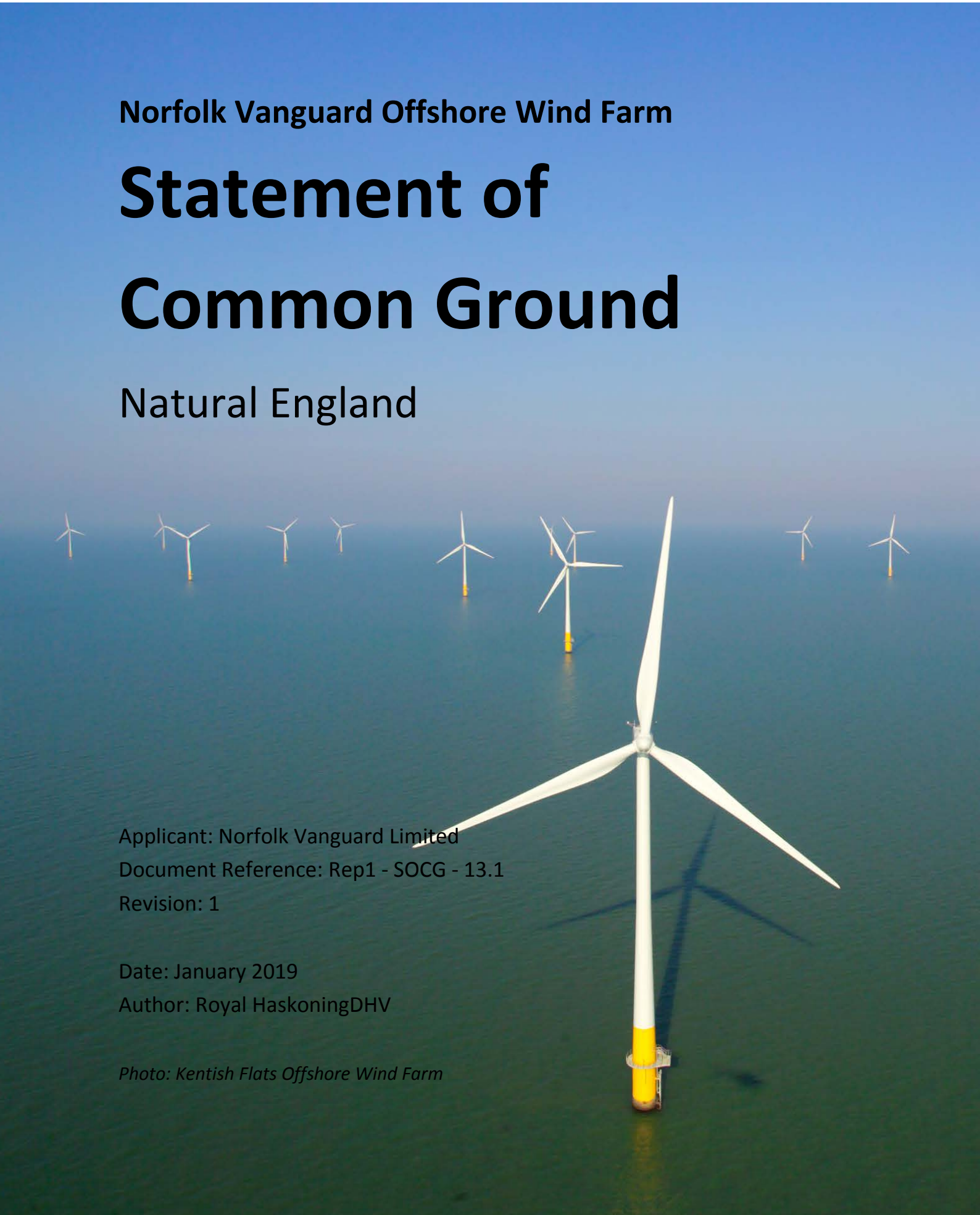
Norfolk Vanguard Offshore Wind Farm

Statement of Common Ground

Natural England



Applicant: Norfolk Vanguard Limited
Document Reference: Rep1 - SOCG - 13.1
Revision: 1

Date: January 2019
Author: Royal HaskoningDHV

Photo: Kentish Flats Offshore Wind Farm

Date	Issue No.	Remarks / Reason for Issue	Author	Checked	Approved
22/08/18	00	First draft for Internal review	GK/ST	JA	JA
23/08/18	01D	First draft for Norfolk Vanguard Limited review	GK/ST	JA	JA
05/09/18	02D	Second draft for legal review	GK/ST	JA	JA
10/10/2018	03D	Third draft for Norfolk Vanguard Limited review	GK/JA	AD	AD
17/10/18	04D	Fourth draft for Norfolk Vanguard Limited review	GK	JA	JA
12/11/18	05D	Fifth draft for Norfolk Vanguard Limited review	GK	JA	JA
20/11/18	06D	Sixth draft for Norfolk Vanguard Limited review	GK	JA	JA
03/01/19	07D	Seventh draft	GK/JA	GK/JA	JA
08/01/19	08D	Eighth draft	GK/JA	GK/JA	JA
11/01/19	09D	Submission for Deadline 1	GK/JA	GK/JA	RS

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Glossary

AEoI	Adverse Effect on Integrity
ALC	Agricultural Land Classification
BDMPS	Biologically Defined Minimum Population Size
BMV	Best and Most Versatile
CIA	Cumulative Impact Assessment
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CoCP	Code of Construction Practise
CRM	Collision Risk Model
cSAC	Candidate Special Area of Conservation
DCO	Development Consent Order
DML	Deemed Marine Licence
EIA	Environmental Impact Assessment
ES	Environmental Statement
ESS	Entry Level Stewardship Scheme
ETG	Expert Topic Group
ExA	Examining Authority
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Assessment
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
LiDAR	Light Detection and Ranging
LSE	Likely Significant Effect
MarESA	Marine Evidence based Sensitivity Assessments
MarLIN	Marine Life Information Network
MCZ	Marine Conservation Zone
MMMP	Marine Mammal Mitigation Protocol
MMMZ	Marine Mammal Mitigation Zone
MMO	Marine Management Organisation
NV East	Norfolk Vanguard East
NV West	Norfolk Vanguard West
OCoCP	Outline Code of Construction Practice
OLEMS	Outline Landscape and Environmental Management Strategy
O&M	Operation and Maintenance
OWF	Offshore Wind Farm

PBR	Potential Biological Removal
PEI	Preliminary Environmental Information
PEIR	Preliminary Environmental Information Report
PVA	Population Viability Analysis
pSPA	potential Special Protection Area
RoC	Review of Consents
SAC	Special Area of Conservation
SCI	Site of Community Importance
SMP	Soil Management Plan
SNCB	Statutory Nature Conservation Bodies
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SoCG	Statement of Common Ground
UXO	Unexploded Ordnance
WCS	Worst Case Scenario

Terminology

Array cables	Cables which link the wind turbines and the offshore electrical platform.
Landfall	Where the offshore cables come ashore at Happisburgh South.
Mobilisation area	Areas approx. 100 x 100 m used as access points to the running track for duct installation. Required to store equipment and provide welfare facilities. Located adjacent to the onshore cable route, accessible from local highways network suitable for the delivery of heavy and oversized materials and equipment.
National Grid overhead line modifications	The works to be undertaken to complete the necessary modification to the existing 400 kV overhead lines.
Necton National Grid substation	The existing 400 kV substation at Necton, which will be the grid connection location for Norfolk Vanguard.
Offshore accommodation platform	A fixed structure (if required) providing accommodation for offshore personnel. An accommodation vessel may be used instead.
Offshore cable corridor	The area where the offshore export cables would be located.
Offshore electrical platform	A fixed structure located within the wind farm area, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore.
Offshore export cables	The cables which bring electricity from the offshore electrical platform to the landfall.
Onshore cable route	The 45 m easement which will contain the buried export cables as well as the

	temporary running track, topsoil storage and excavated material during construction.
Onshore project substation	A compound containing electrical equipment to enable connection to the National Grid. The substation will convert the exported power from high voltage direct current (HVDC) to high voltage alternating current (HVAC), to 400 kV (grid voltage). This also contains equipment to help maintain stable grid voltage.
The OWF sites	The two distinct offshore wind farm areas, Norfolk Vanguard East and Norfolk Vanguard West.
Trenchless crossing zone	Temporary areas required for trenchless crossing works (e.g. HDD).

1 INTRODUCTION

1. This Statement of Common Ground (SoCG) has been prepared between Natural England and Norfolk Vanguard Limited (hereafter 'the Applicant') to set out the areas of agreement and disagreement in relation to the Development Consent Order (DCO) application for the Norfolk Vanguard Offshore Wind Farm (hereafter 'the project').

2. This SoCG comprises an agreement log which has been structured to reflect topics of interest to Natural England on the Norfolk Vanguard DCO application (hereafter 'the Application'). Topic specific matters agreed, not agreed and actions to resolve between Natural England and the Applicant are included. Points that are not agreed will be the subject of ongoing discussion throughout the examination process, wherever possible to resolve, or refine, the extent of disagreement between the parties.

1.1 The Development

3. The Application is for the development of the Norfolk Vanguard Offshore Wind Farm (OWF) and associated infrastructure. The OWF comprises two distinct areas, Norfolk Vanguard (NV) East and NV West ('the OWF sites'), which are located in the southern North Sea, approximately 70 km and 47 km from the nearest point of the Norfolk coast respectively. The location of the OWF sites is shown in Chapter 5 Project Description Figure 5.1 of the Application. The OWF would be connected to the shore by offshore export cables installed within the offshore cable corridor from the OWF sites to a landfall point at Happisburgh South, Norfolk. From there, onshore cables would transport power over approximately 60 km to the onshore project substation and grid connection point near Necton, Norfolk.

4. Once built, Norfolk Vanguard would have an export capacity of up to 1800 MW, with the offshore components comprising:

   - Wind turbines;
   - Offshore electrical platforms;
   - Accommodation platforms;
   - Met masts;
   - Measuring equipment (Light Detection and Ranging (LiDAR) and wave buoys);
   - Array cables;
   - Interconnector cables; and
   - Export cables.

5. The key onshore components of the project are as follows:

   - Landfall;

- Onshore cable route, accesses, trenchless crossing technique (e.g. Horizontal Directional Drilling (HDD)) zones and mobilisation areas;
- Onshore project substation; and
- Extension to the existing Necton National Grid substation and overhead line modifications.

1.2 Consultation with Natural England

6. This section briefly summarises the consultation that the Applicant has had with Natural England. For further information on the consultation process please see the Consultation Report (document reference 5.1 of the Application).

1.2.1 Pre-Application

7. The Applicant has engaged with Natural England on the project during the pre-Application process, both in terms of informal non-statutory engagement and formal consultation carried out pursuant to Section 42 of the Planning Act 2008.

8. During formal (Section 42) consultation, Natural England provided comments on the Preliminary Environmental Information Report (PEIR) by way of a letter dated 11th December 2017.

9. Further to the statutory Section 42 consultation, several meetings were held with Natural England through the Evidence Plan Process.

10. Table 1 to Table 11 provide an overview of meetings and correspondence undertaken with Natural England. Minutes of the meetings are provided in Appendices 9.15 to 9.26 (pre-Section 42) and Appendices 25.1 to 25.9 (post-Section 42) of the Consultation Report (document reference 5.1 of the Application).

1.2.2 Post-Application

11. As part of the pre-examination process, Natural England submitted a Relevant Representation to the Planning Inspectorate on the 31st August 2018. This SoCG is a live document which will be updated throughout the examination process as the Applicant and Natural England work to resolve outstanding issues.

12. A meeting was held with Natural England on the 18th October 2018 to discuss the drafting of the SoCG. An initial draft of the SoCG was provided on the 17th October 2018, to inform the discussion.

2 STATEMENT OF COMMON GROUND

13. Within the sections and tables below, the different topics and areas of agreement and disagreement between Natural England and the Applicant are set out.

2.1 Marine Geology, Oceanography and Physical Processes

14. The project has the potential to impact upon Marine Geology, Oceanography and Physical Processes. Chapter 8 of the Norfolk Vanguard Environmental Statement (ES) (document reference 6.1 of the Application) provides an assessment of the significance of these impacts.

15. Table 1 provides an overview of meetings and correspondence undertaken with Natural England regarding Marine Geology, Oceanography and Physical Processes.

16. Table 2 provides areas of agreement (common ground) and disagreement regarding Marine Geology, Oceanography and Physical Processes.

17. Minutes of Evidence Plan meetings can be found in Appendix 9.16 and Appendix 25.6 of the Consultation Report (document reference 5.1 of the Application).

Table 1 Summary of Consultation with Natural England in relation to Marine Geology, Oceanography and Physical Processes

Date	Contact Type	Topic
Pre-Application		
21st March 2016	Benthic and Geophysical Survey Scope Meeting	Discussion on the required scope of the geophysical surveys to inform the approach to the offshore surveys conducted in Summer/Autumn 2016 (see Appendix 9.16 of the Consultation Report).
2nd February 2017	Email from the Applicant	Provision of the Marine Physical Processes Method Statement (see Appendix 9.2 of the Consultation Report).
16th February 2017	Benthic and Intertidal Ecology, Fish Ecology, Marine Physical Processes and Marine Water and Sediment Quality Scoping Expert Topic Group Meeting	Discussion of Scoping responses and approach to Environmental Impact Assessment (EIA) and Habitats Regulations Assessment (HRA) (see Appendix 9.16 of the Consultation Report).
22nd June 2017	Email from the Applicant	Offshore HRA Screening (Appendix 5.1 of the Information to Support HRA Report (document 5.3)) provided for consultation.
22nd June 2017	Email from the Applicant	Provision of draft PEIR documents (Chapter 8 and Appendix 10.1 of the ES (Fugro survey report) to inform discussions at the Norfolk Vanguard Benthic Ecology and Marine Physical Processes Expert Topic Group meeting.

Date	Contact Type	Topic
5th July 2017	Benthic and Intertidal Ecology and Marine Physical Processes PEI Expert Topic Group (ETG) Meeting	Discussion of HRA Screening (see Appendix 9.16 of the Consultation Report).
16th January 2018	Email from the Applicant	Provision of the following draft technical reports to support the Information to Support HRA report: • Appendix 7.1 ABPmer Sandwave study; and • Appendix 7.2 Envision Sabellaria data review
31st January 2018	Marine Physical Processes and Benthic Ecology HRA ETG meeting	PEIR feedback and comments on approach to HRA (see Appendix 25.6 of the Consultation Report).
22nd February 2018	Email from the Applicant	Provision of draft Norfolk Vanguard Information to Support HRA (document 5.3).
22nd February 2018	Letter from Natural England	Natural England advice regarding potential impacts from the offshore cable installation to Annex I habitat within the Happisburgh Hammond and Winterton Special Area of Conservation (SAC).
15th March 2018	Email from Natural England	Natural England advice on *Sabellaria spinulosa* reef in Happisburgh, Hammond and Winterton SAC.
23rd March 2018	Letter from Natural England	Feedback on the draft Information to Support HRA report.
Post-Application		
31st August 2018	Relevant Representation	Natural England's initial feedback on the DCO application.
17th October 2018	Email from the Applicant	First draft SOCG provided by the Applicant
18th October 2018	SoCG Meeting	Discussion regarding the drafting of the SoCG
21st November 2018	Email from the Applicant	Second draft SOCG provided by the Applicant
30th November 2018	Email from the Applicant	Clarification notes (Appendices 1-3 of the SOCG) provided by the Applicant

Table 2 Statement of Common Ground - Marine Geology, Oceanography and Physical Processes

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
Site Selection and Project Design			
Landfall	Landfall at Happisburgh South is the most appropriate of the options available, avoiding the Cromer Shoal Chalk Beds Marine Conservation Zone (MCZ).	Agreed	It is agreed by both parties that landfall at Happisburgh South is a viable option.
Landfall	The design of the landfall works will adopt a highly conservative approach to ensure cables do not become exposed as a result of erosion (see Appendix 1). A construction method statement, including cable landfall, must be agreed with the MMO prior to construction, as required under the Deemed Marine Licence (DML) Schedules 11 and 12 Part 4 Condition 9(c)(iv).	Agreed, following receipt of further information on 29/11/2018 (provided in Appendix 1) Natural England is satisfied that the specific issues raised in the Relevant Representation relating to the assessment of coastal erosion at Happisburgh have been resolved.	It is agreed by both parties that the design of the landfall works will adopt a suitably conservative approach to ensure cables do not become exposed as a result of erosion
Environmental Impact Assessment			
Existing Environment	Survey data collected for Norfolk Vanguard for the characterisation of Marine Geology, Oceanography and Physical Processes are suitable for the assessment and as agreed in during the survey scope meeting March 2016.	Agreed	It is agreed by both parties that sufficient survey data has been collected to undertake the assessment.
	The ES adequately characterises the baseline environment in terms of Marine Geology, Oceanography and Physical Processes	Agreed	It is agreed by both parties that the existing environment of Marine Geology, Oceanography and Physical Processes has been characterised appropriately for the assessment.
Assessment methodology	Appropriate legislation, planning policy and guidance relevant to Marine Geology, Oceanography and Physical Processes has been used.	Agreed	It is agreed by both parties that appropriate legislation has been considered.
	The list of potential impacts assessed for Marine Geology, Oceanography and Physical Processes is appropriate	Agreed	It is agreed by both parties that appropriate impacts on Marine Geology, Oceanography and

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
			Physical Processes have been assessed.
	The impact assessment methodologies used provide an appropriate approach to assessing potential impacts of the proposed project. This includes: • The assessment uses expert judgement based upon knowledge of the sites and available contextual information (Zonal and East Anglia ONE studies and modelling); therefore no new modelling (e.g. sediment plumes or deposition) was undertaken for the assessment • The definitions used of sensitivity and magnitude in the impact assessment are appropriate. These are in line with the Method Statement provided in February 2017 (see Appendix 9.2 of the Consultation Report (Application document 5.1) and as discussed during expert topic group meetings.	Agreed	It is agreed by both parties that the impact assessment methodologies used in the EIA are appropriate.
	The worst case scenario used in the assessment for Marine Geology, Oceanography and Physical Processes is appropriate. This includes a conservative assessment for cable installation based on pre-sweeping as well as potential reburial requirements.	Agreed, although it is noted by Natural England that there is currently no evidence that sandwave levelling ensures cables remain buried and therefore there is no future need for reburial or cable protection.	It is agreed by both parties that the worst case scenario used in the assessment for Marine Geology, Oceanography and Physical Processes is appropriate.
	As discussed in the Change Report (document reference Pre-ExA;Change Report;9.3), the increase in the maximum number of piles per offshore electrical platform from six to 18 (36 in total for two platforms) does not affect the conclusions of ES Chapter 8 Marine Geology, Oceanography and Physical Processes.	Agreed	It is agreed by both parties that the proposed increase in the maximum number of piles per offshore electrical platform from six to 18 (36 in total for two platforms) does not affect the conclusions of ES Chapter 8 Marine Geology, Oceanography and Physical Processes.

