD is not proposed at the crossings of two further Norfolk Trails, the Wensum Way and Weaver's Way, nor the majority of the crossing points of the general PRoW network.
- 1.3. Mitigation for impacts on the majority of the PRoW and Trails network will be addressed by two documents: A *Public Right of Way Strategy*, and a *Code of Construction Practice* (CoCP), draft versions of which have been submitted with the DCO application. The Council believes these documents should result in appropriate measures to manage impacts in relation to cable-laying. In relation to the discharge of the DCO requirement for the CoCP, the documents refer to liaison with the "relevant local planning authority" (e.g. CoCP, section 4; paragraph 71; p 16). However, when it comes to matters relating to PRoW and Trails, it is felt that the County Council as the Highways Authority should be the relevant local authority to agree the management of PRoW.
- 1.4. The County Council welcomes the intention of the applicant to liaise with the PRoW Officers and Trail Officers over short-term temporary diversions of PRoW or other potential impacts. This will be important in reducing the burden on NCC in managing matters relating to the PRoW network with regards to the cable-laying works. The County Council also welcomes the approach for providing advanced warning of works that would affect PRoW. Where Norfolk Trails would be affected, it would additionally be helpful if information could be provided for inclusion on the Norfolk Trails website.

Ecology

- 1.5. The involvement of the County Council with regards to ecology has been with onshore works only. Representatives from the Natural Environment Team have been involved in the onshore Ecology Expert Topic Group (ETG).
- 1.6. The Ecology Chapter of the ES (Chapter 22) and the onshore Ornithology Chapter (Chapter 23) describe the ecological baseline and assess the impacts resulting from the onshore infrastructure requirements. The design of the scheme contains "embedded mitigation" for ecology. Where "additional mitigation" is required, potential impacts on terrestrial ecology will be delivered

as described in the Outline Code of Construction Practice (OCoCP) and the Outline Landscape Ecological Management Strategy (OLEMS). The final detail of the mitigation and enhancement measures will be provided through one or more Ecological Management Plans (EMP) which will act as a single document for all ecological mitigation considerations on site.

Comments

- 1.7. The County Council welcome the above approach and agree the content of the outline CoCP and the OLEMS. In the second document, it is stated that “*Norfolk Vanguard Limited will work with the relevant local authorities to ensure appropriate resourcing is in place to monitor compliance with the provisions of the OLEMS, and the plans and schemes of which it forms the basis*”. The Natural Environment Team of the County Council would wish to be involved in this process.
- 1.8. The County Council welcomes the use of HDD where cable routes intersect with County Wildlife Sites. It is noted that a running track will still be necessary at the Wendling Carr CWS, but the need for this was discussed at the ETG meeting and is further described in the ES. The County accept that this approach is needed and believe the proposed mitigation is appropriate.
- 1.9. The County Council has previously raised concerns about the following matters, which have now been addressed:
- The constraints on access for ecological surveys: The OLEMS states that due to access constraints only 50% of the onshore project area was subject to ecological field surveys, and only 40% of the ponds. It is noted that the use of the Norfolk Living Map to ‘fill-in’ data gaps at this stage, but recognise field surveys of the currently un-surveyed locations will be necessary post-consent, and these surveys may lead to further mitigation at specific locations.
 - Insufficient survey effort of CWS: At an early stage of the scoping process, the County Council advised that surveying of CWS close to the cable corridor was necessary (ETG meeting Jan 2107). This was accepted by Vattenfall and the surveys were completed. The results of those surveys are included in the ES.
 - The suitability of the bat surveys to enable delivery of appropriate assessments of impacts and therefore appropriate mitigation (ETG Meeting July 2017): Vanguard came back to the County Council on this matter with revised reports, and the County Council is now satisfied that the assessments are broadly valid and the proposed mitigation for is appropriate. It is noted that some surveys will still need to be made post-consent at locations where access constraints resulted in no or incomplete surveys (OLEMS, paragraph 68). It is also noted that during the design process, landfall has moved away from the key area of concerns for barbastelle bats at the Paston Great Barn SAC colony.

Historic Environment

Onshore Comments

- 1.10. Subject to the submission and approval of a revised version of Document 8.5 Outline Written Scheme of Investigation: Archaeology and Cultural Heritage (Onshore) to state that work will be carried out in accordance with the Norfolk County Council *Standards for Development-led Archaeological Projects in*

Norfolk (2018), the County Council is happy to recommend that the following requirements are placed on the consent if granted;

- 1.11. A) No development shall take place other than in accordance with the submitted and approved Outline Written Scheme of Investigation: Archaeology and Cultural Heritage (Onshore).

And, separately,

B) The development shall not be operated until the site investigation and post investigation assessment has been completed in accordance with the programme set out in the archaeological written scheme of investigation approved under (A) and the provision to be made for analysis, publication and dissemination of results and archive deposition has been secured.

Offshore Comments

- 1.12. The Offshore Historic Environment implications of the proposed development are considered in Chapter 17 of the ES (Offshore Archaeology and Cultural Heritage). The offshore historic environment below the low-water mark is not specifically within the remit of the County Council.
- 1.13. A decision has been made by Vattenfall to use a long HDD technique at the landfall of the cable route. As a result of this there will be no construction work, or resulting historic environment impact, within the inter-tidal zone on Happisburgh beach (where internationally significant archaeological remains of Palaeolithic date are known to exist). As such the County Council does not have any specific comments or recommendations to make on the offshore archaeology and cultural heritage of the proposed development. However, Vattenfall and their heritage consultants should continue to liaise with Historic England and other key stakeholders (e.g. Ancient Human Occupation of Britain) regarding any post-consent works.

Lead Local Flood Authority (LLFA) Comments

- 1.14. The ES states that the crossing of ordinary watercourses would be by Horizontal Directional Drilling (trenchless) or open cut. Referring to Appendix 20.4 Detailed Watercourse Crossing Schedule Table 20.1 it is noted that it appears that the majority all Norfolk County Council ordinary watercourses are proposed to be crossed by open cut rather than Horizontal Directional Drilling for permanent works. If this is the case, or any other temporary works proposed as part of this project are likely to affect flows in an ordinary watercourse, then the applicant would need the approval of Norfolk County Council. The County Council would appreciate early consultation on the number of such crossings of Ordinary Watercourses and the required timeframes for approval. This will enable the team to have adequate staffing resources in place to ensure approvals are not unduly delayed and for any issues to be identified. It is also noted that other ordinary watercourse crossings would need consent approval from the relevant Internal Drainage Board (IDB). In line with good practice, Norfolk County Council seeks to avoid culverting, and its consent for such works will not normally be granted except as a means of access. It should be noted that this approval is separate from planning and temporary mitigation methods may be required while cable laying is undertaken.

Proposed Condition/Requirement -

- 1.15. Prior to commencement of development, in accordance with the submitted Environmental Statement for Application for Development Consent - The proposed Norfolk Vanguard Offshore Wind Farm, detailed designs of a surface water drainage scheme incorporating the following measures shall be submitted to and agreed with the Secretary of State or his delegated approving body. The approved scheme will be implemented prior to the first use of the development. The scheme shall address the following matters:
- I. Detailed infiltration testing to be undertaken in accordance with BRE Digest 365 within the study areas for the sub-station and the National Grid sub-station extension for the design of SuDs features.
 - II. If infiltration is not possible surface water runoff rates will be attenuated to the pre development 1 in 1 year rate (or 2 l/s/ha). Where applicable confirmation should be sought from the Internal Drainage Board that the proposed rates and volumes of surface water runoff from the development are acceptable.
 - III. Provision of surface water infiltration / attenuation storage should be sized and designed to accommodate the volume of water generated in all rainfall events up to and including the critical storm duration for the 1 in 100 year return period, including allowances for climate change, flood event.
 - IV. Detailed designs, modelling calculations and plans of the of the drainage conveyance network in the:
 - 1 in 30 year critical rainfall event to show no above ground flooding on any part of the site.
 - 1 in 100 year critical rainfall plus 40% climate change event to show, if any, the depth, volume and storage location of any above ground flooding from the drainage network ensuring that flooding does not occur in any part of a building or any utility plant susceptible to water (e.g. electricity equipment required at the converter / booster station and substation) within the development.
 - V. The design of any drainage structures will include appropriate freeboard allowances. Plans to be submitted showing the routes for the management of exceedance surface water flow routes that minimise the risk to people and property during rainfall events in excess of 1 in 100 year return period
 - VI. Details of how temporary works or temporary storage areas that will generate surface water runoff will be controlled to prevent a temporary increased risk of flooding. These details will also include what strategy/ plans will be provided to reinstate land to the pre-development state.
 - VII. Finished ground floor levels of the converter / booster station and substation should have a freeboard such that all infrastructure is above expected flood levels from all sources of flooding, including fluvial flooding associated with the ordinary watercourse, tidal flooding and any above ground storage or flooding from the proposed drainage scheme.
 - VIII. Details of how all surface water management features are to be designed in accordance with The SuDS Manual (CIRIA C697, 2007), or the updated The SuDS Manual (CIRIA C753, 2015),

including appropriate treatment stages for water quality prior to discharge.

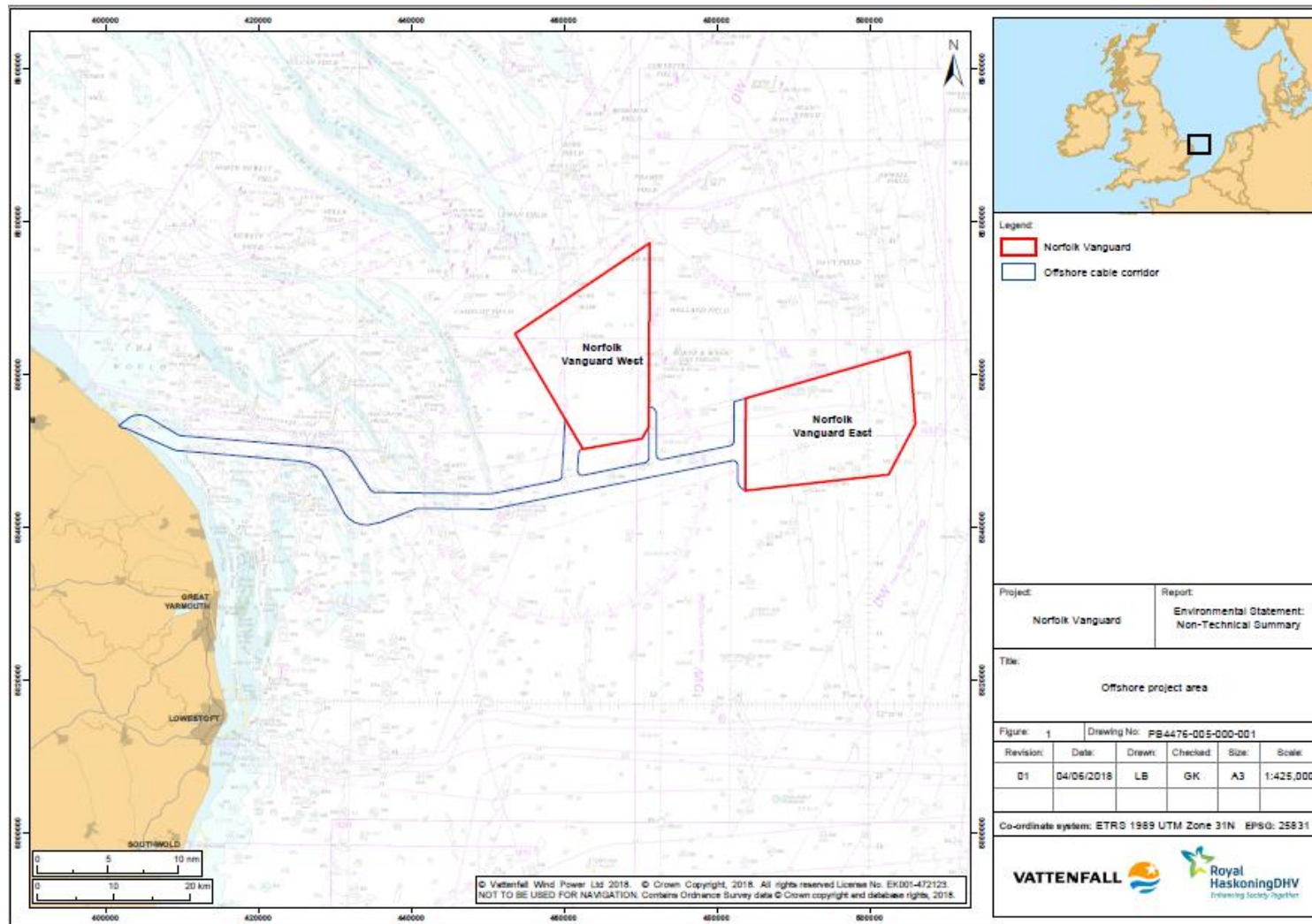
- IX. A maintenance and management plan detailing the activities required and details of who will adopt and maintain the all the surface water drainage features for the lifetime of the development. This will also include the ordinary watercourse and any structures such as culverts within the development boundary.

Reason:

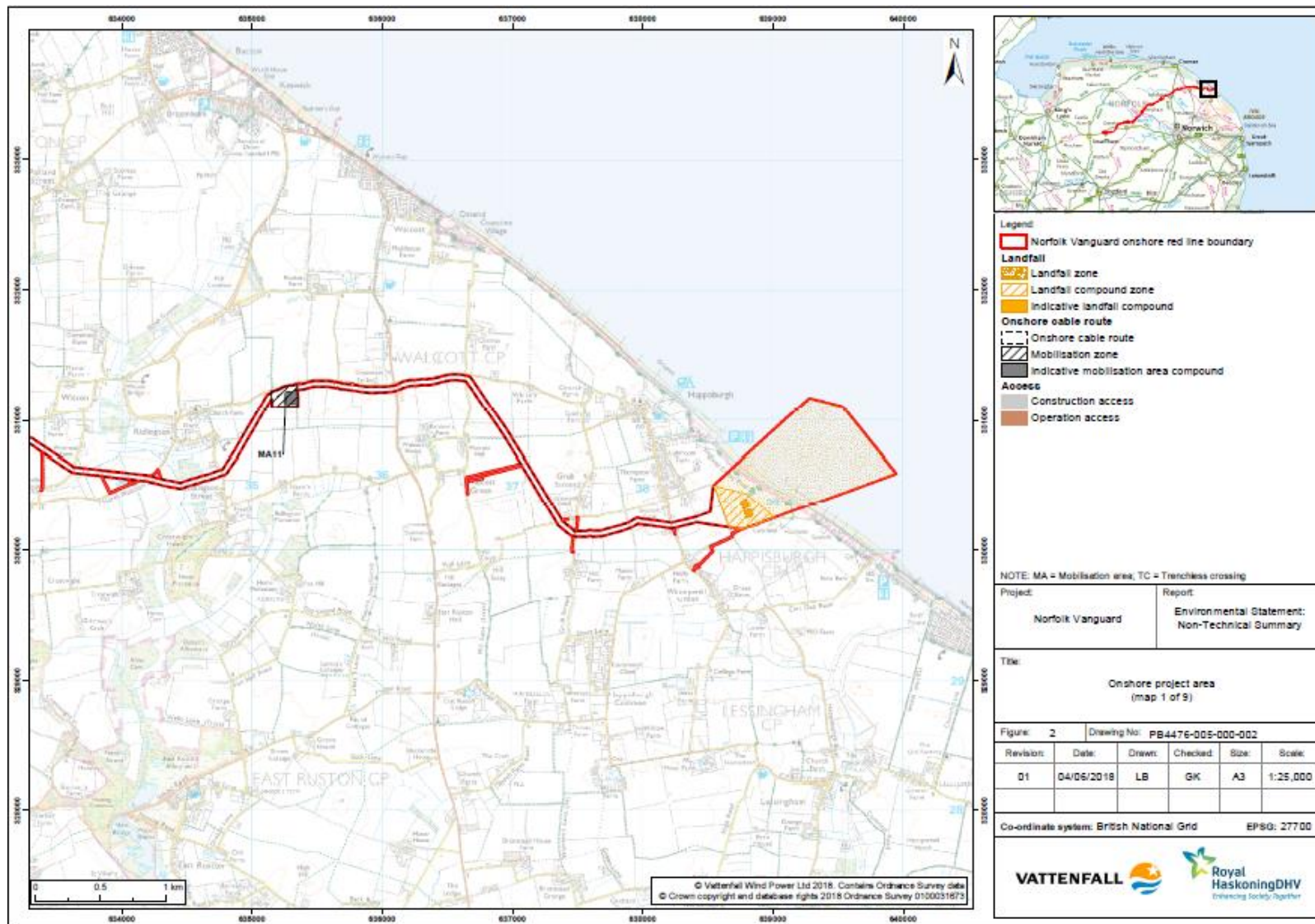
To prevent flooding in accordance with National Planning Policy Framework paragraph 103 and 109 by ensuring the satisfactory management of local sources of flooding surface water flow paths, storage and disposal of surface water from the site in a range of rainfall events and ensuring the surface water drainage system operates as designed for the lifetime of the development.

- 1.16. NB Further detailed technical comments will be sent to both the applicant and the Planning Inspectorate.