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	Regardless of whether the project is installed in a single or two-phased scenario, export cable installation will be undertaken for one cable pair at a time and therefore the main difference between the scenarios would potentially be the duration between the installation of one HVDC cable pair and the next. The export cable corridor is in a dynamic environment and therefore sandwave bedforms are continually being formed, modified, converging and bifurcating as they migrate through the cable corridor area. The scale of the sand movement through the cable corridor is of such large magnitude that the impact of the bed levelling operations during installation will be of comparatively minimal impact to the form and function of the sandwaves and sand bank feature regardless of the phasing scenario.	To be confirmed	
	Cable protection will only be required at cable crossing locations and in the unlikely event that hard substrate (i.e. areas that are not Annex 1 Sandbank) is found along the cable route that cannot be avoided. The Scour Protection and Cable Protection Plan (required under DCO Schedules 9 and 10 Part 4 Condition 14(1)(e) and Schedules 11 and 12 Part 4 Condition 9(1)(e)) provides the mechanism for the volume, extent and location of cable protection to be agreed with the MMO in consultation with Natural England prior to construction.	Agreed that cable protection should only be used at essential locations. Discussions are ongoing on this topic. Natural England note that past experience has shown that additional cable protection has often been required beyond that which is expected.	
	The resolution of available data is not sufficient to confirm that there are no areas of hard substrate in the cable corridor and therefore a contingency of 10% of the cable length requiring cable protection has been included in order to be conservative. The total volume of cable protection in the Haisborough Hammond and Winterton SAC is 0.003% of the SAC area as shown in Table 7.4 of the Information to Support HRA report. It should be noted that the Sweetman I case law (C258/11 para 46) only specifically refers to permanent loss of priority natural habitat, which Article 1(d) of the Habitats Directive defines as 'natural habitat	Not agreed, Natural England does not agree to 10% contingency. Further consideration of permanent habitat loss from cable protection is included in 5.03 Para 380 of the HRA. However, please note that as a result of recent case law (Sweetman I) the permanent loss of Annex I habitat could be	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	types in danger of disappearance' for whose conservation the European Union has 'particular responsibility' (Ibid, para 42), which is not applicable in this case as Annex 1 Sandbank and Annex 1 Reef are not priority natural habitats. In addition, Waddenzee case law states (C-127/02 para 47) that a project which is not likely to undermine the site's nature conservation objectives cannot be considered to have an adverse effect on site integrity - The small proportion of cable protection proposed for Norfolk Vanguard would not interfere with the physical processes of the sandbanks or adversely affect the communities of the sandbank which are of low diversity and therefore the conservation status would not be affected.	considered as an Adverse Effect on Integrity (AEoI).	
	Cable protection is assessed as permanent habitat loss in Chapter 10 Benthic Ecology, section 10.7.5 due to the likelihood of leaving cable protection *in situ* following decommissioning.	Agreed	It is agreed by both parties that habitat loss from cable protection should be considered a permanent impact
Assessment findings	The characterisation of sensitivity for Marine Geology, Oceanography and Physical Processes receptors (i.e. the East Anglian Coast and relevant designated sites) is appropriate.	Not agreed as too overarching given further points raised.	
	Norfolk Vanguard Limited acknowledges that the scale of suspended sediment should be classified as high. This results in a medium magnitude of effect taking into account the duration, frequency and reversibility which are classified as negligible. This has no change to the resulting negligible impact significance on Marine Geology, Oceanography and Physical Processes receptors.	Agreed Natural England states that near field effects of suspended sediment in the offshore cable corridor should be of greater scale than the 'low' classification identified in the ES due to the large volume of proposed dredging and material released.	It is agreed by both parties that near field effects of suspended sediment in the offshore cable corridor should be of greater scale than the 'high' classification.
	Norfolk Vanguard Limited acknowledges that the scale of seabed level changes should be classified as medium as stated by Natural England in their relevant representation. This has no change to the overall magnitude classification which remains low taking into account the duration, frequency and reversibility which are classified as negligible	Not agreed. Natural England does not agree that the magnitude of seabed level	

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	and therefore no change to the impact significance presented in the ES. Appendix 7.1 of the Information to Support HRA report shows that Sandwaves are expected to recover within approximately 1 year.	changes is low given the large volumes dredged.	
	The impact significance conclusions of negligible significance on marine geology, oceanography and physical processes receptors for Norfolk Vanguard alone are appropriate.	Not agreed as too overarching given further points raised.	
Cumulative Impact Assessment (CIA)	The plans and projects considered within the CIA are appropriate and as agreed during the expert topic group meeting in July 2017.	Agreed	It is agreed by both parties that the plans and projects included in the CIA are appropriate.
	The CIA methodology is appropriate. Chapter 8 Marine Geology, Oceanography and Physical Processes of the ES states that theoretical bed level changes of up to 2mm are estimated as a result of cumulative impacts of Norfolk Vanguard cable installation and dredging at nearby aggregate sites. This level of effect has no potential to affect the Marine Geology, Oceanography and Physical Processes of the Haisborough Hammond and Winterton SAC as stated in the Information to Support HRA report (document 5.3).	Agreed, with the exception that combined suspended sediment increases associated with aggregates and Norfolk Vanguard cable installation should be considered for Haisborough Hammond and Winterton SAC.	
	The cumulative impact conclusions of negligible significance are appropriate.	Not agreed as too overarching given further points raised.	
Habitats Regulations Assessment (HRA)			
Screening of Likely Significant Effect (LSE)	The approach to HRA Screening is appropriate. The following site is screened in for further assessment as agreed during the expert topic group meeting in July 2017: Haisborough, Hammond and Winterton SAC	Agreed	It is agreed by both parties that the designated sites and potential effects screened in for further assessment are appropriate.
Assessment of Adverse Effect on Integrity	The approach to the assessment of AEoI is appropriate.	Agreed	It is agreed by both parties that the approach to the assessment of potential adverse effects on site integrity presented in the

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
			Information to Support HRA report (document 5.3) are appropriate
	The physical processes of Annex 1 Sandbanks in the Haisborough, Hammond and Winterton SAC has the potential to recover from construction activities, within the range of natural variation. See comments on phasing in the Assessment Methodology section above.	Agreed, noting that there is limited empirical evidence and sandbank recovery should be monitored (see monitoring below). It is also not clear how single build vs phased build and either option in combination with Norfolk Boreas has been assessed.	It is agreed by both parties that the physical processes of Annex 1 Sandbanks in the Haisborough, Hammond and Winterton SAC has the potential to recover from construction activities, within the range of natural variation.
	The small scale of cable protection assessed will not interfere with the physical processes (e.g. bed level, morphology, sediment transport) associated with the Annex 1 Sandbanks.	Not agreed. Natural England does not agree there will be negligible impact on the sandbank feature and relevant attributes (volume, extent, morphology etc. described in the supplementary advice on conservations objectives[1]).	
	The conclusions of no AEoI in the Information to Support HRA report (document 5.3), both for Norfolk Vanguard alone and in-combination, are appropriate.	Not Agreed	
Mitigation and Management			
Monitoring	The In Principle Monitoring Plan (document 8.12), provides an appropriate framework to agree monitoring with the MMO in consultation with Natural England As stated in the In Principle Monitoring Plan (document 8.12), swath-bathymetric survey would be undertaken pre- and post-construction	Agreed	It is agreed by both parties that the In Principle Monitoring Plan (document 8.12), provides an appropriate framework to agree monitoring with the MMO in consultation with Natural England.

1 https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK0030369&SiteName=hais&SiteNameDisplay=Haisborough%2c+Hammond+and+Winterton+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	in order to monitor changes in seabed topography, including any changes as a result of sand wave levelling. It is acknowledged that the purpose of the post-construction monitoring is to address evidence gaps in this area as well as for engineering purposes.		
Mitigation and Management	As stated in the Site Characterisation Report (document 8.15) all seabed material arising from the Haisborough, Hammond and Winterton SAC during cable installation would be placed back into the SAC using an approach, to be agreed with the Marine Management Organisation (MMO) in consultation with Natural England. The Haisborough, Hammond and Winterton SAC is not a closed system and it presently has sediment both entering and leaving it around the boundaries. The proposed works are some distance from the boundaries (at over 6 km from the southern boundary) and are unlikely to bring about any disruption to the transport regime. Therefore, the movement in and out of the Haisborough SAC as occurs at present will continue, irrespective of the proposed dredging or disposal activities as discussed in Information to Support HRA report Appendix 7.1 ABPmer Sandwave Study. The methods for sediment disposal would be agreed through the Cable Specification, Installation and Monitoring Plan, required under the draft DCO Schedules 9 and 10 Part 4 Condition 14(1)(g) and Schedules 11 and 12 Part 4 Condition 9(1)(g) and would be based on latest evidence, engineering knowledge and pre-construction surveys.	Only agreed if material remains in the site after deposition, modelling will need to demonstrate this.	It is agreed by both parties that seabed material arising from the Haisborough, Hammond and Winterton SAC during cable installation would be placed back into the SAC using an approach, to be agreed with the MMO in consultation with Natural England.
	The Scour Protection and Cable Protection Plan is a live document which will be updated as the final design of the project develops and must be agreed with the MMO prior to construction. Further detail on the locations of cable protection and the habitats in these locations will be developed based on the pre-construction surveys and design developments post consent.	Under review based on Hornsea Project Three.	

2.2 Benthic and Intertidal Ecology

18. The project has the potential to impact upon Benthic and Intertidal Ecology. Chapter 10 of the Norfolk Vanguard ES (document reference 6.1 of the Application) provides an assessment of the significance of these impacts.

19. Table 3 provides an overview of meetings and correspondence undertaken with Natural England regarding Benthic and Intertidal Ecology.

20. Table 4 provides areas of agreement (common ground) and disagreement regarding Benthic and Intertidal Ecology.

21. Minutes of Evidence Plan meetings can be found in Appendix 9.16 and Appendix 25.6 of the Consultation Report (document reference 5.1 of the Application).

Table 3 Summary of Consultation with Natural England in relation to Benthic and Intertidal Ecology

Date	Contact Type	Topic
Pre-Application		
21st March 2016	Benthic and Geophysical Survey Scope Meeting	Discussion on the required scope of the benthic surveys to inform the approach to the offshore surveys conducted in Summer/Autumn 2016 (see Appendix 9.16 of the Consultation Report).
21st March 2016	Letter from Natural England	Feedback on benthic survey methodology.
20th April 2016	Letter from Natural England	Review of the Geophysical and Grab Sampling Impact Assessment.
2nd February 2017	Email from the Applicant	Provision of the Benthic Ecology Method Statement (see Appendix 9.2 of the Consultation Report).
16th February 2017	Benthic and Intertidal Ecology, Fish Ecology, Marine Physical Processes and Marine Water and Sediment Quality Scoping Expert Topic Group Meeting	Discussion of Scoping responses and approach to EIA/HRA (see Appendix 9.16 of the Consultation Report).
27th February 2017	Email from Natural England	Natural England's position on Haisborough, Hammond and Winterton SAC.
8th March 2017	Email from Natural England	Natural England's advice on Cromer Shoal MCZ
22nd June 2017	Email from the Applicant	Offshore HRA Screening (Appendix 5.1 of the Information to Support HRA report) provided for consultation.

Date	Contact Type	Topic
22nd June 2017	Email from the Applicant	Provision of draft documents (Chapter 8 of the PEIR and Appendix 10.1 of the ES (Fugro survey report)) to inform discussions at the Norfolk Vanguard Benthic Ecology and Marine Physical Processes Expert Topic Group meeting.
5th July 2017	Benthic and Intertidal Ecology and Marine Physical Processes PEI ETG Meeting	Discussion of HRA Screening. (see Appendix 9.16 of the Consultation Report).
16th January 2018	Email from the Applicant	Provision of the following draft technical reports to support the Information to Support HRA report: • Appendix 7.1 ABPmer Sandwave study; and • Appendix 7.2 Envision Sabellaria data review
31st January 2018	Marine Physical Processes and Benthic Ecology HRA ETG meeting	PEIR feedback and comments on approach to HRA (see Appendix 25.6 of the Consultation Report).
13th February 2018	Email from Natural England	Confirmation from Natural England that the standard best practice advice to the aggregates industry is a 50m buffer around *Sabellaria spinulosa* reef.
19th February 2018	Email from Natural England	Provision of example Site of Community Importance (SCI) Position Statement in relation to sandbanks from the Dogger Bank Teesside OWF.
22nd February 2018	Email from the Applicant	Provision of draft Norfolk Vanguard Information to Support Habitats Regulations Assessment (HRA) (document 5.3).
22nd February 2018	Letter from Natural England	Natural England advice regarding potential impacts from the offshore cable installation to Annex I habitat within the Happisburgh Hammond and Winterton SAC.
15th March 2018	Email from Natural England	Natural England advice on *Sabellaria spinulosa* reef in Happisburgh, Hammond and Winterton SAC.
23rd March 2018	Letter from Natural England	Feedback on the draft Information to Support HRA report
Post-Application		
31st August 2018	Relevant Representation	Natural England's initial feedback on the DCO application.
17th October 2018	Email from the Applicant	First draft SOCG provided by the Applicant
18th October 2018	SoCG Meeting	Discussion regarding the drafting of the SoCG
21st November 2018	Email from the Applicant	Second draft SOCG provided by the Applicant

Table 4 Statement of Common Ground - Benthic and intertidal ecology

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
Site Selection and Project Design			
Landfall	Landfall at Happisburgh avoids impacts on the Cromer Shoal Chalk Beds MCZ	Agreed	It is agreed by both parties that landfall at Happisburgh avoids impacts on the Cromer Shoal Chalk Beds MCZ
Environmental Impact Assessment			
Existing Environment	Survey data collected for Norfolk Vanguard for the characterisation of Benthic and Intertidal Ecology are suitable for the assessment and as agreed in the survey planning meeting in March 2016 and the expert topic group meeting in February 2017.	Agreed	It is agreed by both parties that sufficient survey data has been collected to undertake the assessment.
	The ES adequately characterises the baseline environment in terms of Benthic and Intertidal Ecology. For the purposes of the EIA, the site characterisation has identified the potential extent and location of *S. spinulosa* reef as far as reasonably practicable. This has allowed the EIA to assess potential impacts on *Sabellaria* reef. The assessment does not discount "low reef". Figure 7.2 of the Information to Support HRA report presents a map of potential *Sabellaria* reef extent based on medium to high confidence of reef presence (N.B. this includes reef of any reefiness characteristic, including low). *Sabellaria* reef identified during the Norfolk Vanguard benthic surveys in 2016 was found to be of low or medium reefiness and this is included in the assessment.	Agreed, although noting the uncertainty associated with *S. spinulosa* reef mapping due to the ephemeral nature of the reef, the use of a range of datasets, and the fact that the applicant has only assessed medium/high quality reef as reef	It is agreed by both parties that the ES adequately characterises the baseline environment in terms of Benthic and Intertidal Ecology, although noting the uncertainty associated with *S. spinulosa* reef mapping due to the ephemeral nature of the reef and the use of a range of datasets.
	The approach to *S. spinulosa* reef mapping is appropriate to inform the EIA based on the data available.	Not agreed. Natural England has uncertainty associated with *S. spinulosa* reef mapping due to the ephemeral	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	The assessment does not discount "low reef". It should be noted however that by definition, "low reef" is inherently patchy (with only 10-20% coverage, Gubbay (2007)[2]) and therefore increases the potential for micrositing. Medium reef also has high potential for micrositing, being classified by 20-30% coverage.	nature of the reef the use of a range of datasets, and the fact that the applicant has only assessed medium/high quality reef as reef.	
	The mapping of potential *S. spinulosa* reef by Envision on behalf of Norfolk Vanguard Limited identifies potential reef areas which are largely consistent with areas Natural England has identified (as shown on Figure 2.1 below).	Agreed	It is agreed by both parties that the mapping of potential *S. spinulosa* reef by Envision on behalf of Norfolk Vanguard Limited identifies potential reef areas which are largely consistent with areas Natural England has identified.
	S. spinulosa is an ephemeral, rapidly growing opportunistic species; pre-construction surveys targeted at establishing the presence, location and extent of *S. spinulosa* reef habitats are therefore required to enable effective micrositing where possible. The assessment provides consideration of the impacts if micrositing is possible and if it is not possible (see Assessment Findings sections below). A cable specification, installation and monitoring plan, must be agreed with the MMO in consultation with Natural England as discussed under 'Mitigation and Management' below. This will provide the mechanism to agree cable routing/micrositing.	Not agreed, parameters/clear commitments are required in the DCO rather than the simple statement "where possible". Natural England would want to see that all Annex I *S. spinulosa* will be avoided. The impact on *Sabellaria spinulosa* reef needs to be fully assessed if micro-siting is not possible and cable installation is still permitted.	
Assessment methodology	Appropriate legislation, planning policy and guidance relevant to Benthic and Intertidal Ecology has been used.	Agreed	It is agreed by both parties that appropriate legislation has been considered.