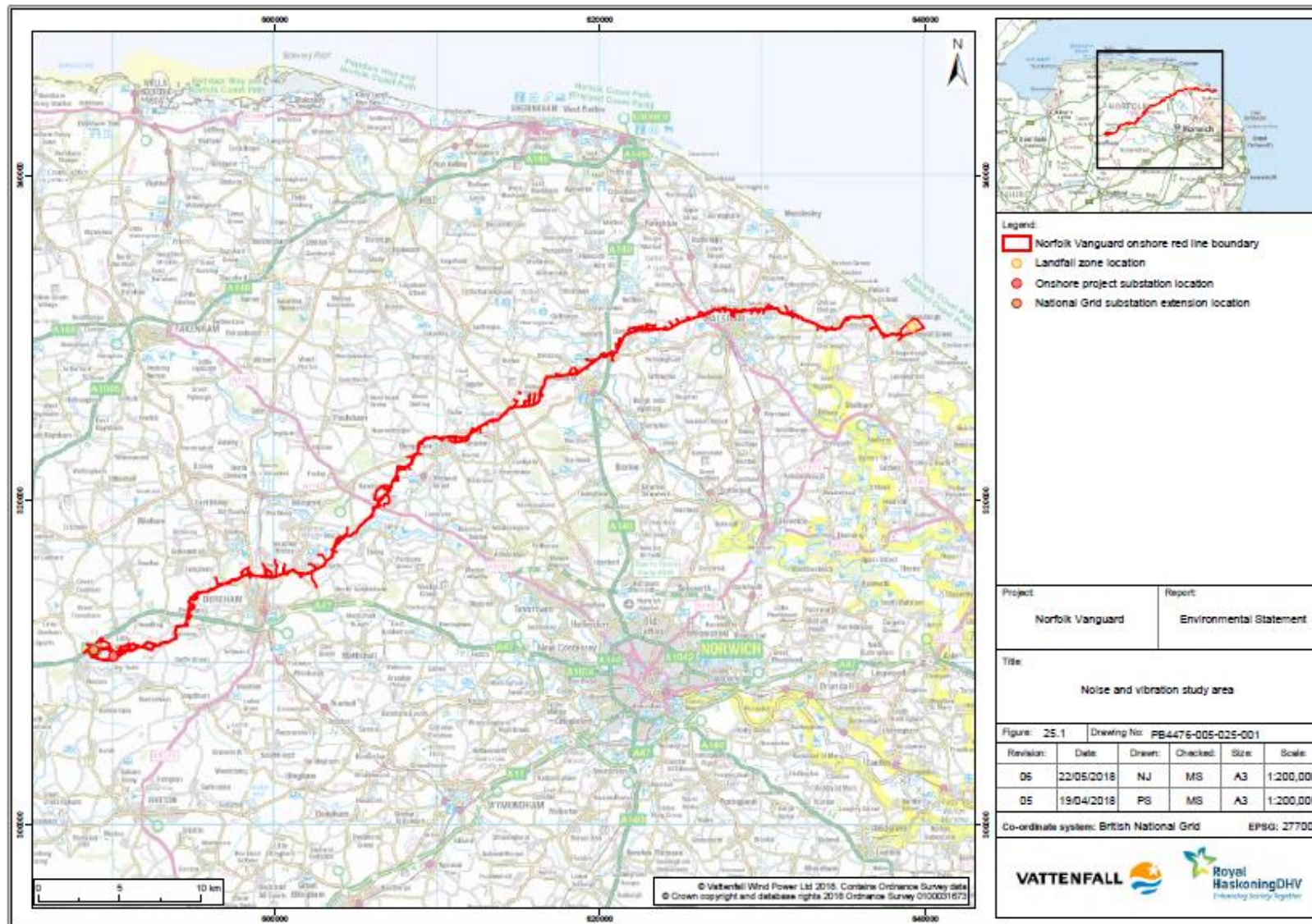
Appendix 2 - Map 1 - Showing location of the Offshore Wind Farm



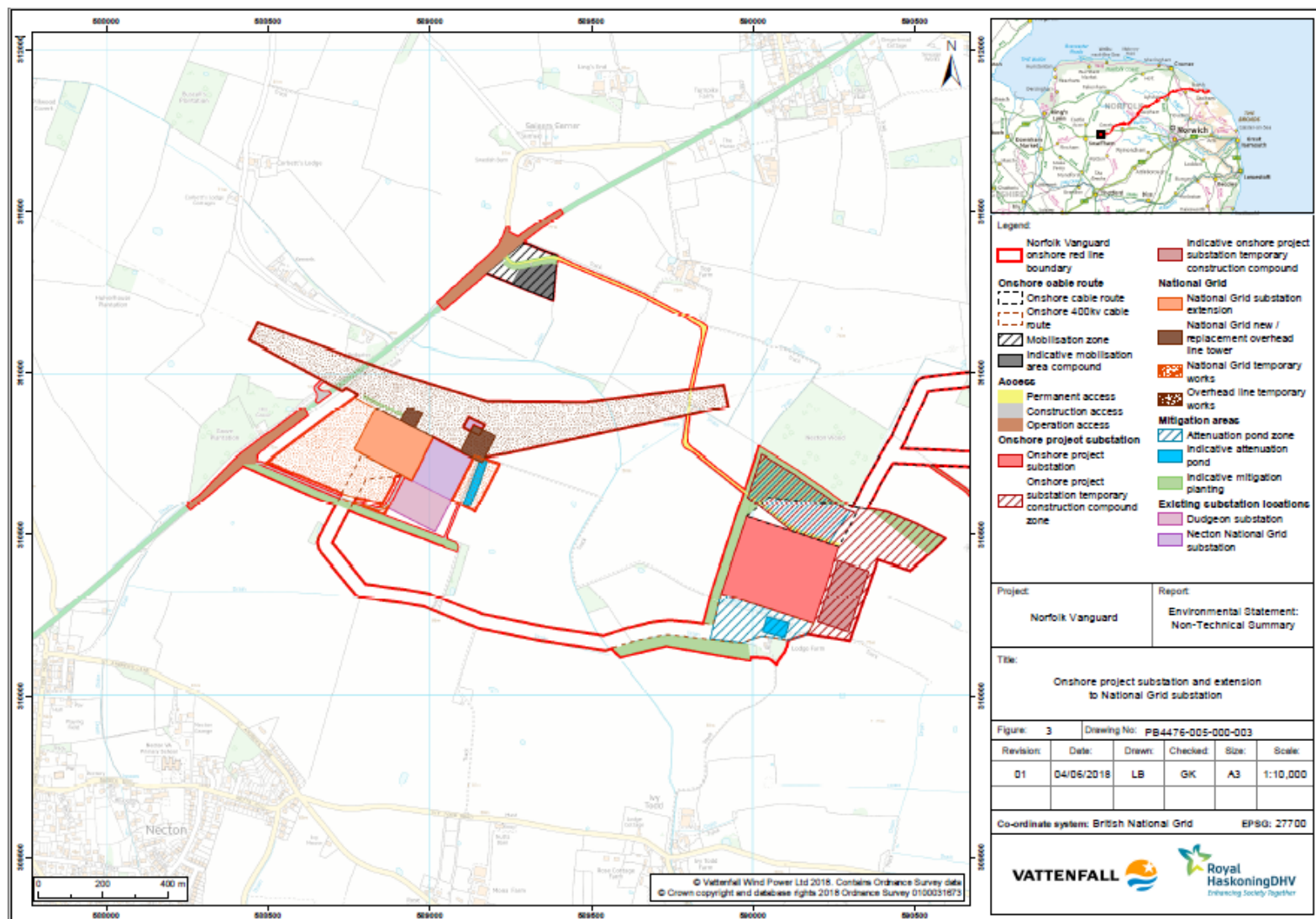
Appendix 3 Map 2 - Cable Landfall South of Happisburgh



Appendix 4 Map 3 Cable Route



Appendix 5 Map 4 - Grid Connection at Necton



Covering Report

Report title:	Norfolk Vanguard Offshore Windfarm Consultation
Date of meeting:	Urgent Decision – November 2017
Responsible Chief Officer:	Tom McCabe - Executive Director, Community and Environmental Services
Strategic impact The above offshore windfarm and onshore grid connection infrastructure will be determined as a Nationally Significant Infrastructure Project under the Planning Act 2008. Norfolk County Council is a statutory consultee on such projects and therefore has the opportunity to comment and influence the final decision. Responding to such consultations will ensure the County Council's views are formally taken into account prior to a final decision being made by the Secretary of State.	

Executive summary

Consultation by Vattenfall (Swedish Energy Company) for an offshore wind farm 47 km off the Norfolk coast comprising: up to 257 turbines; and ancillary onshore supporting infrastructure including: a new cable relay station (if required using HVAC technology); buried cable route (approximately 60 km); extending the existing sub-station at Necton; and construction of a new sub-station (close to Necton Sub-station). The proposal has a generating capacity of 1.8 Giga Watts, which is sufficient to provide 1.3 million homes with electricity. Given the scale of the development it is deemed to be a Nationally Significant Infrastructure Project (NSIP) and will be determined by the Secretary of State for Business, Energy and Industrial Strategy.

This is a formal pre-application consultation under Section 42 of the Planning Act 2008. There will be a further opportunity to comment on this proposal when the application is formally submitted under Section 56 of the Act.

While the proposal is consistent with national targets and objectives on renewable energy and climate change there are a number of detailed issues to be resolved through the subsequent application stage in respect of: highway matters; environmental considerations including flood risk and visual impact/mitigation; and economic development opportunities to be more fully considered.

Recommendations:

It is recommended that the County Council supports the principle of this offshore renewable energy proposal, which is consistent with national renewable energy targets and objectives, subject to the detailed comments raised below and in the Appendix being resolved with the Applicant.

It is recommended that the detailed comments set out in the report and the Appendix are endorsed by the Chair and Vice Chair of the Environment, Transport and Environment Committee.

1. Proposal – Facts and Figures

- 1.1. This proposal for an offshore windfarm and onshore ancillary grid connection infrastructure in Norfolk will be determined by the Secretary of State for Business, Energy and Industrial Strategy (Greg Clark) as it is defined as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008. This is a formal pre-application consultation by Vattenfall under Section 42 of the above Act. It is important to note that the County Council as a statutory consultee will also have an opportunity to formally comment on the submitted application (under Section 56 of the above Act), which is expected in Summer 2018.
- 1.2. At this stage the County Council is invited to make comments on the Preliminary Environmental Information Report (PEIR), made in support of the proposal. The PEIR presents the findings of the Environmental Impact Assessment (EIA) to date.
- 1.3. Members will recall that an information report was brought to the Environment, Development and Transport (EDT) Committee in November 2016 setting the broad scope of this project and the Hornsea Project Three wind farm proposal. This latter scheme was considered at EDT Committee on 15 September 2017 where the broad principle of the development was supported subject to a number detailed County Council matters being resolved.
- 1.4. The proposal for the Vanguard Wind farm comprises:

(a) Offshore

Location and Distance Offshore	:	Located in two distinct areas approximately 47 and 70 km respectively off the Norfolk coast (see Maps attached).
Total Site Area		592 sq.km.
Proposed Capacity	:	Installed capacity of 1.8 Giga-Watt (sufficient to supply 1.3 million households with electricity).
Number and size of turbines	:	Range between 90 x 20MW to 257 x 7MW turbines with a maximum tip height of up to 350 metres
Offshore works	:	Interconnector Cables and foundations:
	:	Up to six cables to landfall totalling 620 km; and 514 km of cables between turbines;
	:	Up to 3 Offshore electrical (sub-station) platforms and 2 accommodation platforms located in the Array area. Maximum size 5,400 sq.m. per platform and maximum height of up to 30 m (55 m including crane height and helideck);

(b) Onshore Work

Landfall Location	:	Immediately south of Happisburgh (1.5 km zone identified - see Maps attached) – all associated infrastructure will be located underground.
HVAC Cable Relay Station (CRS) (if required)	:	Required if electricity brought ashore using HVAC technology within approx. 5 km of landfall. Proposed site (2 options to be refined to 1 to be submitted with application electrical equipment)

		<p>located near the settlement of Ridlington approximately 2.5 km west of Happisburgh (see Maps attached);</p> <p>Maximum height of electrical equipment is 8 m.</p> <p>Site maximum footprint 73 m x 135 m (9,855 sq.m.) with 2.4 m fencing surrounding the site; plus a small control building with associated car parking area 31 m x 18 m; and temporary work compound 150 m x 100m (15,000 sq.m.);</p> <p>(NB the decision on whether to use HVAC or HVDC will be made after the project is consented.)</p>
Cable route		<p>Buried cable route between Happisburgh and grid connection at Necton Substation – approximately 60 km (See Maps attached).</p> <p>Between 2 and 12 cable trenches will be required along an identified 200 m search corridor. The eventual corridor to be submitted with the application (S56) will be 100 m sufficient to accommodate both the Vanguard and Boreas projects in one duct laying operation.</p> <p>The above works would be sufficient to facilitate both the Vanguard and Boreas Projects and forms part of the Vanguard application.</p>
Necton - National Grid Sub-station (Extension)	:	<p>The existing Necton National Grid substation (140 m x 145 m) would require an extension to accommodate the Norfolk Vanguard and Norfolk Boreas connection points (see Map):</p> <ul style="list-style-type: none"> • Easterly extension 130 m; • Westerly extension 200 m • Maximum height 15 m. <p>The extension would take the existing sub-station from 20,300 sq.m. to 65,250 sq.m. (tripling the size). The above works would be sufficient to facilitate both the Vanguard and Boreas Projects and forms part of the Vanguard application.</p>
<p>Necton - New Sub-station Vanguard Project</p> <p>HVDC Convertor or HVAC substation</p>	:	<p>A new onshore substation will be required with a total maximum land requirement for the HVAC onshore substation to the perimeter fence of 250m x 300m (75,000 sq.m.);</p> <p>Maximum building height 15 m (HVAC) and 19 m (HVDC);</p> <p>Plus temporary construction area 200 m x 100 m (20,000 sq.m.);</p> <p>The proposed substation will be located near to the Necton National Grid Substation – see Map attached</p>

Overhead Line Modifications	:	<p>Two new overhead line towers would be required in close proximity to the existing corner tower (to the north east of the existing Necton substation) with a maximum height of 50m. The existing corner tower would be demolished such that the net new number of towers is one.</p> <p>Alternatively, the existing corner tower could be modified and one new terminal tower constructed in close proximity. The design approach taken will be confirmed at the detailed design phase.</p> <p>The above works would be sufficient to facilitate both the Vanguard and Boreas Projects and forms part of the Vanguard application.</p>
	:	Construction time approximately 18 months for sub-station and pylon work (this includes groundworks and civil construction elements).
Ancillary Works	:	<p>The onshore work will require, <i>inter alia</i>:</p> <p>Construction compounds (see Map 2)– i.e. support buildings private road and hard standing;</p> <p>Construction of temporary haul roads and access tracks along the onshore cable route;</p> <p>Archaeological and ground investigation;</p> <p>Improvements to highway verges;</p> <p>Highway and private access roads;</p> <p>Works to move sewers, drains; and cables;</p> <p>Works affecting non-navigable rivers, streams or water courses;</p> <p>Landscaping and other works to mitigate any adverse effects of the construction; operation, maintenance or decommissioning of the project including ecological monitoring and mitigation works.</p>
	:	<p>Construction timetable for above onshore works:</p> <ul style="list-style-type: none"> • Pre-construction works commencing between 2020 -2021; • Main works (duct installation, sub-station and cable relay station civil works) proposed for 2022 – 2023; • Completed by 2026 based on whole project built in longest three phase scenario;

The PEIR indicates that there are a range of transmission options involving using either: (a) High Voltage Alternating Current (HVAC); or (b) High Voltage Direct Current (HVDC). Traditionally HVAC systems have been used in the UK for transmission as the technology is readily available. However, HVDC technology is developing and becoming more economically viable. A HVDC solution would

remove the need for the onshore Cable Relay Station (CRS) and therefore would be more acceptable in environmental terms.

The PEIR shows the maximum infrastructure requirements needed (i.e. a worse case) based on a HVAC solution. The PEIR also shows the potential infrastructure requirements if a HVDC option is chosen.

2. Evidence

2.1. The principal role of the County Council in responding to the above wind farm proposals, and the onshore infrastructure requirements, will be in respect of the Authority's statutory role as:

- Highways Authority;
- Minerals and Waste Planning Authority; and
- Lead Local Flood Authority.

2.2. In addition the County Council has an advisory environmental role and economic development function, which also needs to feed into any response made to the above windfarm proposal.

2.3. Other statutory consultees include:

Natural England	Highways England
Historic England	Drainage Boards
Marine Management Organisation	Public Health England
Maritime and Coastguard Agency	Energy and utility companies with cable and pipeline interests
Civil Aviation Authority	Parish, District and other County Councils

2.4. The remainder of this section of the report assesses the PEIR in respect of the County Council's key functions and sets out the Authority's proposed response / comments. The response largely relates to the onshore infrastructure required to connect the electricity generated to the National Grid. The Appendix provides more detail on: environmental, archaeological, flood and drainage; and public health matters.

ASSESSMENT of the Preliminary Environmental Information Report

Overview

2.5. The proposal has a maximum capacity of 1.8 Giga Watts (1,800 MW) of electricity, sufficient to power approximately 1.3 million households (i.e. this represents more than three times as many dwellings in Norfolk (2011)). Current operational offshore capacity in the UK is just over 4 GW (2015), therefore if consented the Vanguard proposal would potentially increase the UK's installed capacity by 33%.

2.6. The proposal will generate thirty times more energy than the Scroby Sands wind farm (60 MW) and more than five and half times more energy than the Sheringham Shoal wind farm (317 MW). As such the proposal would make a serious contribution to the Government's Renewable Energy targets and objectives (see Section 5 below).

Comment

- 2.7. The principle of this offshore renewable energy proposal is supported as it is consistent with national renewable energy targets and objectives, subject to the detailed comments below being resolved with the applicant.