[2] Gubbay (2007) Defining and managing *Sabellaria spinulosa* reefs: Report of an inter-agency workshop 1-2 May, 2007

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	The list of potential impacts on Benthic and Intertidal Ecology assessed is appropriate.	Agreed, subject to consideration of cleaning activities (see below).	It is agreed by both parties that the list of potential impacts on Benthic and Intertidal Ecology assessed is appropriate, with the exception of clean activities (see below)
	Operational cleaning of offshore infrastructure would consist of jet washing with seawater and therefore, only natural materials would enter the marine environment i.e. marine growth, bird guano and seawater. Whilst it is not possible to quantify the exact volume of the materials to be deposited, due to the small scale of the deposit that will be mixed with seawater, it is considered that such a deposit will quickly dissipate and is not capable of being deposited in sufficient volume to be capable of affecting water quality. No chemicals would be used in this process. The number of estimated operational visits are included as part of the operation and maintenance (O&M) activities described in Chapter 5, section 5.4.18.	Not agreed, details are still required of the volumes of material being deposited in the marine environment.	
	The impact assessment methodology is appropriate, and is in line with the Method Statement provided in February 2017 (see Appendix 9.2 of the Consultation Report (Application document 5.1) and agreed during the topic group meeting in February 2017.	Agreed	It is agreed by both parties that the impact assessment methodologies used in the EIA are appropriate.
	The worst case scenario used in the assessment for Benthic and Intertidal Ecology is appropriate.	Agreed	It is agreed by both parties that the worst case scenario used in the assessment is appropriate
	As discussed in the Change Report (document reference Pre-ExA;Change Report;9.3), the increase in the maximum number of piles per offshore electrical platform from six to 18 (36 in total for two platforms) does not affect the conclusions of ES Chapter 10 Benthic Ecology.	Agreed	It is agreed by both parties that the proposed increase in the maximum number of piles per offshore electrical platform from six to 18 (36 in total for two platforms) does not affect the

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
			conclusions of ES Chapter 10 Benthic Ecology.
	Cable protection may either be installed during installation or maintenance, up to the total volume assessed in Chapter 10 Section 10.7.5 Potential Impacts during Operation (including Section 10.7.5.1, Permanent loss of seabed habitat through the presence of seabed infrastructure in the OWF sites and Section 10.7.5.2, Permanent loss of seabed habitat through the presence of seabed infrastructure in the offshore cable corridor).	Not agreed Natural England suggests that no cable protection associated with repairs has been included within the assessment and therefore should not be permitted in the DML.	
	It is the Applicant's preference to cut and remove redundant cables where possible. This requires agreement from the owners of the redundant cable, and therefore until this can be agreed post consent, an assumption that nine existing cables will be crossed has been assessed in order to provide a conservative assessment. The cable installation methodology will be agreed with the MMO through the Construction Method Statement. The Scour Protection and Cable Protection Plan will be updated as the final design of the project develops and must be agreed with the MMO prior to construction. This will include justification of the location, type and volume/area of essential cable protection based on crossing agreements and preconstruction surveys.	Agreed Natural England advises that where there are out of service cables, in the Haisborough Hammond and Winterton SAC, it would be better to reduce impacts by cutting cables rather than introducing unnecessary hard substrate to cross redundant cables. In addition, where strictly necessary the type of cable protection should be selected on the basis on least environmental impact at each particular location.	It is agreed by both parties that it is preferable to cut and remove redundant cables where possible subject to agreement from the cable owner(s).
Assessment findings	The characterisation of receptor sensitivity is appropriate. Chapter 10, Table 10.15 (mentioned in the Natural England relevant representation) refers to the sensitivity of receptors identified in NV East where *S. spinulosa* individuals were recorded. Individuals are less sensitive than reef and therefore have been classified as low sensitivity. Tables 10.14 and 10.16 refer to the sensitivity of receptors identified in NV West and the offshore cable corridor, respectively, where *S. spinulosa*	Mostly agreed, however all references in the document should note that *S. spinulosa* reef has medium sensitivity to heavy smothering and habitat change and high sensitivity to habitat loss. In addition, Natural England disagree with some of the sensitivity assessments in table 10.7.2, for example coarse sediment	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	reef has been identified. *S. spinulosa* in these areas has been identified as having medium sensitivity in accordance with the Marine Life Information Network (MarLIN) Marine Evidence based Sensitivity Assessments (MarESA).	has high sensitivity to habitat change as does subtidal sand. We advise that 10.7.5.2.2 and Table 10.21 is changed to reflect this.	
	The magnitude of effect is correctly identified.	Agreed, noting the change in the scale of suspended sediment and seabed level changes in relation to the offshore cable corridor discussed in Section 2.1.	It is agreed by both parties that the magnitude of effect on benthic ecology is correctly identified.
	There would be no permanent loss of *S. spinulosa* reef as this is an ephemeral species which is likely to recolonise, as agreed during the Expert Topic Group meeting on the 31st January 2018 (Appendix 25.6 of the Consultation Report).	Not agreed. Evidence presented to date is in relation to recover of individuals and not Annex I reef. And particularly disagree due potential for cable protection.	
	There would be no temporary habitat loss of *S. spinulosa* reef if micro-siting is possible. The magnitude would be low if micrositing is not possible through a small proportion of reef	Not agreed	
	The impact significance conclusions of negligible or minor adverse for Norfolk Vanguard alone are appropriate.	Not agreed	
CIA	The plans and projects considered within the CIA are appropriate as agreed during the expert topic group meeting in July 2017.	Agreed	It is agreed by both parties that the plans and projects included in the CIA are appropriate.
	The CIA methodology is appropriate. See position below regarding the conclusion of a low magnitude.	Not agreed. In- combination Natural England do not agree that there will be a low impact magnitude in terms of HHW SAC when Boreas is considered in combination as the export cable footprint will be 11% of the cable corridor running through the SAC and doesn't take into account the interest features impacted.	It is agreed by both parties that the CIA methodology is appropriate.

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	The cumulative impact conclusions of negligible or minor significance are appropriate. The footprint of Norfolk Vanguard temporary disturbance within the Haisborough, Hammond and Winterton SAC would be up to 4.86km^2 as shown in Table 10.12 of ES Chapter 10. The footprint for Norfolk Boreas in the SAC would be the same. It should be noted that recovery is likely to have occurred, or at least commenced, following the first cable installation before subsequent phases of temporary disturbance from cable installation occur (for the second phase of Norfolk Vanguard and then Norfolk Boreas installation). The total area of the Haisborough Hammond and Winterton SAC is 1,468km^2 and the area of Sandbanks within the SAC is 678km^2. Given the small proportion and temporary nature of disturbance from Norfolk Vanguard and Norfolk Boreas cable installation, it has been concluded to result in a low magnitude impact.	Not agreed. In- combination Natural England do not agree that there will be a low impact magnitude in terms of HHW SAC when Boreas is considered in combination as the export cable footprint will be 11% of the cable corridor running through the SAC and doesn't take into account the interest features impacted. Natural England considers that impacts should be measured against the interest feature not the whole site.	
Habitats Regulations Assessment (HRA)			
Screening of LSE	The approach to HRA Screening is appropriate. The following site is screened in for further assessment as agreed during the expert topic group meeting in July 2017: • Haisborough, Hammond and Winterton SAC.	Agreed	It is agreed by both parties that the designated sites and potential effects screened in for further assessment are appropriate.
Assessment of Adverse Effect on Integrity	The approach to the assessment of AEoI is appropriate.	To be confirmed	
	The communities of Annex 1 Sandbanks in the Haisborough, Hammond and Winterton SAC will recover as the physical processes of the Sandbanks recover within the range of natural variation as the communities are habituated to highly mobile sediments.	Not agreed, Natural England acknowledges that the mobile nature of this particular sandbank system would make it more likely to recover from changes in structure then less mobile ones. But, there are no empirical data that relate to interventions of similar spatial and temporal scale to the proposals and	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
		for this particular sandbank system to support the modelling. Therefore, Natural England continues to have residual concerns in relation to the overall impacts to the form and function of the Annex I sandbank sandwave fields and their potential recoverability.	
	Based on available data, micrositing around *S. spinulosa* reef is likely to be possible. However, it is acknowledged that *S. spinulosa* reef extent may change prior to construction of Norfolk Vanguard and therefore pre-construction surveys are required to determine the extent of *S. spinulosa* reef at that time. A cable specification, installation and monitoring plan, must be agreed with the MMO in consultation with Natural England as discussed under 'Mitigation and Management' below. This will provide the mechanism to agree cable routing/micrositing.	Agreed on the basis of survey data collected to date there should be room to microsite around reef in the cable corridor. Although it should be noted and taken into consideration by the decision-maker now that this may not be the case pre-construction and therefore there is an outstanding risk to the project	It is agreed by both parties that on the basis of survey data at this point there should be room to microsite around reef in the cable corridor, although noting that this may not be the case pre-construction. The cable specification, installation and monitoring plan will provide the mechanism to agree cable routing/micrositing with the MMO in consultation with Natural England.
	In the unlikely event that micrositing around *S. spinulosa* reef is not possible, a small proportion of reef may be temporarily disturbed. *S. spinulosa* in its individual and reef forms, is known to be ephemeral and opportunistic and can be expected to recover/recolonise within the range of natural variation. Therefore, a small proportion of temporary disturbance to *S. spinulosa* reef would not cause an adverse effect on the restoration objective of the Haisborough, Hammond and Winterton SAC. The following references provide examples of evidence that *S. spinulosa* reef can be expected to recover/recolonise Tillin and	Not agreed, there is currently a restore objective for reef features of HHW SAC. Site management measures are being developed for other operations likely to damage the interest features of the site and will be implemented in the future. In the absence of those pressures there is a high likelihood that *Sabellaria spinulosa* reef will recover/develop. One such management measure that is being considered is the use of fisheries byelaws to protect areas where *Sabellaria spinulosa* reef have been shown to be regularly present. Therefore it is hoped	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	Marshall, 2015; OSPAR Commission, 2010; Holt, 1998; Cooper *et al*., 2007; Pearce *et al*., 2007). As stated in Natural England's position, there is a high likelihood that *Sabellaria spinulosa* reef will recover/develop following cessation of disturbance from fisheries. This would also apply following cable installation.	that more extensive *Sabellaria spinulosa* reefs will be restored in these areas, and that existing encrusting and low quality reef will develop into higher quality reef habitat. Natural England would therefore advise that cable installation activities are avoided in these areas. In addition, the evidence presented in the HRA to support conclusions on recoverability relates only to individuals/abundance, but not to reef. Thus we have limited confidence in the ability of reef to recover from cable installation activities. Therefore, we further advocate that the standard mitigation measure of avoidance is adhered to.	
	Cable protection would not affect the potential of *S. spinulosa* reef to recover within the Haisborough, Hammond and Winterton SAC as *S. spinulosa* reef can be expected to colonise cable protection as an artificial substrate, in accordance with the UK Biodiversity Action Plan Priority Habitat Description for *S. spinulosa* Reefs (JNCC, 2016[3]): "*S. spinulosa requires only a few key environmental factors for survival in UK waters. Most important seems to be a good supply of sand grains for tube building, put into suspension by strong water movement....The worms need some form of hard substratum to which their tubes will initially be attached, whether bedrock, boulders, artificial substrata, pebbles or shell fragments*."	Not agreed, Natural England does not consider the colonisation of sub-sea structures as beneficial as it is not natural change. However, we do agree that colonisation of new structures is likely to only be minor adverse significance. The cable protection in the first instance will result in loss of habitat. This will be considered permanent loss of underlying habitat if the cable protection is not removed. In addition if the plan is to remove the cable protection this would also result in removal of any *Sabellaria*	

[3] http://jncc.defra.gov.uk/page-5706

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
		spinulosa which may have colonised the structure	
	As *S. spinulosa* is an ephemeral, rapidly growing opportunistic species, individuals and reef can be expected to recover following cable maintenance, if required. As required under condition 9(g) of the DMLs, a Cable Specification, Installation and Monitoring Plan, must be agreed with the MMO which would include a risk based approach to the management of cables during O&M. The following references provide examples of evidence that *S. spinulosa* reef can be expected to recover/recolonise Tillin and Marshall, 2015; OSPAR Commission, 2010; Holt, 1998; Cooper *et al*., 2007; Pearce *et al*., 2007).	Not agreed, the evidence presented in the HRA to support conclusions on recoverability relates only to individuals/abundance, but not to reef. Thus we have limited confidence in the ability of reef to recover from cable installation activities. Therefore, we further advocate that the standard mitigation measure of avoidance is adhered to.	
	The conclusions of no adverse effect on site integrity in the Information to Support HRA report (document 5.3) are appropriate.	Not agreed. Both the applicant and Natural England have identified several impact pathways that could impact on the Annex I Sandbank and/or Reef features, when considered alone and cumulatively. However, Natural England has concerns in relation to the applicant's use of data sets, the over-reliance on the evidence presented, and assessment of the impacts against the conservation objectives for the designated site, which has resulted in a disagreement between the Applicant and Natural England on the significance of these impacts. Therefore Natural England is unable to agree with the conclusions within the Habitats Regulation Assessment that there will be no adverse effect on the integrity Haisborough Hammond and Winterton	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
		SAC Annex I sandbanks and reef features both alone and in-combination.	
Mitigation and Management			
Mitigation and Management	A 50m buffer from *S. spinulosa* reef is proposed for disposal of sediment in accordance with advice provided by Natural England by email on 13th February 2018.	Agreed, but please also see Point 17 of Appendix 2 of Natural England's Rel. Rep.	
	The Scour Protection and Cable Protection Plan is a live document which will be updated as the final design of the project develops and agreed with the MMO prior to construction. This will include justification of the location and volume/area of essential cable protection based on crossing agreements and preconstruction surveys.	Not Agreed	
	The Conditions of the DMLs (Schedules 9, 10, 11 and 12; Part 4) state that a cable specification, installation and monitoring plan, must be agreed with the MMO. This includes a detailed cable laying plan, incorporating a burial risk assessment to ascertain suitable burial depths and cable laying techniques. This gives the MMO and their advisors the opportunity to input to the cable laying plan including the cable route and potential for micrositing.	Agreed, noting that on the basis of current survey data micrositing around reef in cable corridor should be possible but due to its ephemeral nature, this may not be the case pre-construction.	It is agreed by both parties that the cable specification, installation and monitoring plan gives the MMO and their advisors the opportunity to input to the cable laying plan including the cable route and potential for micrositing.
	The DCO/DML should reflect the project design assessed in the EIA, including the contingency for cable protection which was identified in response to advice from Natural England during the Evidence Plan Process. A cable specification, installation and monitoring plan, must also be agreed with the MMO. This includes a detailed cable route and laying plan, incorporating a burial risk assessment to ascertain suitable burial depths, cable laying techniques and cable protection. This process will rely on pre-construction survey data. It gives the MMO and their advisors the opportunity to input to the	Not agreed Natural England supports the consideration and assessment of the impacts of a realistic worst case scenario (WCS) as this enables the examining authority to understand the full implications of an application prior to granting consent. However, it should not necessarily follow that this WCS then forms the basis of the DCO/DML conditions. Natural England's view is that	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	cable laying plan, ensuring only essential works are permitted prior to construction, including only allowing essential cable protection.	the DCO/DML should only include protection that is deemed essential, such as that required for cable crossings, and that any additional requirement post-consent is dealt with through a robust revision to the Scour Protection and Cable Protection Plan when the project parameters are clearly defined and the full range of mitigation options can be fully considered.	
Monitoring	The In Principle Monitoring Plan (document 8.12), provides an appropriate framework to agree monitoring with the MMO in consultation with Natural England	Agreed	It is agreed by both parties that the In Principle Monitoring Plan (document 8.12), provides an appropriate framework to agree monitoring with the MMO in consultation with Natural England.