Grid Connection and Electricity Supply Issues

- 2.8. As indicated above the proposal could involve either HVAC or HVDC technology. The advantage of using HVDC for transmission purposes would result in removing the need for a HVAC Cable Relay Station (CRS). The CRS has a footprint of 9,800 sq.m. and a height of 8 m. While the applicant has not ruled out the use of HVDC technology, it is felt that every effort ought to be made to enable a HVDC solution, which would remove the need for the HVAC CRS near the villages of Ridlington and East Ruston.
- 2.9. Grid connection is proposed at Necton and would involve, as indicated above, a significant extension to the existing sub-station taking it from just over 20,000 sq.m to over 65,000 sq.m. In addition there would be the need for a new substation for the Vanguard project comprising a further 75,000 sq.m. There would also be a need for up-grading the power lines comprising a new tower (worst case scenario).
- 2.10. County Council officers have been in discussion with Vattenfall and other potential offshore windfarm developers regarding the potential for electricity generated from these proposals to be used within the local distribution networks (132 kv and below) i.e. to assist where there are electricity deficits. These discussions have also involved National Grid who have made a formal and legally binding grid connection “offer” to Vattenfall.
- 2.11. National Grid have indicated that the onshore cables from the wind farms will ultimately belong to a future Offshore Transmission Operator (OFTO). In such circumstances, where the main connection point for the OFTO system is at a transmission substation (National Grid), the regulatory arrangements governing OFTO infrastructure do not provide for secondary interconnection between the OFTO system and a local distribution network operator (DNO)(i.e. UK Power Networks). In other words there is no opportunity of “tapping” into the transmission cables and feeding into the local electricity transmission network.
- 2.12. There have been on-going officer and member discussions/meetings with both Vattenfall and Orsted (Formerly DONG Energy) regarding the potential impact on the County’s infrastructure. As part of these discussions officers have sought assurances that there will be as much practical collaboration between the two companies as possible in order to minimise any environmental impact on the County. However, in practice the opportunities for collaboration will be minimal given that grid connection points and landfall sites are being made in separate locations, and both companies are operating in a competitive market. Notwithstanding these issues Vattenfall and Orsted are working together in respect of:
- (a) Where each project’s transmission cables cross;
 - (b) Stakeholder engagement; and
 - (c) Environmental data and survey work.

Comments

- 2.13. It is felt that Vattenfall should:
- (a) Make every effort to enable a HVDC solution in order to minimise the onshore environmental impacts arising from the proposal;
 - (b) Work with National Grid and UK Power Networks to consider options

regarding the potential to feed electricity into the local transmission networks; and

- (c) Continue to work closely with other offshore windfarm developers to minimise any onshore impacts arising from their development.

Socio-Economic Issues

- 2.14. There are potentially significant economic benefits that may arise from the Vanguard proposal in terms of:
- Local employment creation;
 - Business sectors affected by construction; and
 - Operations and Maintenance (O&M) of the wind turbines.
- 2.15. 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 project will create between 70 -80 jobs in O&M. There will also jobs created in the building/construction of the new onshore substation and possible CRS.
- 2.16. The County Council is working with all energy companies and the New Anglia LEP to promote this sector and develop a Skills Strategy for the types of skills required for young people in schools and colleges. In addition the County Council is working to create:
- Apprenticeships,
 - Work experience; and
 - Internship opportunities at an appropriate stage.
- 2.17. 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.

Comments

- 2.18. The County Council strongly encourage, on economic development grounds and supporting the Norfolk economy, Vattenfall to use the Port facilities at Great Yarmouth for:
- Construction; assembly and manufacture of windfarm components; and
 - Operations and maintenance.
- 2.19. Vattenfall should set out clearly in the following application stage (Section 56 submission) and the accompanying Environmental Statement (ES):
- (a) how local communities impacted by the onshore construction (e.g. Cable Route, CRS and Substation) can have such impacts mitigated; and
 - (b) the need for a “local community fund” to assist the wider community affected by the proposal.
- 2.20. 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.

Commercial Fishing

- 2.21. 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).
- 2.22. 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:
- Local UK Static gear Fishing potting by UK vessels (i.e. for brown crab, lobster and Whelk);
 - Dutch Vessels undertaking trawling
- 2.23. The PEIR indicates that fishing will be permitted within the Norfolk Vanguard 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.

Comment

- 2.24. It is felt that where there is likely to be a demonstrable impact on commercial fishing affecting communities in Norfolk that Vattenfall should provide appropriate mitigation and compensation to those fishing communities affected.

Local Highway Issues

- 2.25. The PEIR presents the initial traffic and transport considerations. The construction phase is identified as generating the greatest number of vehicle movements. The transportation of materials and removal of spoil for the trenches will cause the greatest impact. The delivery of abnormal loads also needs to be taken into account.
- 2.26. The formal planning application, when submitted, must be accompanied by a Transport Assessment (TA). The TA will assess the effects of the anticipated traffic upon driver delay; severance; pedestrian delay; pedestrian amenity; accidents; road safety; and impact from abnormal loads. Development Consent Order (DCO) requirements will also have commitments to agree a Construction Traffic Management Plan (CTMP), which will initially be submitted in outline, then completed and agreed when the contractor is appointed.

The PEIR sets out the methodology and criteria that will be used to produce the TA and CTMP.

Highway Comment 1

- 2.27. The anticipated volume of construction traffic upon each route is contained within the PIER, however, until such time as a full TA and outline CTMP have been completed by the applicant, the Local Highway Authority (LHA) is unable to endorse the proposal.

The County Council, as LHA is working closely with the applicant on the above matters.

Wider Strategic Highway Issues

- 2.28. An onshore substation will be required. The intention is to extend the Necton substation in an east west direction with vehicular access provided from the A47(T). Traffic assessments for the A47(T) are issues for Highways England to comment upon and not the County Council. Nevertheless the County Council has expressed concern with regard to the proposed access arrangements and has suggested that as a minimum, a full right turn lane be provided from the A47(T). An alternative access strategy from the A47(T) has also been proposed by the applicant, however the County Council has again raised safety concerns. Ultimately, access to the A47(T) for the proposed new substation is a matter for Highways England to assess and the County Council can only inform them of our concerns.
- 2.29. Members will be aware of proposals to dual the A47(T) between Easton and North Tuddenham. Highways England have announced a preferred route for the A47(T). Proposals for the dualling of the A47 (T) will follow the same NSIP procedures as the above application. It is understood that formal pre-application work on the A47 dualling will commence later in the year. While there are no immediate plans to dual the A47(T) in the Necton area, it is felt that the above proposal should not fetter any long terms possibilities for the dualling of the A47 in the area.
- 2.30. The applicant will need to liaise with both Highways England and Norfolk County Council (as LHA) to ensure that the planned cable route does not fetter any future major road plans in the area and cause additional costs and/or delay to such road schemes.

Highways Comments 2

- 2.31. (a) Vattenfall need to satisfy Highways England with regard to the safety of their proposed access at Necton onto the A47(T). Impact upon driver delay along the trunk road network will also be assessed by Highways England.
- (b) Vattenfall should work closely with Highways England and Norfolk County Council (Highway Authority) to ensure the proposed cable route does not fetter any future plans for the dualling of the A47(T);
- (c) Vattenfall are asked to ensure that their underground Cable Route does not fetter any future highway improvement schemes in Norfolk and that where any reinforcement or diversion is needed to the cable route as a result of such highway works, that Vattenfall will be responsible for any upgrades or diversion of the cables and will fully meet the costs of these works.

Minerals and Waste

- 2.32. Norfolk County Council in its capacity as the Mineral and Waste Planning Authority has been involved in discussions with Norfolk Vanguard Ltd about the Vanguard Wind Power Project; 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.

- 2.33. The Mineral Planning Authority considers that the PEIR correctly assesses the magnitude, sensitivity and significance of the effect of the project on Mineral Safeguarding Areas. The further mitigation suggested, in the PEIR is considered likely to be effective. Therefore, Norfolk County Council in its capacity as the Mineral Planning Authority does not object to the Proposed Vanguard Wind Power Project provided that the applicant continues to work with Norfolk County Council regarding the mitigation of impacts on the Mineral Safeguarding Areas as the final scheme design continues.

Comment

- 2.34. It is felt that Vattenfall should continue to work closely with the County Council with regard to mineral and waste planning issues.

Flood and Drainage Issues and Comments

- 2.35. The PEIR contains several documents relating to the flood risk of the study area, including a water resources and flood risk document together with a Flood Risk Assessment FRA.
- 2.36. The Report indicates that the onshore project area will largely be located on rural, agricultural land. Therefore, the majority of the project shall be located within areas where there are no existing formal surface water drainage systems, other than agricultural land drains and ordinary watercourses.
- 2.37. The Flood Risk Assessment and supporting documentation shows that the proposed development at present meets the requirements of the NPPF. At this stage 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.

Comment

- 2.38. The County Council would 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. Further detailed comments relating to flood and drainage issues are set out in the Appendix.

Landscape and Historic Setting

- 2.39. The PEIR (Chapter 29 - Landscape and Visual Impact Assessment - LVIA) considers the impacts of the proposed infrastructure including the substation at Necton and, if a HVAC connection is used, a cable relay station (CRS) near Ridlington on the North Norfolk Coast.
- 2.40. Necton - The County Council's Landscape Architect has met with the consultant undertaking the LVIA at Necton alongside planning officers from Breckland District Council and agreed the viewpoints for the photomontages / visualisations at that location. The majority of the photomontages included in the PEIR (Chapter 29) are considered appropriate. The proposed mitigation set out in the PEIR is broadly considered satisfactory. However, the proposed mitigation will need to be more fully addressed in the Outline Landscape Ecological Management Plan (OLEMP), which will be produced alongside the Environmental Statement accompanying the submitted application (under Section 56 of the Plan Act 2008).
- 2.41. Ridlington - the photomontages within Chapter 29 of the PEIR reveal issues that need to be further investigated prior to the completion of the full ES. In particular, viewpoint 1 for CRS Option 5a shows that the proposed infrastructure would

affect the view towards St Mary's Church at Happisburgh (Grade I listed) from a location close to St Peter's Church at Ridlington (Grade I listed). The medieval churches in this part of the coastal landscape are very prominent landscape features and inter - visibility between them has been identified as forming part of their combined setting and significance.