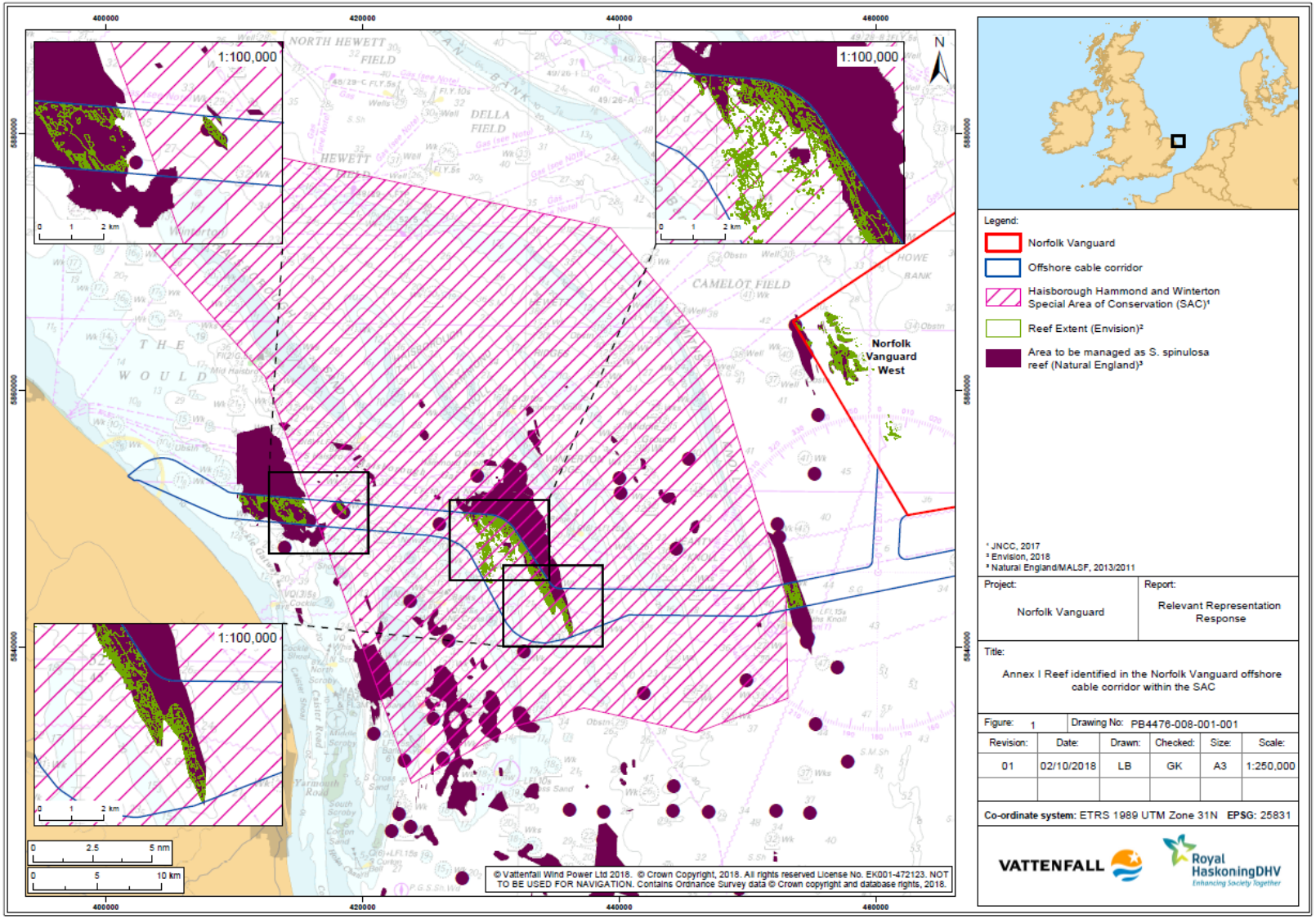

Figure 2.1 *Sabellaria spinulosa* reef mapping by the Applicant and Natural England

2.3 Fish and Shellfish Ecology

22. The project has the potential to impact upon Fish and Shellfish Ecology. Chapter 11 of the Norfolk Vanguard ES (document reference 6.1 of the Application) provides an assessment of the significance of these impacts.

23. Table 5 provides an overview of meetings and correspondence undertaken with Natural England regarding Fish and Shellfish Ecology.

24. Table 6 provides areas of agreement (common ground) and disagreement regarding Fish and Shellfish Ecology.

25. Minutes of Evidence Plan meetings can be found in Appendix 9.16 of the Consultation Report (document reference 5.1 of the Application).

Table 5 Summary of Consultation with Natural England in relation to Fish and Shellfish Ecology

Date	Contact Type	Topic
Pre-Application		
21st March 2016	Benthic and Geophysical Survey Scope Meeting	Agreement that no further fish surveys were required to inform the EIA.
2nd February 2017	Email from the Applicant	Provision of the Fish Ecology Method Statement (see Appendix 9.2 of the Consultation Report).
16th February 2017	Benthic and Intertidal Ecology, Fish Ecology, Marine Physical Processes and Marine Water and Sediment Quality Scoping Expert Topic Group Meeting	Discussion of Scoping responses and approach to EIA/HRA (minutes provided in Appendix 9.16 of the Consultation Report).
Post-Application		
31st August 2018	Relevant Representation	Natural England's initial feedback on the DCO application.
17th October 2018	Email from the Applicant	First draft SOCG provided by the Applicant
18th October 2018	SoCG Meeting	Discussion regarding the drafting of the SoCG
21st November 2018	Email from the Applicant	Second draft SOCG provided by the Applicant

Table 6 Statement of Common Ground - Fish and shellfish

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
Environmental Impact Assessment			
Existing Environment	The ES adequately characterises the baseline environment in terms of Fish and Shellfish Ecology. No site specific survey data is required for the characterisation of Fish and Shellfish Ecology as agreed by email on 13th April 2016.	Agreed	It is agreed by both parties that the existing environment for fish and shellfish has been characterised appropriately for the assessment.
Assessment methodology	Appropriate legislation, planning policy and guidance relevant to Fish and Shellfish Ecology has been used.	Agreed	It is agreed by both parties that appropriate legislation has been considered.
	The list of potential impacts on Fish and Shellfish Ecology assessed is appropriate	Agreed	It is agreed by both parties that appropriate impacts on fish and shellfish have been assessed.
	The impact assessment methodology is appropriate, and is in line with the Method Statement provided in February 2017 (see Appendix 9.2 of the Consultation Report (Application document 5.1) and agreed during the topic group meeting in February 2017.	Agreed	It is agreed by both parties that the impact assessment methodologies used in the EIA are appropriate.
	The worst case scenario used in the assessment for Fish and Shellfish Ecology is appropriate.	Agreed	It is agreed by both parties that the worst case scenario used in the assessment is appropriate
	As discussed in the Change Report (document reference Pre-ExA;Change Report;9.3), the increase in the maximum number of piles per offshore electrical platform from six to 18 per platform (36 in total for two platforms) does not affect the conclusions of ES Chapter 11 Fish and Shellfish Ecology.	Agreed	It is agreed by both parties that the proposed increase in the maximum number of piles per offshore electrical platform from six to 18 (36 in total for two platforms) does not affect the conclusions of ES Chapter 11 Fish and Shellfish Ecology.

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
Assessment findings	The characterisation of receptor sensitivity is appropriate.	Agreed	It is agreed by both parties that fish and shellfish sensitivity is appropriately characterised.
	The magnitude of effect is correctly identified.	Agreed	It is agreed by both parties that the magnitude of effects on fish and shellfish are appropriately characterised.
	The impact significance conclusions of negligible or minor adverse for Norfolk Vanguard alone are appropriate.	Agreed	It is agreed by both parties that the impact significance for fish and shellfish is appropriately characterised for Norfolk Vanguard alone.
Cumulative Impact Assessment (CIA)	The plans and projects considered within the CIA are appropriate.	Agreed	It is agreed by both parties that the plans and projects included in the CIA are appropriate.
	The CIA methodology is appropriate.	Agreed	It is agreed by both parties that the CIA methodology is appropriate.
	The cumulative impact conclusions of negligible or minor significance are appropriate.	Agreed	It is agreed by both parties that the impact significance for fish and shellfish is appropriate for cumulative impacts.
Mitigation and Management			
Mitigation and Management	Given the impacts of the project, the embedded mitigation outlined in Section 11.7.1 of Chapter 11 is adequate.	Agreed	It is agreed by both parties that the embedded mitigation proposed is appropriate.
Monitoring	Given the minor impacts of the project, no monitoring is proposed for fish and shellfish ecology. The In Principle Monitoring Plan provides framework to agree monitoring post consent.	Agreed as Natural England acknowledges the applicant will seek to address these concerns post consent. as Natural England is concerned that no further monitoring or independent surveys are proposed regarding Fish and Shellfish ecology within the In Principle	It is agreed by both parties that the In Principle Monitoring Plan (document 8.12), provides an appropriate framework to agree monitoring with the MMO in consultation with Natural England.

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
		Monitoring Plan. Sandeel and herring habitat is of particular interest as these are important prey species including for harbour porpoise of the Southern North Sea cSAC (candidate Special Area of Consevration) /SCI. However Natural England would defer to Cefas on this issue.	

2.4 Marine Mammals

26. The project has the potential to impact upon Marine Mammals. Chapter 12 of the Norfolk Vanguard ES (document reference 6.1 of the Application) provides an assessment of the significance of these impacts.

27. Table 7 provides an overview of meetings and correspondence undertaken with Natural England regarding Marine Mammals.

28. Table 8 provides areas of agreement (common ground) and disagreement regarding Marine Mammals.

29. Minutes of Evidence Plan meetings can be found in Appendix 9.24 and Appendix 25.9 of the Consultation Report (document reference 5.1 of the Application).

Table 7 Summary of Consultation with Natural England in relation to Marine Mammals

Date	Contact Type	Topic
Pre-Application		
21st March 2016	Meeting	Discussion on the required aerial survey methodology (see Appendix 9.17 of the Consultation Report).
2nd February 2017	Email from the Applicant	Provision of the Marine Mammals Method Statement (Appendix 9.13 of the Consultation Report).
15th February 2017	Marine Mammals Scoping Expert Topic Group Meeting	Discussion of the scoping responses and approach to EIA/HRA (minutes provided in Appendix 9.24 of the Consultation Report).
22nd June 2017	Email from the Applicant	Provision of HRA Method Statement (Appendix 9.13 of the Consultation Report) to inform discussions at the Marine Mammals Topic Group meeting.
6th July 2017	Marine Mammals pre-PEI ETG Meeting	Marine mammal HRA Screening agreed and approach to HRA discussed (minutes provided in Appendix 9.24 of the Consultation Report).
25th October 2017	Email from the Applicant	Provision of the Marine Mammals PEIR Chapter.
8th December 2017	Marine mammal ETG Conference call	Marine mammal PEIR comments and approach to HRA.
3rd January 2018	Email from Natural England	Written advice on approach to the marine mammal HRA and clarifying PEIR feedback following meeting on the 8th December 2017.
23rd March 2018	Letter from Natural England	Feedback on the draft Information to Support HRA report.
26th March 2018	Marine Mammal ETG Conference Call	Discussion of feedback on the draft Information to Support HRA for Marine Mammals (minutes provided in Appendix 25.9 of the Consultation Report).

Date	Contact Type	Topic
13th April 2018	Email from the Applicant	Provision of draft In Principle Southern North Sea cSAC Site Integrity Plan (document 8.17) for review.
Post-Application		
31st August 2018	Relevant Representation	Natural England's initial feedback on the DCO application.
17th October 2018	Email from the Applicant	First draft SOCG provided by the Applicant
18th October 2018	SoCG Meeting	Discussion regarding the drafting of the SoCG
21st November 2018	Email from the Applicant	Second draft SOCG provided by the Applicant

Table 8 Statement of Common Ground - Marine mammals

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
Environmental Impact Assessment			
Existing Environment	Survey data collected for Norfolk Vanguard for the characterisation of marine mammals are suitable for the assessment.	Agreed	It is agreed by both parties that sufficient survey data has been collected to undertake the assessment.
	The ES adequately characterises the baseline environment in terms of marine mammals.	Agreed In addition to project specific surveys, sufficient background characterisation data from previous strategic surveys have been included. Species assessed are harbour porpoise, grey seal and harbour seal.	It is agreed by both parties that the existing environment for marine mammals has been characterised appropriately for the assessment.
Assessment methodology	Appropriate legislation, planning policy and guidance relevant to marine mammals has been used.	Agreed	It is agreed by both parties that appropriate legislation has been considered.
	The list of potential impacts on marine mammals assessed is appropriate.	Agreed	It is agreed by both parties that appropriate impacts on marine mammals have been assessed.
	Harbour porpoise, grey seal and harbour seal are the only species of marine mammal required to be considered in the impact assessment.	Agreed Other marine mammal species are at such low density that it is not necessary to assess further.	It is agreed by both parties that appropriate species of marine mammal have been assessed.
	The reference populations as defined in the ES are appropriate.	Agreed	It is agreed by both parties that appropriate reference populations have been used in the assessment.
	The approach to underwater noise modelling and assessment of impacts from pile driving noise for marine mammals follows current best practice and is therefore	Agreed	It is agreed by both parties that the approach to underwater noise impact assessment is appropriate

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	appropriate for this assessment as agreed during the expert topic group meeting in February 2017.		
	The impact assessment methodology is appropriate.	Agreed	It is agreed by both parties that the impact assessment methodology is appropriate
	The worst case scenario for Norfolk Vanguard alone used in the assessment for marine mammals is appropriate.	Agreed.	It is agreed by both parties that the worst case scenario used in the assessment is appropriate
	As discussed in the Change Report (document reference Pre-ExA;Change Report;9.3), the increase in the maximum number of piles per offshore electrical platform from six to 18 (36 in total for two platforms) does not affect the conclusions of ES Chapter 12 Marine Mammals.	Agreed	It is agreed by both parties that the proposed increase in the maximum number of piles per offshore electrical platform from six to 18 (36 in total for two platforms) does not affect the conclusions of ES Chapter 12 Marine Mammals.
	Unexploded Ordnance (UXO) clearance is considered in the EIA to provide a conservative assessment but would be subject to additional licencing once the nature and extent of UXO present is known following pre-construction surveys. This licencing would be supported by a UXO Marine Mammal Mitigation Protocol (MMMP)	Agreed	It is agreed by both parties that UXO clearance will be licenced separately
Assessment findings	The characterisation of receptor sensitivity is appropriate.	Agreed	It is agreed by both parties that marine mammal sensitivity is appropriately characterised for each species and impact.
	The magnitude of effect is correctly identified.	Agreed	It is agreed by both parties that the magnitude of effects on marine mammals are appropriately characterised.
	The impact significance conclusions of negligible or minor for Norfolk Vanguard alone are appropriate.	Agreed	It is agreed by both parties that the impact significance for marine

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
			mammals is appropriately characterised for Norfolk Vanguard alone.
Cumulative Impact Assessment (CIA)	The plans and projects considered within the CIA are appropriate.	Agreed	It is agreed by both parties that the plans and projects included in the CIA are appropriate.
	The CIA methodology is appropriate.	Agreed	It is agreed by both parties that the CIA methodology is appropriate.
	The cumulative impact conclusions of negligible or minor significance are appropriate. The Site Integrity Plan (DCO Schedules 9 and 10 Part 4 Condition 14(1)(m) and Schedules 11 and 12 Part 4 Condition 9(1)(l))) provides the framework to agree appropriate mitigation measures based on the latest guidance and provides the mechanism for the MMO to ensure that disturbance can be limited to an acceptable level, as piling cannot commence until the MMO is satisfied that there would be no adverse effect on integrity. As outlined in the In Principle Site Integrity Plan (Table 2.1 of document 5.3), it is proposed that the Site Integrity Plan would be updated to capture all relevant assessments and mitigation measures. This will include updating the in-combination assessment, taking into account the conclusions of the RoC process.	Not agreed, it is the view of Natural England that the assessment of any future plan or project, such as Norfolk Vanguard, is unable to fully complete any in-combination assessment and Habitat Regulation Assessments until: - The RoC consent process has concluded and the predicted level of disturbance to the Southern North Sea cSAC from the consented projects is agreed; and b) A mechanism is in place to ensure that disturbance can be limited to an acceptable level.	
Habitats Regulations Assessment (HRA)			
Screening of LSE	The Approach to HRA Screening is appropriate. The following sites are screened in for further assessment: • Southern North Sea cSAC/SCI • Humber Estuary SAC	Agreed	It is agreed by both parties that the designated sites and potential effects screened in for further assessment are appropriate.