Comments

- 2.42.
- Further work is required through the preparation of the Outline Landscape Ecological Management Plan (OLEMP) outlining how the proposed mitigation will be addressed. It is felt that further work will be necessary by the applicant to ensure that the proposed development in the area is mitigated appropriately.
 - It is felt that further evidence, in terms of photomontages / visualisations, is needed in respect of the proposed CRS near Ridlington and that this will need to be covered and addressed in the OLEMP (see detailed Historic Environment comments in the Appendix). The location of the proposed CRS will need to avoid / minimise the impact on the setting and inter - visibility of the local historic churches in the area.

Local Member Views

- 2.43. The local member for South Smallburgh division (Cllr Price) has made the following comments:
- Vattenfall should accept that if they chose the HVAC option then the CRS is an industrial unit and as such should be located on an industrial site and not within the flat and unspoilt countryside;
 - It is also considered unlikely that Vattenfall could design such a CRS with a noise level less than 3db above the current countryside background noise level. This would be less of a problem on an industrial site;
 - The roads around, and giving access to, Ridlington and East Ruston are just exceptionally quiet country lanes and not suitable for heavy vehicles and especially not to the level of 760 such vehicles per day. There are no pavements so there are concerns about what happens to the walkers, dog walkers, cyclists and horse riders;
 - The area of East Ruston and Ridlington is richly populated with small tourist and nature businesses, developed over many years to attract walkers, bird watchers and countryside lovers. A CRS would not just adversely affect those businesses but given the construction period and their scale, destroy them;
 - The people of East Ruston and Ridlington hope that their lives will not be permanently blighted by the insertion of an Industrial CRS into their villages rather than placing it on an Industrial Site for the sake of profit over people.
- 2.44. The local County Council for Necton and Launditch division (Cllr Kiddle-Morris) has made the following comments:
- Visual Impact – it is difficult to assess the impact of the proposal (sub-station) from the visualisations supplied by the applicant. Cllr Kiddle-Morris has suggested that further visualisations / photomontages ought to be undertaken with a crane or, temporary structure, erected in order to provide a context/reference point regarding the height and scale of the proposed sub-station and sub-station extension;

- Certainty – considers that the applicant should, prior to any Development Consent Order (DCO) submission, provide greater certainty as to which technology will be installed at the sub-station (i.e. whether it will be HVAC or HVDC);
- Flood Risk and Drainage – further work is required by the applicant regarding the flood risk and drainage issues arising from the proposed new Vanguard sub-station. In particular the issue of potential run-off from the proposed new sub-station onto local country lanes in the area needs fully addressing;
- Future Maintenance – while appreciating that maintenance will be required of any new infrastructure installed, it is felt that this should be restricted to normal working hours in order to avoid any disturbance to local residents (i.e. avoid night time working which could lead to light and noise pollution);
- Right-hand turn (A47(T) – considers that there ought to be a full right-hand turn lane on the A47(T) onto the sub-station site on highway safety grounds.

3. Financial Implications

- 3.1. Staff have engaged with the applicant at the technical scoping stage; attending steering group and topic based meetings and provided technical advice and information in respect of the County Council's statutory responsibilities. The County Council has charged for some of this advice and technical data provided.

4. Issues, risks and innovation

- 4.1. The County Council is a statutory consultee on any Nationally Significant Infrastructure Project determined by the Secretary of State within Norfolk or on the borders with Norfolk. The County Council will also be invited to submit a Local Impact Report (LIR), the content of which is a matter for the Local Authority and can include local transport issues and the local area characteristics.
- 4.2. The Council's Planning functions are subject to equality impact assessments. No EqIA issues have been identified at this stage.
- 4.3. The County Council's internal procedures allow for corporate response/s to be made to NSIP consultations ensuring all the County Council's statutory responsibilities are taken into account.

5. Background

- 5.1. At a national level the key energy objectives are:
 - Reducing greenhouse gases (carbon reduction);
 - Providing energy security; and
 - Maximising economic opportunities.

In order to meet these objectives more infrastructure is required with an increased emphasis on energy generation from renewable and low carbon sources.

- 5.2. The government's long term aspiration is to increase the diversity of the electricity mix, thereby improving the reliability of energy supplies as well as lowering carbon emissions. The Government is committed to the following

targets by 2030:

- A 40% cut in greenhouse gas emissions compared to 1990 levels;
- At least a 27% share of renewable energy consumption; and
- At least 27% improvement in energy efficiency.

5.3. The Energy Act 2013 includes provision intended to incentivise investment in low carbon electricity generation, ensure security of supply and help the UK meet its emissions reduction and renewable energy targets. The Climate Change Act 2008 underlines the government's commitment to addressing both the causes and consequences of climate change. The Act aims to improve carbon management and help the transition towards a low carbon economy in the UK. The Planning Act 2008 also makes specific reference to the need for local authorities to tackle climate change.

5.4. In terms of planning, the UK's commitment to renewable energy has been captured in the following National Policy Statements (NPSs):

- Overarching NPS for Energy (NPS EN 1);
- NPS for Renewable Energy Infrastructure (NPS EN 3);
- NPS for Electricity Networks Infrastructure (NPS EN 5).

The Planning Act 2008 requires the Secretary of State to have regard to the relevant NPSs when making their decision.

5.5. With regard to local planning issues the National Planning Policy Framework (NPPF 2012) indicates that the planning system has a key role in supporting the delivery of renewable and low carbon energy and associated infrastructure. To help increase the use and supply of renewable energy the NPPF (section 10) indicates, inter alia, that local planning authorities (LPAs) should:

- Have a positive strategy to promote energy from renewable and low carbon sources;
- Design their policies to maximise renewable and low carbon development;
- Consider identifying suitable areas for renewable development and supporting infrastructure.

5.6. As the above proposal is a NSIP it will be the Secretary of State (SoS) rather than the respective LPAs who will determine the application. The SoS will need to have regard to Local Plan policies and allocations when determining the application. The individual LPAs, including the County Council, are also statutory consultees in the NSIP process and will respond having regard to their Local Plan policies and other statutory responsibilities including environmental health (District Councils).

Background Papers

The Planning Act (2008)

(<http://www.legislation.gov.uk/ukpga/2008/29/contents>)

The National Planning Policy Framework (2012) -

<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

Energy Act (2013)

<http://www.legislation.gov.uk/ukpga/2013/32/contents/enacted/data.htm>

Vanguard Proposal (2017)

<https://corporate.vattenfall.co.uk/projects/wind-energy-projects/vattenfall-in-norfolk/norfolkvanguard/documents/preliminary-environmental-information-report/>

Officer Contact

If you have any questions about matters contained in this paper or want to see copies of any assessments, eg equality impact assessment, please get in touch with:

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If you need this report in large print, audio, braille, alternative format or in a different language please contact 0344 800 8020 or 0344 800 8011 (textphone) and we will do our best to help.

Detailed Comments

Ecology

- 5.7. Ecologists from the Natural Environment Team at the County Council have attended a number of Ecology Expert Topic Group (ETG) meetings and have had the opportunity to comment on methodology and approaches for establishing and assessing the ecological situation. Officers consider the approach is acceptable. The results of many of the ecology field surveys are not presented in the PEIR and it is understood that the County Council will not see the survey results until the Environmental Statement is produced.
- 5.8. The County Council notes that an Outline Landscape Ecological Management Plan will be produced alongside the Environmental Statement at submission, and agree that this is the most appropriate way to address mitigation in relation to ecology.
- 5.9. The following comments refer to specific onshore ecological issues within the PEIR (Chapter 22):
 - (a) County Wildlife Site (CWS)
 - 5.10. The County Council notes the reference in the PIER to CWSs potentially impacted by the onshore cable (Chapter 22: Section 22.7.3.2.3, p. 70). CWSs all have a unique reference number and it would be particularly helpful if the reference codes are used to identify sites. There may be some confusion as to why the sites are designated; of the sites that are mentioned in Paragraph 260, Paston Way and Knapton Cutting CWS (CWS No. 1175) is not designated for its wet woodland as stated, neither is the Marriott's Way (CWS No. 2176) designated as a 'green woodland corridor'.
 - 5.11. Where CWS will be crossed by the cable corridor, the County Council would request that very strong consideration is given to using Horizontal Directional Drilling (HDD), particularly at Wendling Carr CWS 1013, which is associated with Wendling Beck. Paragraph 314 (p. 78) indicates that only one of the two crossings of Wendling Beck will be using trenchless techniques but it is unclear as to whether this will be at the CWS.
 - 5.12. The cable route runs parallel to the Marriott's Way CWS at several points and bisects it twice. Potential impacts on this site may therefore be cumulative. Cables for the DONG/Orsted 'Hornsea 3' offshore windfarm scheme also bisect the Marriott's Way in two places and so cumulative impacts may be more significant than implied, notably east of Reepham.
 - (b) Protected Species and Habitats
 - 5.13. At the Onshore Ecology Expert Topic Group meetings, various issues with surveys for bats have been raised. The Norfolk Vanguard Ecological Surveys Interim Report (June 2017) concludes "*For bat surveys there is a more significant issue. If continuing with the present methodology, gaining sufficient access is a significant constraint for spatial and temporal coverage of the study area*" (paragraph 8.9). At this stage, the County Council retains reservations regarding the ability of the bat survey results to allow a robust and lawful

decision to be reached.