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	• The Wash and North Norfolk Coast SAC		
Assessment of Adverse Effect on Integrity	The approach to the assessment of AEoI is appropriate.	Agreed in part, however, as a result of the in-combination effect of underwater noise during the construction period at the project (from piling and UXO clearance), the Information to Support the HRA indicates that there is potential for LSE. Natural England advises that without the Site Integrity Plan and a mechanism to control subsea noise from multiple sources, there could be the potential for an adverse effect on the integrity of the Southern North Sea cSAC because of potential impacts on harbour porpoise. This is not an issue unique to the project and work will need to be undertaken to reduce the noise levels of multiple wind farms potentially constructing at the same time. This has been reflected in the Environmental Statement.	It is agreed by both parties that the approach to the assessment of potential adverse effects on site integrity presented in the Information to Support HRA report (document 5.3) are appropriate
	The reference populations as defined in the Information to Support HRA report are appropriate.	Agreed	It is agreed by both parties that appropriate reference populations have been used in the Information to Support HRA report.
	The conclusions of the Information to Support HRA report are appropriate for Norfolk Vanguard alone.	Agreed	It is agreed by both parties that there would be no AEoI as a result of Norfolk Vanguard alone
	The conclusions of the In-combination Assessment provided in the Information to Support HRA report are appropriate. The Site Integrity Plan (DCO Schedules 9 and 10 Part 4 Condition 14(1)(m) and Schedules 11 and 12 Part 4 Condition 9(1)(l))) provides the framework to agree	Not agreed. Effectively the Worst Case Scenario (WCS) presented in the HRA will be that all consented projects and those in the planning system will undertake 'noisy' pre-construction site preparation and construction activities at the same time which will almost certainly result in an	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	appropriate mitigation measures based on the latest guidance and provides the mechanism for the MMO to ensure that disturbance can be limited to an acceptable level, as piling cannot commence until the MMO is satisfied that there would be no adverse effect on integrity. As outlined in the In Principle Site Integrity Plan (Table 2.1 of document 5.3), it is proposed that the Site Integrity Plan would be updated to capture all relevant assessments and mitigation measures. This will include updating the in-combination assessment, taking into account the conclusions of the RoC process.	Adverse Effect on Integrity (AEoI). We recognise that this is an unrealistic WCS because for no other reason it is not technically feasible. However, it does remain probable that two, or more, projects will wish to undertake noisy activities at the same time and depending on the combination of projects there remains a high risk of an AEoI. It is also the view of NE that the assessment of any future plan or project, such as Norfolk Vanguard, is unable to fully complete any in-combination assessment and Habitat Regulation Assessments until: - The RoC consent process has concluded and the predicted level of disturbance to the Southern North Sea cSAC from the consented projects is agreed; and b) A wider mechanism is in place to ensure that disturbance can be limited to an acceptable level.	
Mitigation and Management			
Mitigation and Management	The Site Integrity Plan, in accordance with the In Principle Site Integrity Plan (application document 8.17) provides an appropriate framework to agree mitigation measures for effects on the Southern North Sea cSAC/SCI with Statutory Nature Conservation Bodies (SNCB)s and the MMO prior to construction.	Agreed, however Natural England would like to see the applicant commit to a final detailed SIP being produced at least 4 months (preferably 6) prior to commencement of pile driving. And would support this being a condition in the DCO	It is agreed by both parties that the Site Integrity Plan provides an appropriate framework to agree mitigation measures for effects on the Southern North Sea cSAC/SCI with SNCBs and the MMO prior to construction.
	The MMMP, in accordance with the draft MMMP (application document 8.13), provides an appropriate framework for securing marine mammal mitigation	Largely agreed. Natural England would suggest that the outline MMMP should be updated to reflect the changes we have	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	measures in agreement with and the MMO prior to construction.	proposed to DML Condition 19 (3) i.e. the during construction noise monitoring condition. More details are also required regarding establishment of Marine Mammal Mitigation Zone (MMMZ). Natural England expects to be further consulted on the development of the MMMP for piling and UXOs prior to construction. More details are also required regarding establishment of Marine Mammal Mitigation Zone (MMMZ). Natural England expects to be further consulted on the development of the MMMP for piling and UXOs prior to construction.	

2.5 Offshore Ornithology

30. The project has the potential to impact upon Offshore Ornithology. Chapter 13 of the Norfolk Vanguard ES (document reference 6.1 of the Application) provides an assessment of the significance of these impacts.

31. Table 9 provides an overview of meetings and correspondence undertaken with Natural England regarding Offshore Ornithology.

32. Table 10 provides areas of agreement (common ground) and disagreement regarding Offshore Ornithology.

33. Minutes of Evidence Plan meetings can be found in Appendix 9.17 and Appendix 25.8 of the Consultation Report (document reference 5.1 of the Application).

Table 9 Summary of Consultation with Natural England in relation to Offshore Ornithology

Date	Contact Type	Topic
Pre-Application		
21st March 2016	Meeting	Discussion on the required aerial survey methodology (see Appendix 9.17 of the Consultation Report).
21st March 2016	Letter from Natural England	Natural England's review of the ornithological survey strategy.
15th February 2017	ETG meeting	Discussion on the draft Offshore Ornithology PEIR Chapter (minutes provided in Appendix 9.17).
14th March 2017	Email from Natural England	Natural England feedback on Offshore Ornithology Method Statement.
8th May 2017	Email from Natural England	Natural England advice on population modelling methods for assessing impacts of the Vanguard OWF.
22nd June 2017	Email from the Applicant	Offshore HRA Screening (Appendix 5.1 of the HRA (document 5.3)) provided for consultation.
7th September 2017	Email from the Applicant	Provision of draft offshore ornithology PEIR Chapter 13.
6th October 2017	ETG meeting	Discussion of comments on the draft PEIR chapter (minutes provided in Appendix 9.20).
11th December 2017	PEIR response	Comments on the PEIR chapter
22nd February 2018	Email from the Applicant	Provision of draft Norfolk Vanguard Information to Support Habitats Regulations Assessment (HRA) (document 5.3).
23rd March 2018	Letter from Natural England	Feedback on the draft Information to Support HRA report
26th March 2018	Offshore Ornithology HRA Conference Call	Project update and comments on HRA for Offshore Ornithology (minutes provided in Appendix 25.8).

Date	Contact Type	Topic
Post-Application		
31st August 2018	Relevant Representation	Natural England's initial feedback on the DCO application.
17th October 2018	Email from the Applicant	First draft SOCG provided by the Applicant
18th October 2018	SoCG Meeting	Discussion regarding the drafting of the SoCG
21st November 2018	Email from the Applicant	Second draft SOCG provided by the Applicant

Table 10 Statement of Common Ground - Offshore ornithology

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
Environmental Impact Assessment			
Existing Environment	Survey data collected for Norfolk Vanguard (and East Anglia FOUR, now NV East) for the characterisation of offshore ornithology are suitable for the assessment.	Agreed.	Agreed.
	The methods and techniques used to analyse offshore ornithological data are appropriate for characterising bird distributions and estimating populations.	Agreed.	Agreed.
	The method used to determine flight heights is appropriate.	Agreed.	Agreed that generic flight height data (Johnston et al. 2014) will be used due to data reliability concerns raised by aerial surveyor.
	The method used to assign unidentified birds to species is appropriate.	Agreed.	Agreed.
	The use of migration-free breeding months to define seabird seasons is appropriate.	Agreed with the exceptions below.	Agreed except for gannet and lesser black-backed gull.
		Not agreed for gannet and lesser black-backed gull for EIA and HRA, where Natural England request that the full breeding season should be used.	Not agreed
Assessment methodology			
General	Appropriate legislation, planning policy and guidance relevant to offshore ornithology has been used.	Agreed.	Agreed.
	The list of potential impacts on offshore ornithology assessed is appropriate.	Agreed.	Agreed.

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	The methods for determining impact significance on offshore ornithological receptors is appropriate.	Agreed	Agreed.
	The worst case scenario used in the assessment for offshore ornithology is appropriate.	Agreed	Agreed.
	Differences between single and two phased approaches to construction are trivial in terms of ornithology impacts.	Agreed	Agreed.
	The characterisation of receptor sensitivity is appropriate	Agreed	Agreed.
Construction impact methods	The lists of potential construction impacts and ornithology receptors assessed are appropriate.	Agreed.	Agreed.
	The methods used to estimate impacts during construction, including cable laying operations, based on mean density estimates and using evidence based percentages of displacement and mortality are appropriate.	Not agreed. Natural England requests inclusion of displacement assessments for the site alone based on upper and lower confidence intervals for bird density in addition to the mean densities, although Natural England agree that this would not alter the conclusion of the assessment (no impacts predicted to be greater than minor adverse significance).	Not agreed
		Natural England does not agree with the percentage values used for estimating red-throated diver displacement (80%) and mortality (5%).	Not agreed
Operation impact methods	The sources of operational impact assessed are appropriate	Agreed	Agreed
	The lists of ornithology receptors assessed for each impact are appropriate. Species included were those with impacts above minimal thresholds (e.g. >10 collisions per year).	Agreed, with exceptions noted below.	Agreed (with exceptions noted below)
		Natural England requests that herring gull collision impacts should be included in the seabird collision risk assessment and an updated non-seabird collision risk assessment is undertaken, including for Bewick's swan and avocet, using the terrestrial migration collision methods.	Not agreed. Natural England requests inclusion of herring gull and update to the

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
			non-seabird collision assessment.
	Methods for assessing operational displacement are appropriate, based on the use of mean densities and evidence based percentages of displacement and mortality.	Not agreed. Natural England requests displacement assessments for the site alone based on upper and lower confidence intervals for bird density in addition to the mean densities, although agree that this would not alter the conclusion of the assessment (no impacts predicted to be greater than minor adverse significance) for all species except red-throated diver.	Not agreed
		Not agreed. Natural England disagrees with the percentage values used for estimating red-throated diver displacement (80%) and mortality (5%)	Not agreed
		Not agreed. Natural England has highlighted the erroneous omission of birds in flight for red-throated diver for this part of the assessment.	Not agreed
	Methods for assessing seabird collision risk are appropriate: That is use of Band collision risk model (CRM) options 1 and 2, implemented as stochastic simulations using the R programming language in order to permit incorporation of uncertainty in all the parameters, for which Natural England previously requested upper and lower predictions. These included nocturnal activity rates, proportions at collision height, avoidance rates and seabird densities.	Agreed with respect to use of Band model options 1 and 2 and seabird avoidance rates.	Agreed
		Not agreed with respect to stochastic simulation methods used. Natural England is seeking further information and clarifications via comments and questions provided in their Relevant Representation.	Not agreed
		Not agreed that use of median bird densities rather than mean densities is appropriate.	Not agreed
		Not agreed due to omission of the deterministic model outputs for the various scenarios accounting for variability/uncertainty in bird densities (i.e. use of 95% CLs	Not agreed

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
		of density as well as mean), avoidance rates with standard deviations, flight heights (CLs), and nocturnal activities.	
		Not agreed that use of empirical nocturnal activity factors for gannet and kittiwake rather than the agreed position of a range of factors (1-2 for gannet and 2-3 for kittiwake) is appropriate.	Not agreed
		Not agreed as there is a need to fully present all of the input parameters for the CRM (bird, turbine and wind farm parameters).	Not agreed
	Methods for assessing non-seabird collision risk are appropriate (reference to previous assessments).	Not agreed. Natural England request that the migrant collision risk assessment undertaken at East Anglia THREE is re-assessed with the Vanguard turbine parameters and with the additional inclusion of Bewick's swan and avocet.	Not agreed
	Methods for assessing barrier effects are appropriate.	Agreed	Agreed
	Methods for assessing indirect effects are appropriate.	Agreed	Agreed
Impact assessment findings – project alone (EIA)			
Construction impacts	The magnitude of effects and conclusions on significance resulting from impacts during construction are correctly identified and predicted. No impacts of greater than minor adverse significance are predicted.	Agreed, subject to the following caveats: assessment using upper and lower confidence limits on bird densities should be included (although it is agreed that this does not alter the conclusions (no impacts predicted to be greater than minor adverse significance) for all species).	Agreed subject to caveats (details in Natural England position)
Operation impacts	The magnitude of effects and conclusions on significance resulting from displacement impacts during operation are correctly identified and predicted. No impacts of greater than minor adverse significance are predicted.	Agreed, for gannet, razorbill, guillemot and puffin subject to the following caveats: assessment using upper and lower confidence limits on bird densities should be included and extended breeding season for gannet (although it is agreed that these do not alter the conclusions (no impacts predicted to be greater than minor adverse) for these species).	Agreed

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
		Not agreed. Red-throated diver density estimates used in the displacement matrices for NV West omits birds in flight.	Not agreed
		Not agreed. Percentages used for displacement and mortality for red-throated diver do not correspond to Natural England guidance.	Not agreed
		Not agreed. Natural England considers that there is an additional need to assess potential impacts resulting from operation and maintenance vessel movements.	Not agreed
	The magnitude of effects and conclusions on significance resulting from collision impacts during operation are correctly identified and predicted. No impacts of greater than minor adverse significance are predicted.	Not agreed due to the methods used to produce CRM outputs (see methods section above for details).	Not agreed
		Not agreed. Natural England considers that herring gull should be fully assessed for collision risk.	Not agreed
		Not agreed. Collision assessment for the non-seabird migrants covered at East Anglia THREE should be presented for the Vanguard turbine specifications, and this should also include the addition of assessment for Bewick's swan and avocet.	Not agreed
	The magnitude of effects and conclusions on significance resulting from barrier effects during operation are correctly identified and predicted. No impacts of greater than minor adverse significance are predicted.	Agreed	Agreed
	The magnitude of effects and conclusions on significance resulting from indirect effects during operation are	Agreed	Agreed

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	correctly identified and predicted. No impacts of greater than minor adverse significance are predicted.		
Decommissioning impacts	The magnitude of effects and conclusions on significance resulting from impacts during decommissioning are correctly identified and predicted. No impacts of greater than minor significance are predicted.	Agreed that decommissioning impacts are likely to be no worse than those during construction. However, Natural England notes that further consultation will be required (at the time decommissioning is being planned) to ensure potential impacts are minimised.	Agreed
Cumulative impact assessment (EIA)			
Cumulative construction assessment	The plans and projects considered within the CIA are appropriate	Agreed	Agreed
	The magnitude of effects and conclusions on significance resulting from cumulative impacts during construction are correctly identified and predicted. No impacts of greater than minor adverse significance are predicted.	Agreed.	Agreed.
Cumulative operation assessment	The plans and projects considered within the CIA are appropriate.	Not agreed. Natural England requests consideration of additional offshore wind farms as noted in the cumulative displacement and collision sections below. Natural England has raised concerns about the validity of the displacement assessments for the Hornsea THREE and Thanet extension applications during the ongoing Examination process, and advises that the associated values are unlikely to reflect the impacts of these developments should they be consented.	Not agreed
	The magnitude of effects and conclusions on significance resulting from cumulative displacement impacts during operation are correctly identified and predicted. No impacts of greater than minor adverse significance are predicted.	Not agreed. Red-throated diver assessment should include additional offshore wind farms in the relevant Biologically Defined Minimum Population Size (BDMPS) region.	Not agreed

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
		Not agreed. Natural England does not consider that 80% displacement and 5% mortality is appropriate for red-throated diver assessment.	Not agreed
		Not agreed that offshore wind farms built prior to 2012 constitute the baseline for red-throated diver assessment.	Not agreed
		Not agreed. Natural England does not agree with use of 70% displaced and 1% mortality rate for auk species.	Not agreed
		Not agreed. Natural England has identified summing errors in the cumulative tables presented for auks.	Not agreed
		Not agreed. Natural England does not agree with numbers presented for the Seagreen projects for auks in the non-breeding seasons.	Not agreed
		Not agreed that gannet has not been included in the cumulative displacement assessment.	Not agreed
	The magnitude of effects and conclusions on significance resulting from cumulative collision impacts during operation are correctly identified and predicted. No impacts of greater than minor significance are predicted.	Not agreed due to outstanding issues with collision modelling methods (as detailed above).	Not agreed
		Not agreed due to references to estimates of significance made on the basis of Potential Biological Removal (PBR) thresholds, as Natural England does not advocate the use of PBR.	Not agreed

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
		Not agreed due to references to existing PVA outputs that were conducted following previous guidance. Updated Natural England advice on a number matters (e.g. matched runs, counterfactuals) provided to Vanguard during Evidence Plan process. Existing PVAs also based on projection of 25 years rather than over the 30 year predicted lifespan of the Vanguard project.	Not agreed
		Not agreed as assessment should also include herring gull.	Not agreed
Habitats Regulations Assessment (HRA)			
Screening of LSE	The Approach to HRA Screening is appropriate.	Agreed	Agreed
	The following sites and species should be screened in for further assessment: • Alde-Ore Estuary Special Protection Area (SPA) (lesser black-backed gull); • Flamborough and Filey Coast potential Special Protection Area (pSPA) (gannet and kittiwake); • Flamborough Head and Bempton Cliffs SPA (kittiwake); and • Greater Wash SPA (red-throated diver and little gull).	Agree with list but also advise inclusion of gannet, guillemot and razorbill from Flamborough and Filey Coast SPA for displacement following revision to assessment methods (see above). There may also be a requirement to include non-seabird migrants following further assessment of collision risk (see above). Natural England also considers that Outer Thames Estuary may need to be considered for disturbance to red-throated divers by operation and maintenance vessels. Natural England also advises that Flamborough Head and Bempton Cliffs SPA is now subsumed into the designated Flamborough and Filey Coast SPA and the former can therefore be removed from the list.	Agree (subject to caveats as per Natural England position column)
Assessment	The approach to the determination of AEoI is appropriate.	Agreed	Agreed
	Conclusion of no AEoI for lesser black-backed gull population at Alde-Ore Estuary is appropriate, on the basis	Not agreed due to concerns about the population estimates and SPA apportioning.	Not agreed

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	of alone and in-combination collisions in the context of the large non-SPA populations of lesser black-backed gull in Norfolk and Suffolk with potential for connectivity to NV, the outputs from PVA models, and the widely varying status of the population due to various contributory natural causes (e.g. fox predation, flooding) and human causes (e.g. changing farm practices), as documented elsewhere (e.g. https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010003/EN010003-000012-Galloper%20Offshore%20Wind%20Farm_Appropriate%20Assessment.pdf.	Not agreed due to outstanding issues with the collision methods used.	Not agreed
		Not agreed due to PVA methods used (including around use of recommended counterfactuals, 'matched runs' and length of projection) and possible mismatch of adult and all age birds.	Not agreed
	Conclusion of no AEoI for gannet population at Flamborough and Filey Coast SPA is appropriate on the basis of alone and in-combination collisions and the predicted consequences from PBR and PVA.	Not agreed. Due to the assignment of months to the breeding season and the nonbreeding apportioning rates.	Not agreed
		Not agreed due to outstanding issues with the collision methods used (see above).	Not agreed
		Not agreed due to PVA methods used (including around use of recommended counterfactuals, 'matched runs' and length of projection) and possible mismatch of adult and all age birds.	Not agreed
		Not agreed. Natural England considers that project alone and in-combination effects should be assessed for displacement for this SPA feature, and also for combined displacement and collision risk.	Not agreed
	Conclusion of no AEoI for kittiwake population at Flamborough and Filey Coast SPA is appropriate on the	Not agreed. Due to the method used to apportion nonbreeding season collisions.	Not agreed

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	basis of alone and in-combination collisions and the predicted consequences estimated from PVA.	Not agreed due to outstanding issues with the collision methods used (see above).	Not agreed
		Not agreed due to PVA methods used (including around use of recommended counterfactuals, 'matched runs' and length of projection) and possible mismatch of adult and all age birds.	Not agreed
	Conclusion of no AEoI for kittiwake population at Flamborough Head and Bempton Cliffs SPA is appropriate on the basis of alone and in-combination collision totals and the predicted consequences estimated from PVA. Note that this feature is the same as that for the Flamborough and Filey Coast SPA and therefore covered by that assessment.	Not agreed. Position as per that for the Flamborough and Filey Coast SPA assessment of this feature (see above). Natural England also advices that this SPA no longer requires to be assessed since it is wholly subsumed within the Flamborough and Filey coast SPA.	Not agreed
	Conclusion of no AEoI for the red-throated diver population at the Greater Wash SPA is appropriate on the basis of project alone and in-combination construction displacement.	Not agreed. Natural England advises use of higher displacement and mortality rates for displaced birds and inclusion of additional sources of disturbance (e.g. cable laying for Hornsea THREE and from other operational/consented OWFs located within the SPA) in the in-combination assessment.	Not agreed
	Conclusion of no AEoI for the red-throated diver population at the Greater Wash SPA and Outer Thames Estuary SPA is appropriate on the basis of project alone and in-combination operation displacement.	Not agreed. Natural England advises that vessel movements through the SPA should also be assessed for operations and maintenance.	Not agreed
	Conclusion of no AEoI for the little gull population at the Greater Wash SPA is appropriate on basis of project alone and in-combination collisions.	Not agreed. Natural England accepts methods for apportioning little gull collision to the SPA population, but have outstanding questions regarding the collision methods (see above).	Not agreed

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
Mitigation and Management			
Mitigation and Management	Given the impacts of the project, the proposed mitigation and monitoring (to be developed through the Ornithological Monitoring Plan, in accordance with the In Principle Monitoring Plan (Application document 8.17)) is adequate.	Not agreed. Natural England would like to undertake further discussions with the Applicant to explore mitigation options.	Not agreed

2.6 Onshore Ecology and Ornithology

34. The project has the potential to impact upon Onshore Ecology and Ornithology. Chapters 22 (Onshore Ecology) and 23 (Onshore Ornithology) of the Norfolk Vanguard ES (document reference 6.1 of the Application) provides an assessment of the significance of these impacts.

35. Table 11 provides an overview of meetings and correspondence undertaken with Natural England regarding Onshore Ecology and Ornithology.

36. Table 12 provides areas of agreement (common ground) and disagreement regarding Onshore Ecology and Ornithology.

37. Minutes of Evidence Plan meetings can be found in Appendix 9.19 and Appendix 25.1 of the Consultation Report (document reference 5.1 of the Application).

Table 11 Summary of Consultation with Natural England in relation to onshore ornithology

Date	Contact Type	Topic
Pre-Application		
8th August 2016	Email	Draft Onshore Winter/Passage Bird Survey Scoping Report provided (Appendix 23.1 of the ES).
15th September 2016	Email	Comments on draft survey specification for wintering/autumn and spring passage bird survey.
18th November 2016	Email	Provision of the amended Onshore Winter/Passage Bird Survey Scoping Report following comments on the survey specification (provided in Appendix 23.1 of the ES).
14th January 2017	Email	Provision of the Onshore Ecology and Ornithology Method Statement (provided in Appendix 9.3).
24th January 2017	Meeting	Introduction to the project, approach to ecological surveys, discussion on the method statement.
13th March 2017	Email	Comments on onshore wintering bird survey methodology
3rd April 2017	Email	Agreement on Phase 2 survey methodologies.
18th July 2017	Meeting	Discussion on interim survey results, project update, initial findings of assessment and approach to mitigation.
11th December 2017	Email	Feedback on the PEIR from Natural England.

Date	Contact Type	Topic
22nd January 2018	Meeting	Discussion on PEIR feedback, survey results and updates to the project.
5th February 2018	Email	Provision of advice from Natural England regarding great crested newt mitigation alternatives.
6th February 2018	Email	Review of Onshore Ecology and Ornithology baseline reports.
9th February 2018	Email	Provision of the Norfolk Vanguard Bat Activity Survey Report (Appendix 22.4 of the ES (document 6.2).
19th February 2018	Meeting	Discussion on the baseline report from the onshore ornithological surveys.
22nd February 2018	Email	Provision of draft Norfolk Vanguard Information to Support Habitats Regulations Assessment (HRA) (document 5.3).
6th March 2018	Email	Natural England comments on bat activity survey report.
12th March 2018	Meeting	Discussion on the outcomes from the assessment and the approach to great crested newt mitigation (minutes provided in Appendix 25.1).
23rd March 2018	Email and PDF	Clarifications following HRA meeting 22nd February 2018 sent to Natural England.
23rd April 2018	Great Crested Newt – Draft Licence Meeting	Discussion on the draft great crested newt mitigation licence (minutes provided in Appendix 25.1).
23rd April 2018	Onshore Habitats Regulations Assessment Meeting	Discussion of Natural England comments on the onshore ecology section of the HRA Report (minutes provided in Appendix 25.1).
Post-Application		
31st August 2018	Relevant Representation	Natural England's initial feedback on the DCO application.
17th October 2018	Email from the Applicant	First draft SOCG provided by the Applicant
18th October 2018	SoCG Meeting	Discussion regarding the drafting of the SoCG
21st November 2018	Email from the Applicant	Second draft SOCG provided by the Applicant
30th November 2018	Email from the Applicant	Clarification notes (Appendices 1-3 of the SOCG) provided by the Applicant

Table 12 Statement of Common Ground - Onshore ecology and ornithology

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
Environmental Impact Assessment			
Survey methodology	Survey methodologies for Phase 1 Habitat Surveys are appropriate and sufficient, and were agreed during the Expert Topic Group meeting held in January 2017. Phase 1 habitat surveys were undertaken in February 2017. Whilst the Applicant acknowledges that the optimum period for Phase 1 Habitat Survey is between March and September the findings of the Phase 1 survey are considered appropriate to characterise the habitats present within the study area.	Survey data was only collected for 50% of onshore cable route where access was available and in a suboptimum period. Any future surveys should aim for better coverage and be completed within the appropriate survey season.	
	Survey methodologies for Phase 2 Surveys are appropriate and sufficient, and were discussed during the Expert Topic Group meeting held in January 2017 and agreed via email on 3rd April 2017.	Agreed	Both parties agree that Phase 2 survey scopes are appropriate.
Existing Environment	Survey data collected for Norfolk Vanguard for the characterisation of onshore ecology and ornithology are suitable for the assessment.	Not agreed, refer to specific issues identified later within this SoCG	
	The ES adequately characterises the baseline environment in terms of onshore ecology and ornithology.	Not agreed, refer to specific issues identified later within this SoCG	
Assessment methodology	Appropriate legislation, planning policy and guidance relevant to ecology and ornithology has been considered for the project (listed in section 22.2 and 23.2 in Chapter 22 Onshore Ecology and Chapter 23 Onshore Ornithology respectively).	Not agreed, refer to specific issues identified later within this SoCG	
	The list of potential impacts on onshore ecology and ornithology assessed is appropriate, based on feedback at Section 42 consultation.	Not agreed, refer to specific issues identified later within this SoCG	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	The impact assessment methodologies used for the EIA provide an appropriate approach to assessing potential impacts of the project. This was discussed and agreed during the Expert Topic Group meetings in January and September 2017.	Agreed	It is agreed by both parties that the impact assessment methodologies used in the EIA are appropriate.
	The worst case scenario presented in the ES, is appropriate for the project.	Agreed	It is agreed by both parties that the worst case scenario presented in the ES, is appropriate for the project.
Assessment findings	Dereham Rush Meadow Site of Special Scientific Interest (SSSI), Holly Farm Meadow SSSI, Whitwell Common SSSI and Booton Common SSSI, whilst predominantly surface water fed are also partly groundwater fed – from the underlying chalk aquifer (based on WETMECS data). Clarification of the water supply to these designated sites and the potential for interaction with the Norfolk Vanguard project is provided within Appendix 2 of this document. The onshore duct installation works comprise open cut trenching (to 1.5m) and trenchless crossings to bury cable ducts (down to typically 6-8m below ground level). There is no direct pathway between the construction works and the underlying chalk aquifer, and detailed groundwater assessment is not deemed necessary. In terms of surface water flows, Dereham Rush Meadow SSSI and Holly Farm Meadow SSSI are upstream of the works and would not be affected by	Natural England suggest the following nationally designated wetland sites should be screened in for further consideration of impacts on groundwater supply and surface water quality: • Dereham Rush Meadow SSSI (0.4km away); • Holly Farm Meadow, Wendling SSSI (0.9km away); • Whitwell Common SSSI (1.2 km away); • Booton Common SSSI (0.6km away). Further information should be obtained from Environment Agency and used in a detailed appraisal of groundwater effects, e.g. WETMEC data showing the water supply mechanism for all the component sites and/or EA's groundwater modelling of the area. If the installation of the cable route would affect the groundwater supply to these sites, then a detailed assessment should be undertaken and mitigation	

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	surface water quality effects associated with the construction works. Booton Common SSSI is considered in detail within the HRA Report at Section 9.3.3.2, which concludes no AEoI. Whitwell Common SSSI is fed by Booton Common SSSI and the findings for Booton Common SSSI would be equally applicable to Whitwell Common SSSI. In addition, the Applicant has committed to develop a scheme and programme for each watercourse crossing, diversion and reinstatement which will include site specific details of the sediment management measures and pollution prevention. This scheme will be submitted to and, approved by the relevant planning authority in consultation with Natural England. This is secured through Requirement 25 of the draft DCO. With these commitments in place there will be sufficient control measures to safeguard designated sites in relation to sediment control, pollution prevention and reinstatement of all work areas at watercourse crossings.	measures implemented to minimise any identified effects. The qualifying features of the Norfolk Valley Fens SAC present at Booton Common are water-sensitive habitats reliant on the groundwater supply and not surface water from the Blackwater Drain to maintain their structure and function as stated. Measures to safeguard water quality should be employed at watercourse crossings (see our comments in relation to River Wensum). Natural England advise further detail is required to minimise the risk of pollutant and fine sediment release from the works at the trenchless crossing zone at the Wendling Beck during construction.	
	Groundwater The potential for the construction works to affect groundwater supply to nearby designated sites is presented within Appendix 2 of this document. This specifically considers: • Dereham Rush Meadow SSSI (0.4km away); • Holly Farm Meadow, Wendling SSSI (0.9km away); • Whitwell Common SSSI (1.2 km away); • Booton Common SSSI (0.6km away). The exercise presented in Appendix 2 demonstrates that there is no direct pathway between the	Natural England require further information to assess the functional connections and the effects from potential changes to groundwater supply to Badley Moor SSSI, Buxton Heath SSSI, Southrepps Common SSSI, Potter & Scarning Fens, East Dereham SSSI. We are not able to agree at this stage that these four sites are not subject to any effects arising from the construction phase of the project.	

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	construction works and the underlying chalk aquifer. The findings are equally applicable to other groundwater sites located further from the construction footprint, i.e.: • Bradley Moor SSSI (3.8km away) • Buxton Heath SSSI (4km away) • Southrepps Common SSSI (3.5km away); • Potter & Scarning Fens, East Dereham SSSI (3.2km away); On this basis detailed groundwater assessment is not deemed necessary.		
	The landfall area is underlain by sandy clay and sand to a depth of approximately 18m below ground level – refer to Chapter 19 Ground Conditions and Contamination, section 19.6.1.1. Horizontal Directional Drilling (HDD) through this loose material would generate limited vibration effects; in addition, the loose material itself is a poor propagator of vibration effects. Vibration is best propagated through hard surfaces and the looser the material the more any potential vibration effect becomes dampened. As such there is no propagation pathway for vibration effects between the works (either 130m away or up to 20m below) and known sand martin nesting sites.	Not agreed, sand martin are known to nest in Happisburgh Cliffs. Works are located 130m from nesting sites and drill may pass 10-20m beneath nest sites. An assessment of potential vibration effects and the significance of this for birds should be evaluated. It would be preferable to avoid the breeding season during construction. We agree that lighting should follow good practice guidance for wildlife.	
	Ancient Woodland and trees Trenchless crossing techniques are proposed to be used at any location where mixed lowland deciduous woodland is present and which cannot be avoided, and no works will take place within 15m of any woodland. A pre-construction survey will be undertaken by an appropriately experienced arboriculturalist which will	Agreed. We agree with a 15m buffer between the project area and ancient woodland and trees. We note that trenchless crossing techniques (e.g. HDD) are proposed to be used at any location where mixed lowland deciduous woodland is present and which cannot be avoided, and no works will take place within 15m of any woodland. In the area of	It is agreed by both parties that the measures proposed will protect trees and ancient woodland during the works.