- 5.14. The Paston Great Barn Special Area of Conservation (SAC, a European site) is designated for its barbastelle bat breeding colony, and at this stage it is unclear as to whether the locations where bat surveys were undertaken were appropriate to assess the impacts on this feature of the SAC. The County Council welcomes that the project sought data from the Norfolk Barbastelle Study Group, particularly with regard to radio-tracking information. Where statements are made to specific ecological information (e.g. to barbastelle bat territorial ranges), they should be supported by a suitable peer-reviewed reference.
- 5.15. The County Council notes that the PEIR refers to surveys for the Norfolk Hawker dragonfly (e.g. paragraph 182 and subsequently). As County Council officers have previously mentioned at the ETG meetings, surveys for adult dragonflies will not provide confirmation of breeding. Criteria for establishing proof of breeding have been defined by the British Dragonfly Society.

(c) Loss of Ponds

- 5.16. In Chapter 22: section 22.7.3.8.3 (Paragraph 314) it states “*The cable route works will result in a temporary loss of approximately 40 ponds (approximately 0.4ha) during the cable ducting element of the construction phase (approximately two years) and for a further 16 weeks during the three year cable pull element of the construction phase.*” The County Council is unclear what the ‘temporary loss’ means in this context.

Public Rights of Way

- 5.17. Access routes of regional and national importance potentially impacted by the cable route and/or landfall and managed by the County Council are The England Coast Path/Norfolk Coast Path, The Paston Way, The Weavers Way, The Wensum Way (twice), and The Marriott’s Way.

Minimising impacts to the use of the England Coast path is a priority for the County Council. For the Marriott’s Way, there may also be impacts that will cause disruption to users of the Trail; the cable route runs parallel to the trail at several points and bisects it twice. There may also be cumulative impacts as the cables for the DONG/Orsted ‘Hornsea 3’ offshore windfarm NSIP scheme also bisect the Marriott’s Way in two places close to Reepham. The County Council would welcome an opportunity to discuss potential impacts and to be involved in identifying suitable mitigation.

- 5.18. In addition, the wider un-promoted PRow network serve a number of settlements within or near to the cable corridor. Un-promoted PRow should not be considered of lesser importance; settlements such as Reepham will see disruption to its PRow network not only from this development but cumulatively with the Orsted proposal. The closure and diversion of routes near to populated areas such as this need to be considered in the wider context of both the type of use they receive and the potential implications of other projects.
- 5.19. In terms of mitigation, the County Council would therefore expect that:
- For all PRow affected, Temporary Traffic Regulation orders should be put in place to cover the periods of closure, with reopening as soon as possible i.e. the very minimum periods of closure. Signed and maintained

alternative routes for the closures should be provided where appropriate. These alternative routes should consider cumulative effects and where possible be of equal value to the communities they affect.

- Alternative routes on the England Coast Path and the Marriott's Way should be as of high a standard as practicable, should be off-road where possible, and should be identified well in advance of closures so that the information can be advertised.
- Where phasing of works is necessary, the County Council would anticipate that reinstatement of PROW is carried out between construction phases. This will be particularly necessary for the England Coast Path, the Marriott's Way, other trails and frequently used PROW around settlements.

- 5.20. Post-construction, the County Council would seek opportunities for enhancements, such as surfacing and connectivity enhancements to the network where appropriate. Any trees or other vegetation that were removed during construction should be replaced within a reasonable timeframe and that measures are put in place to ensure such reinstatement is delivered. Norfolk County Council's Environment Team would be happy to work with Vattenfall to find effective solutions to issues relating to the Trails and PROW network.

Historic Environment Comments

- 5.21. Chapter 28 of the PEIR provides baseline data about the historic environment implications of the onshore cable route and its associated infrastructure. Two key aspects are considered; (a) the potential indirect impact of the proposals on the setting of designated heritage assets - which is principally relevant to the construction and operation phases of the project – and (b) the physical impact on undesignated heritage assets with archaeological interest – principally during the construction phase. Potential impacts during the decommissioning phase are also considered.
- 5.22. The onshore above-ground infrastructure for the project includes a proposed substation at Necton and, if a HVAC connection is used, a CRS for which two site options are currently proposed at Ridlington. The PEIR chapter has identified a number of designated heritage assets (including scheduled monuments, listed buildings, conservation areas and designated parks and gardens) which may have their settings affected by the proposed infrastructure for the project but does not carry out a full assessment of the impact at this stage. Some photomontages / visualisations of the proposed infrastructure have been included in Chapter 29 (Landscape and Visual Impact Assessment) but these have not been produced specifically from a historic environment perspective.
- 5.23. Chapter 28 outlines a programme of pre-application archaeological work, the results of which will be included in the ES submitted with the DCO application. This includes geotechnical surveys (including at the Happisburgh landfall site), and targeted geophysical surveys which are currently being undertaken along the cable route and at proposed infrastructure / mobilisation sites. A range of post-consent mitigation options for buried and above-ground archaeological remains are also set out. The programme of pre-application archaeological

evaluation and post-consent mitigation has been developed in consultation with Norfolk County Council Historic Environment Service and Historic England.

Comment / Recommendation

- 5.24. Vattenfall and their heritage consultant (Royal Haskoning DHV) should continue to assess the setting of the designated heritage assets (and selected non-designated heritage assets) that may be affected by the proposed cable relay station. This assessment should include further heritage-asset specific visualisations to be included in the ES and should be carried out in tandem with any further assessment of wider landscape impact issues. It is requested that the locations of the visualisation viewpoints are agreed with Norfolk County Council, Historic England and the Conservation Officers at Breckland Council / North Norfolk District Council ahead of the assessment taking place and that the results, and proposed mitigation measures, are discussed with these consultees prior to the submission of the DCO application.
- 5.25. Vattenfall and their heritage consultant (Royal Haskoning DHV) should also continue to liaise with Norfolk County Council Historic Environment Service and Historic England and other key stakeholders (e.g. AHOB) regarding the potential physical impact on buried and above-ground archaeological remains. It is requested that this includes discussion of the geotechnical and geophysical survey results and the proposed mitigation measures prior to the production of the full Environmental Statement for the DCO application.
- 5.26. **Appendix 1: Specific comments concerning the potential indirect impact on the setting of designated heritage assets:**
- 5.27. Further visualisations produced from a historic environment perspective are required for both of the Cable Relay Station site options and the substation site. Specifically, for CRS Option 5a. The County Council request that the following views are included in the additional work;
- View from Bachelor's Lane to the NW of St Peter's Church, Ridlington looking SE to include the church and CRS Site Option 5a.
 - View SW from All Saint's Church, Walcott toward CRS Site Option 5a.
 - View SSW from Rookery Farm Road close to the junction with Coast Road, including All Saints' Church Walcott and CRS Site Option 5a.
 - CRS Site Option 5a Viewpoint 7 should be supplemented with a view from the top of the tower of St Mary's Church in Happisburgh as this is opened to the public. This should also be included for CRS Option 6a.
 - View from the top of the tower of St Mary's Church East Ruston towards the proposed CRS options.
- 5.28. **Appendix 2: Specific comments concerning the potential direct impact on buried and above-ground archaeological remains:**