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	inform site-specific measures to protect trees adjacent to the works. Measures to protect trees are captured within the Outline Landscape and Environmental Management Strategy (OLEMS) and secured through Requirement 24 Ecological Management Plan, which will require consultation with Natural England prior to discharge.	cable route immediately east of the onshore project substation, if the northern route option is selected trenchless techniques will not be possible for one area of woodland and cable trenching activities will lead to a loss of approximately 0.15ha of semi-natural broadleaved woodland at this location. We support the engagement of an appropriately experienced arboriculturalist.	
	Badgers The procedure outlined within the OLEMS for badger main setts within the project area which require to be closed and destroyed **will** include other types of setts which may be found within (previously un-surveyed) areas of the project area. This will be captured within the Ecological Management Plan, secured through DCO Requirement 24, which will require consultation with Natural England prior to discharge.	Agreed on the basis that this captured within the final EMP allowing sufficient controls to be put in place We advise that the procedure outlined for badger main setts within the project area which require to be closed and destroyed (para 408) should include other types of setts which may be found within (previously un-surveyed) areas of the project area.	Both parties agree that the measures for main sett closure (and applied to other setts) are appropriate.
	Wintering and breeding birds To account for potential noise disturbance a buffer of 300m from designated sites (where birds are qualifying features) was identified and potential noise impacts considered. This was agreed with Natural England in January 2017 (Onshore Wintering Bird Surveys Survey Methodology Approach Update). Beyond this no additional requirement was identified to assess potential disturbance effects. On this basis the assessment of impacts for construction, operation and decommissioning presented are consistent with the agreed assessment methodologies.	We agree that there will be a temporary, long term loss of habitats along the cable route which support wintering and breeding birds. Whilst arable land can be re-instated fairly quickly, hedgerow habitat will take up to 7 years to re-establish. In addition to direct habitat loss, there is the potential to disturb birds during construction from noise and human presence. Again, no detailed noise assessment appears to have been carried out. We are pleased to note that an Ecological Clerk of Works will be present on site during construction (OLEMS para 229) and suggest that nesting birds should be added to protected species in para 230 as	

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		requiring works to stop immediately if found during construction. We agree that the loss of arable breeding habitat is of sufficient duration to be classified as an effect of medium magnitude. Natural England do not currently agree with the residual impact for birds. The applicant has not conducted a noise survey and mitigation outlined as part of the design has not been successfully incorporated or detailed in the CoCP or OLEMS. Further measures should be included in OLEMS to deal with the risk of damaging or destroying ground nesting birds (i.e. skylarks) during construction.	
	Air Quality Potential air quality impacts have been assessed for designated sites within 200m of the road transport network that will be required during construction. This is presented in Chapter 26 Air Quality, section 26.7.5.2.2. Felbrigg Wood SSSI was identified as a designated site with the potential for air quality impacts due to its proximity to the nearest road network (A148 between King's Lynn and Cromer). A transect was walked through the designated site, at 50m intervals set back from the road up to 200m. Air quality measurements were taken and included within an air quality model. The results of this are presented in Table 26.31 of Chapter 26. This shows that there will be a short-term 2% increase in critical nitrogen load within 50m of the A148, reducing to 1% at 100m from the A148 and 0% beyond that. This has been assessed as to be an impact of negligible significance.	Under discussion - checking additional text added by applicant. The report has identified possible air quality effects from increased road traffic on Felbrigg Wood SSSI which is designated for lichens along with its invertebrate assemblage and beech woodland community. We advise that further information is required on woodland species within 200m of the road that will be affected and on the timings, number of vehicles and how polluting the vehicles are likely to be etc. If there is likely to be an effect on a designated feature, the OLEMS should include mitigation measures to reduce changes in air quality, e.g. using efficient vehicles, reducing number of vehicles/time on the road, timing of construction to support biodiversity, possible use of barriers etc.	

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	Land Use/Soils The onshore cable duct installation strategy will be conducted in a sectionalised approach in order to minimise impacts. Construction teams would work on a short length (approximately 150m section) with topsoil stored adjacent to the excavated trench. Once the cable ducts have been installed, the section would be back filled and the top soil replaced before moving onto the next section. This would minimise the amount of land being worked on at any one time and would also minimise the duration of works on any given section of the route. This embedded mitigation is specified through the ES and secured through the Outline Code of Construction Practise (OCoCP) (section 2.5.1). Within each 150m section topsoil from agricultural land may be treated as a single resource for stockpiling and reuse. The Natural England dataset over this part of Norfolk is no longer broken down into Agricultural Land Classification (ALC) Grades 3a and 3b soils. Norfolk Vanguard has calculated the total extent of land that will be permanently lost within Chapter 21 Land use and Agriculture - 7.5ha for the onshore project substation and 3ha for the National Grid extension works. As a worst-case this is assumed to be best and most versatile (BMV) land. Mitigation measures identified for soil management are captured within the OCoCP. A Soil Management Plan (SMP) will be developed and approved prior to commencing each stage of the works. The SMP will form part of the final approved Code of Construction Practise (CoCP) for each stage of the works and is secured through Requirement 20.	Not agreed. This isn't appropriate and topsoil should be reinstated where it originated. There are significant differences between topsoil in arable and grassland, valley bottom and valley sides and natural, semi natural and managed land. This will need clearly addressing in the SMP mentioned in Para 154. We are also pleased to see that the project will take account of any agri-environment schemes and their land management objectives by negotiation with individual agreement holders. It should be noted that Grade 3 ALC soils need to be split into Grade 3a and Grade 3b, so that the assessment of loss of BMV land can be properly made (Table 21.10). The amount of BMV land that would be permanently lost to the development, i.e. by buildings etc., and the time it would take for the recovery of soils that are disturbed by the construction should be quantified in the ES. We agree that mitigation measures would be set out in a SMP, including construction method statements for soil handling, which would be produced by a competent soil science contractor and agreed with the relevant regulator in advance of the works. This would be completed pre-construction once an earthworks contractor has been appointed and detailed earthworks phasing information is available. The contractor would be required to comply with the SMP. We note that the total permanent land take for the footprint of the onshore project substation and National Grid substation extension zone is approximately 10.5ha according to the worst case	

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		scenario (Table 21.16). These will be on ALC grades 2 and 3 land; the amount of BMV land should be estimated.	
	Land Use/ Agri environment Within the study area there are Entry Level Stewardship Schemes (ESS) with Higher Level components, but no Higher Level Stewardship Schemes. A commitment will be made within the private agreements between Norfolk Vanguard Limited and the landowner/occupier to compensate for losses incurred due to potential impacts on ESS during the construction phase of the project.	Not agreed., There are both Higher Level Stewardship and Higher Tier Countryside Stewardship agreements along the cable route. Due consideration will need to be given to ensure the delivery of these schemes will not be hindered or compromised. We note that during the construction period there would be the potential for impacts on agri-environment schemes within the onshore project area which will be specific to individual landowners / occupiers. We agree that this would need to be discussed between Norfolk Vanguard Limited, landowners, occupiers and Natural England prior to construction. We note that the onshore cable route crosses Entry Level (34.13ha, 6.4% of onshore project area) and Entry Level plus Higher Level (117.8ha, 22.2% of onshore project area) Stewardship Scheme agreements.	
	The assessment of cumulative impacts is consistent with the agreed methodologies.	Not agreed. The in-combination assessment should include Hornsea 3 as the cable route for this offshore wind farm passes within 1km of Booton Common SSSI and construction periods may overlap.	
Mitigation and Management			
Approach to mitigation	All mitigation measures required are outlined in the Outline Code of Construction Practice and OLEMS.	Not agreed, see points below	

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	River Wensum SAC Sediment management measures to mitigate potential water quality impacts during construction are presented within the Information to Support HRA Report (document 5.3) at paragraph 1166. These measures will be included in an updated OCoCP that will be submitted during the examination. The measures identified represent the principles by which mitigation measures will be delivered. The Applicant has committed to develop a detailed scheme and programme for each watercourse crossing, diversion and reinstatement, which will include site specific details regarding sediment management and pollution prevention measures. This scheme will be submitted to and, approved by the relevant planning authority in consultation with Natural England. This commitment is secured through Requirement 25 (Watercourse Crossings) of the draft DCO. With these commitments in place there will be sufficient control measures to safeguard designated sites in relation to sediment control, pollution prevention and reinstatement of all work areas at watercourse crossings.	Not agreed. 9.3.1.2.2 Para 1167. None of the points regarding sediment management and decommissioning of sediment traps post construction highlighted in Para 1166 are detailed in the current CoCP and we need more detail around these mitigation measures to assess effects on River Wensum SAC. This applies to the conclusions for Desmoulins whorl snail in 9.3.1.3.2/3	
	Wintering and breeding birds in wider countryside Mitigation measures for wintering and breeding birds are set out in the OLEMS, paragraphs 224 and 225. This includes measures to minimise effects on ground nesting birds such as, no winter works undertaken in consecutive years, keep winter crop stubble low during	Wintering and breeding birds in wider countryside: We generally agree with the mitigation measures suggested in Outline Landscape and Ecological Management Strategy (para 224/225.) Measures should be included in OLEMS to deal with the risk of damaging or destroying ground nesting birds (i.e. skylarks) during construction.	

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	breeding bird season and set aside ground nesting areas beyond 50m of the cable route prior to works. If any protected species are unexpectedly found (all bird species are protected) then works will cease immediately. This is specified at paragraph 230 of the OLEMS.	Nesting birds should be included with measures to safeguard protected species if they are unexpectedly found, i.e. work to cease immediately.	
	Soil Mitigation measures identified for soil management and reinstatement are captured within the OCoCP. A SMP will be developed and approved prior to commencing each stage of the works which will specify the site specific methods that will be employed. The SMP will form part of the final approved CoCP for each stage of the works and is secured through Requirement 20.	Not agreed. Details of actual methods employed are needed in relation to sediment control, and reinstatement of all work areas and in-principle approach would help agreement.	
	Semi natural habitats Semi-natural grassland habitats that may subject to topsoil strip are limited to 0.2ha scattered scrub, 8.1ha marshy grassland and 0.1ha tall ruderal. Out of a total project footprint of 270ha. Buffer strips will be retained adjacent to watercourses where possible. Where surface vegetation has been removed, it will be reseeded to prevent future runoff (excluding arable crops).	Not agreed. Reseeding may not be appropriate in semi-natural habitats or land with permanent vegetative cover, where deep turf stripping and reinstatement may be more appropriate. Reseeding will only be effective when carried out in suitable growing conditions, otherwise it risks extended periods of bare ground, liable to erosion.	
	The use of trenchless crossing techniques at County Wildlife Sites is acceptable subject to detailed design. This was discussed and agreed (in principle) during the Expert Topic Group meeting in January 2018.	Agreed	It is agreed by both parties that the use of trenchless crossings at CWS are acceptable,

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			subject to detailed design.
	The provision of an Ecological Management Plan (based on the OLEMS submitted with the DCO application, document reference 8.7) is considered suitable to ensure potential impacts identified in the Ecological Impact Assessment are appropriately minimised.	Yet to be discussed	
	The mitigation proposed for great crested newts is appropriate and proportionate (as outlined in the draft great crested newt mitigation licence, circulated and discussed at April 2018 meeting).	Agreed, Natural England are satisfied that the great crested newt plans reflect our advice given earlier in the year. The report identifies where licences may be required for bats and water voles.	
HRA			
Screening of LSE	The methodology and sites screened in for the HRA as presented in Appendix 5.2 of the Information to Support HRA report (Application document 5.3) are considered appropriate, considering sites within 5km of onshore infrastructure. This was agreed during the Expert Topic Group meeting in July 2017.	Further consideration should be given to Broadland and Breydon SPA in relation to non seabird migrants	
	The approach to HRA screening is appropriate. The following sites were screened in for further assessment: • River Wensum; • Paston Great Barn; and • Norfolk Valley Fens. This was agreed during the Expert Topic Group meeting in July 2017.	The Broads SAC should also have been screened for assessment	

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	Broadland SPA/Ramsar Wintering/passage bird surveys were undertaken for the full survey period, October – March, was collected for the following habitats: • Agricultural land within 5km of the Broadland SPA and Ramsar site, and also within – or within a precautionary 1km disturbance buffer of – the onshore infrastructure; • Coastal habitats within 5km of the Broadland SPA and Ramsar site, and also within – or within a precautionary 1km disturbance buffer of – the onshore infrastructure; and • Lowland fen, rivers and lakes and lowland heathland habitats of the Hundred Stream within 5km of the Broadland SPA and Ramsar site, and also within – or within a precautionary 1km disturbance buffer of – the onshore infrastructure The results of these surveys demonstrated low levels of wintering birds and the site was screened out for further consideration within the HRA report.	Not agreed Broadland SPA/Ramsar site: This site was scoped out of the HRA on the basis that there was evidence of low levels of wintering birds associated with the SPA/Ramsar using the study area. However, this may have been due to the cropping regime at the time of survey. We requested that this point was taken account of by including additional measures, e.g. survey and/or WeBS data and information about predicted crop patterns at the time of the proposed work. We suggest that the Outline Landscape and Ecological Management Strategy (OLEMS) is amended to include further survey and provide suitable mitigation measures if required.	
Information to support HRA	River Wensum SAC Cable trench arrangement The cable trench arrangement is described within Chapter 5 of the ES Project Description. Plate 5.16 shows the trench arrangement and the extent of stabilised backfill (cement bound sand). The cement bound sand will represent a stabilised layer within	River Wensum SAC From information provided, we are not able to agree with the conclusion that there is no potential adverse effect on the integrity of the River Wensum SAC in relation to the conservation objectives for the site. 5.5.2.3.1 Para 314. The cement bound sand would need the same hydrological properties as the native	

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	which the cable ducts are secured. There will be approximately 10cm of cement bound sand above and below the cable ducts. Above the cement bound sand will be approximately 1m of subsoil and topsoil. The cement bound sand will represent an impermeable barrier. A detailed assessment of potential changes to subsurface flows is presented in Chapter 20 Water Resources and Flood Risk at section 20.7.6.1.1. As a result of the limited spatial extent of permanent impermeable development along the cable route, the effect is considered to be of negligible magnitude. Drainage A Surface Water and Drainage Plan (Requirement 20 (2)(i) will be developed, agreed with the relevant regulators and implemented to minimise water within the cable trench and other working areas and ensure ongoing drainage of surrounding land. This typically includes interceptor drainage ditches being temporarily installed parallel to the trenches and soil storage areas to provide interception of surface water runoff and the use of pumps to remove water from the trenches during cable installation. Drainage would remain in place for the duration of the construction period.	subsoil to avoid long term disruption to hydrological regime 5.5.2.4 Para 317. Drainage/water management needs to be maintained for the whole construction period, for as long as any un-reinstated ground remains, including the cable pulling phase where the running track will still be in place.	
Assessment of Adverse Effect on Integrity	The approach to undertaking the assessment is appropriate	Not agreed	It is agreed by both parties that the approach to the HRA is appropriate.
	Booton Common SSSI (part of Norfolk Valley Fens SAC), is located 0.6km from the onshore cable route. Broad Fen, Dilham component SSSI (part of The Broads SAC) is located 3.6km from the onshore cable route.	From the information provided with the application, Natural England consider that there is insufficient evidence provided to assess any impacts which may	

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	These sites, whilst predominantly surface water fed are also partly groundwater fed – from the underlying chalk aquifer (based on WETMECS data). Clarification of the water supply to these designated sites and the potential for interaction with the Norfolk Vanguard project is provided within Appendix 2 of this document. There is no direct pathway between the works and the underlying chalk aquifer that these sites are dependent upon, and detailed groundwater assessment is not deemed necessary. The conclusions of no adverse effect on site integrity in the Information to Support HRA report (document 5.3) for these two sites are appropriate. With reference to the two HDD crossings near to Blackwater Drain – this is in fact a single HDD crossing with individual compounds depicted at each end of the crossing, for entry and exit of the HDD. This trenchless crossing is needed for crossing the proposed Hornsea Project Three cables for technical requirements. Impacts at watercourse crossings are predominantly related to the introduction of temporary culverts to provide access either side of the watercourse. Whether the crossing technique is trenched or trenchless, a temporary culvert will be required for access either side of the Blackwater Drain. However, each crossing (whether trenched or trenchless) is not considered to result in a significant effect when assessed individually. Impacts resulting from the use of temporary culverts would be reversible once the structures have been removed and the area reinstated. The natural	arise from changes in groundwater flow to component SSSIs of Norfolk Valley Fens SAC. Natural England note that there is no information provided on the water supply mechanism for The Broads / Norfolk Valley Fens SACs and how this may be affected by the installation of the cable route. Natural England advise that further information is obtained from Environment Agency and used in a detailed appraisal of groundwater effects, e.g. WETMECS data showing the water supply mechanism for all the component sites and/or EA's groundwater modelling. There appears to be 2 HDDs very close to Blackwater Drain tributary crossings (Figure 9.6), and we are unsure as to why HDD cannot be undertaken for the watercourses which feed into Blackwater Drain rather than the trenched crossings which are proposed. Not agreed, Table 9.13 identifies surface water catchments and whether the project area is upstream or downstream of the SSSI. All component sites except Booton Common SSSI have been screened out from further investigation. However, we are not able to agree with this conclusion as all sites are dependent on groundwater supply. We advise that further information is obtained from Environment Agency and used in a detailed appraisal of groundwater effects, e.g. WETMECS data showing the water supply mechanism for all the component sites and/or EA's groundwater modelling. If the installation of the cable route would affect the groundwater supply to these sites, then a detailed assessment should be undertaken and mitigation	