- 5.29. Table 28.7 within Chapter 28 and Section 28.2.3.2 of the Desk-Based Assessment (Appendix 28.1) refer to historic map research having been carried out at Norfolk Record Office. While further analysis of cartographic sources for the full Environmental Statement is mentioned, it is important to note that pre-enclosure maps at the Norfolk Record Office (and other relevant repositories) need to be consulted and incorporated into the analysis. For some parts of the route (e.g. Cawston) 17th and 18th century maps are available at the NRO. The information on these maps relating to former land-use and boundaries will be important for the interpretation of the air photo and geophysical survey data.
- 5.30. Section 28.6.5.1 of Chapter 28 outlines the proposed mitigation measures for below-ground archaeological remains. Para 99 within this section, which states that other techniques are being considered, needs to reference field-walking as well as metal-detecting (as indicated in Table 28.2).
- 5.31. Some amendments to the terminology within the Historic Environment and Cultural Heritage chapter would be beneficial so that appropriate terms can then be applied throughout the project. NCC Historic Environment Service is now using the term 'evaluation' only for pre-determination archaeological works. Any post-consent archaeological work forms part of a mitigation strategy, with survey phases (e.g. further geophysical survey and trial trenching) comprising an initial informative stage of the mitigation work.
- 5.32. There is potential to address some decommissioning impacts on buried archaeological remains at the construction phase if archaeological mitigation through recording takes into account any additional ground-disturbance likely to result from the future removal of structures on the project.
- 5.33. In Appendix 28.1 (Archaeological Desk-Based Assessment), Annex 28.1.2 the non-designated assets gazetteer is not the correct table – the designated assets table is repeated in error. The gazetteer of non-designated assets is included separately as Appendix 28.4. However, in this version the RHDHV ID numbering of the entries is not continuous. Comparing this with an earlier version from the draft Desk-Based Assessment it appears that the omitted entries relate to sites that lay within earlier versions of the proposed cable route corridor search area or in the inter-tidal zone. The reason for the omission of the entries needs to be stated.
- 5.34. Table 28.10 within Chapter 28 lists the Areas of Possible Archaeological Interest as Groups. It would be useful for the ES if these could be shown on maps of the route as well – which is not currently the case. The addition of Norfolk HER numbers in this table would also make cross-referencing the information much easier. There are a number of comments on the individual Groups listed in this table as follows;
- Group 1. RHDHV 1015 is a very clear cropmark of a medieval moat with associated features newly recorded by the air photo survey (Site AP1). It should be considered to have Medium – High significance rather than just Medium (see also below).
 - Group 6. RHDHV ID number (1180) is missing.
 - Group 14. Is this group correct as the two heritage assets listed are 1.2km apart? Should it actually include RHDHV 411 (a burnt mound) rather than

RHDHV 1379 (lime kiln)?

Group 24. RHDHV 968 should be 698.

Group 49. Includes RHDHV 2955. This number is higher than those listed in the gazetteer and is presumably an error.

Group 52. Earthwork bank RHDHV 1148 is probably associated with a parish boundary and should therefore be considered as being of Low - Medium significance rather than just Low.

Group 54. It is possible that the cropmark features in this group will be associated with buried archaeological remains associated with settlement. As such the (worst case scenario) significance of this group should be seen as Medium - High rather than Medium.

Group 60. RHDHV 1362 is not listed in Appendix 28.4.

- 5.35. The air photo assessment (Figure 28.4) has established that features associated with a known medieval moated site (RHDHV 1015 / AP1) extend beyond the site boundary previously recorded in the Norfolk Historic Environment Record (as shown on Figure 28.2). Figure 28.2 shows that the National Grid Temporary Works Area at Necton will significantly overlap this archaeological site, including the previously recorded area of the medieval moat itself. Further consultation with NCC Historic Environment Service and Historic England is therefore required to ensure disturbance to significant archaeological remains at this site is avoided.

5.36. **Vanguard Offshore Wind Farm PEIR Chapter 17: Offshore and Inter-Tidal Archaeology and Cultural Heritage**

- 5.37. Only the inter-tidal archaeology covered by this chapter falls directly within the scope of what NCC Historic Environment Service will comment on. The offshore archaeology lies within the remit of Historic England, but we nevertheless maintain an interest in the results of the offshore survey and recording work.

- 5.38. The key element of the inter-tidal archaeology at the Happisburgh landfall site comprises a group of internationally significant Lower Palaeolithic remains which are summarised in Section 7.6.3 of the PEIR. These remains are also discussed in Chapter 28 (Onshore Archaeology and Cultural Heritage). Through early consultation with Historic England, NCC Historic Environment Service and other key stakeholders (including the Ancient Human Occupation of Britain project) a programme of geotechnical survey has been implemented to assess the location of Palaeolithic deposits within the proposed development area. The results of this survey work will be included within the Environmental Statement and used to inform an appropriate mitigation strategy.

5.39. **Comments**

Vattenfall and their heritage consultant (Royal Haskoning DHV) should continue to liaise with Norfolk County Council Historic Environment Service, Historic England and other key stakeholders (e.g. AHOB) regarding the potential physical impact on, and appropriate mitigation strategies for, archaeological remains within the inter-tidal and offshore areas of the project.

Detailed Flood and Drainage Comments

- 5.40. The Vattenfall Project has provided a PEIR containing several documents relating to the flood risk of the study area, including a water resources and flood risk document together with a Flood Risk Assessment (FRA).

The report indicates that the onshore project area will largely be located on rural, agricultural land. Therefore, the majority of the project shall be located within areas where there are no existing formal surface water drainage systems, other than agricultural land drains and ordinary watercourses. Risk to any nearby properties should also be considered – no reference to this was found in the submission.

The British Geological Survey (BGS) maps identify the bedrock underlying the onshore project area as Chalk to the west and Neogene and Quaternary Rocks to the east, overlain by superficial deposits of till (Diamicton), glacial sand and gravel, clay, silt and sand alluvium, and Crag Group (sand and gravel) throughout

The CRS location options are located within Flood Zone 1, as defined by the Environment Agency online Flood Map for Planning. Flood Zone 1 is defined as land as having a less than 1 in 1,000 annual probability of river flooding (<0.1%). The onshore cable corridor is located within Flood Zones 1, 2 and 3 and the Happisburgh landfall location is located within Flood Zone 3 as defined by the Environment Agency online Flood Map for Planning. However, there are many ordinary watercourses within the proposal area and these also have a flood risk associated with them (equivalent to flood zone 2 and 3). These areas of risk are not shown on the Environment Agency Map as the catchments are smaller than 3km² and are not included on the national map. The proposal should consider this local source of flood risk to ensure that all sources of flooding have been assessed.

The onshore cable corridor is influenced by three key hydrological catchments, and intersects significant watercourses at six key crossing points. In addition, there are a number of minor watercourses, land drains and ditches the onshore cable corridor will cross however, these have been reviewed using a high-level approach. Additionally, there are a number of Internal Drainage Board (IDB) channels which cross the onshore project area. Furthermore, there are a large number of ordinary watercourses and agricultural drainage channels.

The applicant is suggesting that trenchless crossing techniques will be used for the larger watercourse crossings (specifically the River Wensum, River Bure, King's Beck, Wendling Beck (downstream), and the North Walsham and Dilham Canal) - Paragraph 20.4.3.5 – 64 of the FRA indicates that this will be by passing under watercourses (at least 2m below the river bed). However, the project also includes numerous trenched watercourse crossings within river water body catchments, with one trenched crossing of the main Wendling Beck watercourse, also designated as a main river by the Environment Agency, and a trenched watercourse crossing of the Blackwater Drain main river. Where the proposals involve works to any ordinary watercourse 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 Norfolk County Council or the Internal Drainage Board.

The assessment states that during the temporary damming and re-routing of

watercourses required during the construction of the onshore cable corridor, the original flow volumes and rates need to be maintained to ensure flood risk is not increased at the construction site and elsewhere. Post-construction, watercourses should be reinstated to pre-construction channel depths and bank slopes as far as possible to ensure flood risk is not affected. Mitigation of the existing flood risk at key crossing points during the construction phase of the project will need to be managed. Any construction work located within Flood Zone 2 or 3, or within proximity to an ordinary watercourse should undertake suitable risk assessments, including the formation of site specific evacuation routes into areas of low flood risk. It is also advised that any temporary plant storage including potentially polluting substances e.g. oil storage is located above expected flood levels. On ordinary watercourses (where there are no formal flood warning systems in place) we suggest that the applicant consider signing up to available weather alerts from the Met office. This could help understand when significant rainfall may be expected and could go to provide onsite procedures to halt any works within watercourses to prevent an increased risk from in channel workings.

There are a number of groundwater SPZ (Source Protection Zone) areas within the onshore project area. Currently, trenchless crossing techniques activities (as described above) are proposed in these areas

It states in paragraph 20.7.3 (Post construction), that following completion of the project the onshore cable corridor shall be located below ground level and as such would have no impact on surface water drainage. Temporary works and all access route surfacing shall be removed and would have no operational use. 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 (i.e. changes to the permeability of the site). The surface water drainage requirements for the permanent compounds will be dictated by the final drainage study.

The FRA states that the SuDS philosophy will be employed to limit run-off, where feasible, through the use of infiltration techniques. Discharge should be limited to greenfield run off rates, where infiltration is not possible, by reducing rates and volumes of run off associated with the project during operation via the integration of effective surface drainage systems.

In the submission it is proposed to limit post development off site run-off to the existing greenfield rate and provide sufficient on site attenuation for rainfall events up to 1 in 100 year rainfall event, plus a 30% allowance for climate change over the lifetime of the development (however we would recommend that this be increased to 40%). However 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 with areas of 2.5ha and 10ha respectively. . **Further information should be requested to be provided at design stage.**

The FRA and supporting documentation shows that the proposed development at present meets the requirements of the NPPF. At this stage 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.

Public Health

- 5.41. No substantive Public Health issues have been identified by the Public Health Team. However, there may be localised issues surrounding Air Quality, which the respective District Councils and Highway Authority may need to consider associated with the construction phase and the movement of the construction traffic. A full Health Impact Assessment (HIA) will be included within the Environmental Statement (ES), which in turn will accompany the S56 submission. The preparation of HIA is welcomed.