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	hydrology would recover immediately upon structure removal, and geomorphology and associated physical habitats are also expected to recover rapidly. The use of these techniques is therefore not considered to result in significant adverse effects. The design of all watercourse crossing will be submitted to and approved by the relevant planning authority in consultation with Natural England, prior to the commencement of each stage of the onshore transmission works. This is secured through Requirement 25 of the draft DCO.	measures implemented to minimise any identified effects. An 'in combination' assessment with Hornsea 3 OWF should also be undertaken as this cable route passes about 360m to east of Booton Common and construction periods may overlap. In addition, information should be provided on the design and longevity of any temporary culverts.	
	Sediment management and water quality measures have been identified and are described in Section 11.1 of the outline CoCP; Requirement 20 of the draft DCO sets out that no stage of the onshore transmission works may commence until for that stage a final CoCP has been submitted to and approved by the relevant local planning authority. This would provide site specific details for sediment management informed by the detailed design and appointment of the Principal Contractor. In addition, the Applicant will develop a scheme and programme for each watercourse crossing, diversion and reinstatement which will include site specific details of the sediment management measures including their use and removal. This scheme will be submitted to and, approved by the relevant planning authority in consultation with Natural England. This is secured through Requirement 25 of the draft DCO. Both the final CoCP and watercourse specific crossing schemes will also include site specific details of	Not agreed, further site specific information is required regarding the River Wensum SAC (RR4.5.1). There is insufficient detail in the CoCP for measures to safeguard the designated sites in relation to sediment control and reinstatement of all work areas. In addition, detailed management and monitoring procedures should be provided in the CoCP in case of 'breakout' Not agreed, Works to facilitate the trenchless crossing of the River Wensum may take place within the River Wensum floodplain north of Penny Spot Beck, which we advise should be avoided as it is part of a Countryside Stewardship agreement to improve the site integrity of the River Wensum SAC. Natural England note that there is insufficient detail in the CoCP for measures to safeguard the designated site in relation to sediment control, pollution prevention, and reinstatement of all work areas. In addition, detailed management and	

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	management and monitoring procedures in case of bentonite breakout at trenchless crossings. With these commitments in place there will be sufficient control measures to safeguard designated sites in relation to sediment control, pollution prevention and reinstatement of all work areas at watercourse crossings.	monitoring procedures should be provided in the CoCP in case of 'breakout' (where the drilling fluid leaves the bore and escapes into the surrounding substrate). [This comment also relates to Norfolk Valley Fens SAC and The Broads SAC and SSSI sites downstream]. Information from the EIA on dependency on groundwater, a Clarification Note should draw out additional information for inclusion in HRA.	
	All hedgerows within 5km of Paston Great Barn SAC that will be temporarily removed during construction (130m) were identified. 82m of these hedgerows have been confirmed as supporting foraging Barbastelle bats (based on bat activity surveys undertaken by the Applicant) and are accordingly classified as important hedgerows for foraging Barbastelle bats. On this basis, the 82m of hedgerows are all considered to be important Barbastelle features and the assessment has been undertaken on this basis. Clarification of the process that was undertaken by the Applicant is provided within Appendix 3 of this document. Paragraph 1185 of the Information to Support HRA Report (document 5.3) provides details of the anticipated hedgerow recovery for the affected 82m of hedgerow (3-7 years) – recovery meaning to "mature up to a standard whereby the hedgerow is providing value for commuting and foraging barbastelle bats". All hedgerows temporarily removed will be replaced in their original locations, i.e. replacement hedgerows will be planted above the buried cables. Details of hedgerow mitigation are provided at Paragraph 1186 of the Information to Support HRA Report which includes a commitment for hedges to	Natural England acknowledge the provision of a clarification note, however, will be unable to review this document until after Deadline 1 and therefore this remains not agreed. From the information provided with the application, Natural England consider that there is likely to be an impact on the SAC due to loss and severance of foraging and commuting habitat over at least 7 years. However, we are unable to assess the significance of the impact without further information on habitat to be lost and fragmented as a result of the proposed development. To fully assess the impact Natural England would like more information about the 82m of hedgerow to be removed, within 5km of Paston Great Barn, plus an accurate estimation of the timescale for recovery to previous condition (or better) following installation of the cable trench. The assessment should provide an indication of hedgerow quality for bats, as well as the potential long-term effects on quality with estimated timescales. Approximately 82m of hedgerow is used for foraging by barbastelles of the Paston Great Barn maternity	

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	become overgrown either side of the section to be removed prior to construction. All bat and hedgerow mitigation measures are also captured within the OLEMS and secured through Requirement 24 of the draft DCO (Ecological Management Plan), which will require consultation with Natural England prior to discharge. On this basis, the approach to determining the value of hedgerows for Barbastelle bats and the approach to mitigation, is appropriate and sufficient.	colony. However, the report does not recognise the heterogeneity of the hedgerows and, therefore, how they might be used by barbastelle bats. A hedge of low quality that is used as a commuting route, but not for foraging/roosting, may continue to be used as a route following removal of a section, whereas, a hedgerow of good quality that is used for multiple purposes may cease to be used as a roosting/foraging feature after removal of a section. As bats from the Old Hills barbastelle maternity colony have overlapping core foraging areas with barbastelle bats using Paston Great Barn SAC (Table 22.14), we advise that our comments in Information to Support HRA regarding mitigation for impacts to the SAC will also mitigate for impacts to Old Hills colony. We advise that, as a requirement of the development, that prior to removal of hedgerows, a mitigation plan should be drawn up and agreed with Natural England. The plan should include for the improvement of the hedgerows either side of the section to be removed including any gapping up, tree management and the development of scrub/rough grassland margins. The mitigation plan should be in place for 7 years or until the original hedgerow has recovered fully. We agree with the proposals to replant hedgerows with locally relevant species and with 2m margins to encourage biodiversity. Note that protection against browsing animals will need to be in place until the shrubs are established.	
	A mosaic of approximately 11ha of broadleaved woodland, rank grassland, hedgerows and drainage	Natural England acknowledge the provision of a clarification note, however, will be unable to review	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	ditches around Witton is used by foraging Barbastelle bats associated with the Paston Great Barn colony. Accordingly, this 11ha has been classified as an important feature for foraging Barbastelle bats and the assessment has been undertaken on this basis (impacts relate to the temporary severance of a hedgerow linking Paston Great Barn to this area). Clarification of the process that was undertaken by the Applicant is provided within Appendix 3 of this document. Details of hedgerow mitigation / restoration are provided at Paragraph 1186 of the HRA Report which includes a commitment for hedges to become overgrown either side of the section to be removed prior to construction. All bat and hedgerow mitigation measures are also captured within the OLEMS and secured through Requirement 24 Ecological Management Plan, which will require consultation with Natural England prior to discharge On this basis, the approach to determining the value of features for Barbastelle bats is appropriate and sufficient to inform the assessment.	this document until after Deadline 1 and therefore this remains not agreed Natural England would like to see an estimation of the importance to bats from Paston Great Barn of the 11ha of woodland that will be fragmented by the hedgerow removal. Without additional information, we are unable to agree that 'given the scale of the available alternative habitat available within the Paston Great Barn maternity colony home range, this level of habitat fragmentation is not anticipated to comprise a likely significant effect.' We advise that, as a requirement of the development, that prior to removal of hedgerows, a mitigation plan should be drawn up and agreed with Natural England. The plan should include for the improvement of the hedgerows either side of the section to be removed including any gapping up, tree management and the development of scrub/rough grassland margins. The mitigation plan should be in place for 7 years or until the original hedgerow has recovered fully. Without further information, we are not able to agree that there is no potential adverse effect on the integrity of the Paston Great Barn SAC in relation to the conservation objectives for the site.	
	A 300m buffer zone for potential noise impacts to birds which are features of designated sites was agreed with Natural England in January 2017 (Onshore Wintering Bird Surveys Survey Methodology Approach Update). The assessment provided within the application has been undertaken on the basis of that formal agreement	Not agreed. For the assessment of noise disturbance on birds which are features of designated sites, Natural England suggest designated sites within 500m are screened in for assessment. namely River Wensum SSSI; Dereham Rush Meadow SSSI; Dillington Carr, Gressenhall SSSI	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
	of the methodology. The 300m buffer was is based on an average of the disturbance buffers detailed in Ruddock and Whitfield (2007) and is an appropriate distance for the basis of the assessment.	We advise that a detailed noise assessment is carried out for sites within 500m of the project area and mitigation provided for any impacts identified or evidence is provided to demonstrate that there will be no additional noise experienced from construction at the designated site boundary.	
	The conclusions of no adverse effect on site integrity for all onshore sites presented in the Information to Support HRA report (document 5.3) are appropriate	Not agreed. Natural England acknowledge the provision of clarification notes covering effects to Paton Great Barn SAC and water dependent designated sites (including Norfolk Valley fens SA0, however, will be unable to review this document until after Deadline 1 and therefore this remains not agreed On the basis of the information provided within the application Natural raise the following points: River Wensum SAC further information required Paston Great Barn SAC – further information required Norfolk Valley Fens SAC – further information required Hedgerows: We note that a moderate adverse residual effect on hedgerows and bats has been identified for the project as a whole (Table 22.32). Grassland: see our comments on the re-instatement of marshy grassland adjacent to River Wensum in Information to Inform HRA.	

Topic	Norfolk Vanguard Limited position	Natural England position	Final position
		Watercourses: see our comments on the requirement for further detail on measures to control sediment and pollutant release into watercourses in Information to Inform HRA. Hedgerows and bats: We note that moderate adverse residual impacts have been identified for hedgerows and bats.	

2.7 Development Consent Order

38. Natural England was provided with a draft of the Development Consent Order for review prior to submission. Comments were addressed where possible.

39. Natural England's relevant representation, submitted to the Planning Inspectorate on the 31st August 2018 includes comments on the draft DCO which Norfolk Vanguard Limited are currently considering. The draft DCO will be updated and submitted early in the Examination process.

2.8 References

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The undersigned agree to the provisions within this SOCG

Signed	K. Louise Burton
Printed Name	K. Louise Burton
Position	Senior Adviser Southern North Sea
On behalf of	Natural England
Date	11/01/2019

Signed	R Sherwood
Printed Name	Rebecca Sherwood
Position	Norfolk Vanguard Consents Manager
On behalf of	Norfolk Vanguard Ltd (the Applicant)
Date	11 January 2019

Appendix 1
Clarification Note: Norfolk Vanguard
Coastal Erosion

HaskoningDHV

1 Introduction

This note provides clarification in relation to queries raised by Natural England in their Relevant Representation regarding the information provided on coastal erosion in the Norfolk Vanguard Development Consent Order (DCO) application:

> *Whilst the variable and uncertain nature of soft cliff erosion has been mentioned throughout Environmental Statement Chapter and Appendix, Natural England does not feel that the truly unpredictable nature of cliff recession prediction has been fully captured in the recommendations. Soft cliff recession is uncertain and how the cliffs are likely to evolve whilst being forced by increases in relative sea level is unclear. It has been observed at sites within the UK that with increases in relative sea level there are subsequent increase in the rate of cliff recession.*
>
> *Cliff recession itself is uncertain and predictions often a best estimate. At the sites cited in the application the future coastal management and management techniques are also uncertain, particularly regarding up-drift management and sediment input. Cliff recession itself is also often episodic, going long periods of observable stability before large and significant events of retreat/erosion. Compounding the uncertainty around cliff recession is the variability of beach levels, particularly at this location, which are forced both through seasonal variability as well as storm conditions.*
>
> *Whilst the Environmental Statement Chapter and Appendix take cliff recession into detailed consideration, it is suggested that a more precautionary approach should be developed at Happisburgh, due to the historically rapid erosion and future unpredictability of cliff recession.*
>
> *If the Happisburgh site is taken forward NE suggests that the two methods of predicting a cliff recession distance set out below are used to obtain a robust and appropriately precautionary location for landward infrastructure. Existing (SMP, future coast, or other) historic rates of retreat should then be used to factor in uncertainty. The upper bound estimate (historical projection method) in this case would offer a precautionary scenario past which the cliff is unlikely to recede past over the timespan (in this case 50 years): -*
>
> - *Lower bound estimate; this has involved simply extrapolating the assumed baseline rate over 50-years: 50-Year Distance = Baseline Rate x 50*
> - *Upper bound estimate; this is based on the use of the "historical projection" method, and involves multiplying the baseline rate by an adjustment factor calculated from the ratio of the historical and future rates of relative sea-level rise (RSLR[11]): 50-Year Distance = Baseline Rate x 50 x (Future RSLR/Historical RSLR)*
>
> *As well as distance back (from the cliff), distance down or burial of the pipes is also*

important. It is critical to ensure these do not become exposed, therefore potentially interfering with longshore and shore normal movement of sediment. As mentioned within the coastal erosion study, beach levels fluctuate - this this is particularly true for storm conditions. Cable burial should look to well exceed the predicted fluctuation of beach levels.

NE advises that it is a reasonable conclusion and recommendation put forward by the erosion study [Appendix 4.3 of the ES]; 'The headline conclusion, purely from the perspective of coastal processes, is that the Bacton Green and Walcott sites are expected to experience less erosion, and there is a narrower uncertainty band, compared with the Happisburgh site.

The information in this note provides clarification of the approach taken to predicting future coastal erosion and the conservative design proposed for the landfall of Norfolk Vanguard export cables.

2 Baseline Erosion

The selected landfall site for Norfolk Vanguard export cables at Happisburgh South is fronted by unprotected cliffs which are subject to dynamic natural processes. This area of the coastline is considered within the Kelling to Lowestoft Ness Shoreline Management Plan (SMP) published and adopted by North Norfolk District Council (NNDC, 2012). The shoreline policy is 'Managed Realignment' at the landfall and as such, forecast erosion rates presented in both the SMP (NNDC, 2012) and in Appendix 4.3 of the Norfolk Vanguard Environmental Statement (ES) have been and will continue to be considered in the design of the landfall. Table 1 provides the historic erosion rates at the landfall site.

Table 1: Historic rates of erosion at Happisburgh South (see ES Appendix 4.3 for further information)

Dates	Erosion Rate
1900 - 1937	the average erosion rate varied between 0.4 – 2.1 metres per year
1937 - 1999	erosion rates varied between 0.4 (north of the landfall site) – 0.8 metres per year.
Since 1999	the shoreline has shown a higher rate of erosion in response to the failure of existing defences with erosion of up to 10 metres per year.

3 Approach to Predicting Future Erosion

The Coastal Erosion Study (ES Appendix 4.3) takes account of the following, in predicting future erosion rates:

- Various data and information sources, including local knowledge;
- Modelling of the longshore interactions;
- Consideration of a range of coastal management scenarios, including a scenario that matches current intentions, both locally and in neighbouring frontages;
- The upper end estimate of sea level rise from the Environment Agency's Guidance (Environment Agency, 2011); and
- An increase in wave loading.

Norfolk Vanguard Ltd suggest that the approach for predicting future erosion rates proposed by Natural England would be more appropriate to use in the absence of the detailed local information outlined above. The Norfolk Vanguard Coastal Erosion Study takes into account the fact that coastal management in this area of the Norfolk coast has varied strongly over the years; both locally at Happisburgh and in the neighbouring frontage which acts as a control. Due to the nature of erosion at Happisburgh and the previous coastal management there is not a single 'historical erosion rate' to use in the formula proposed by Natural England and therefore the outcomes could be misleading.

4 Summary of Predicted Future Erosion

Predicted future erosion is included within the Kelling to Lowestoft Ness SMP (NNDC, 2012), which indicates the estimated coastal erosion (Table 2). In the short term, the Local Authority will make every effort to minimise the rate of coastal erosion, with beach and cliff erosion allowed to occur in a controlled manner over the next 100 years (NNDC, 2012).

Appendix 4.3 of the Norfolk Vanguard ES provides a coastal erosion study undertaken by Royal HaskoningDHV which considered the likely impact of climate change on the coastal erosion in the area. The study found that the rapid continuous erosion from the past is being replaced by episodic erosion and therefore the SMP predictions could be conservative. Recent indications suggest that erosion south of the village has reached a point where it is likely to slow down significantly, with the main area of erosion now likely to be the main village and the area to its north-west, at the caravan park. The headland acts as a control and a shelter for the undefended beach. As the headland continues to erode, the undefended area will follow, but more slowly as the 'depth' of the local bay shape reduces. This theory is supported by the monitoring data discussed further in ES Appendix 4.3.

Furthermore, Happisburgh is south of a proposed sand engine (very large scale beach nourishment) for a coastal protection scheme in front of Bacton Gas Terminal. If consented, the effect of the beach nourishment is likely to be felt at Happisburgh South, driven by longshore sediment transport, slowing the rate of coastal erosion.

Royal HaskoningDHV's predicted erosion rates at Happisburgh South can be seen in Table 2.

Table 2: Predicted erosion levels at Happisburgh South (see ES Appendix 4.3 for further information)

Prediction by	Dates	Predicted Erosion
Kelling to Lowestoft Ness SMP (NNDC, 2012)	2016 - 2035	50m
	2035 - 2065	A further 40 – 60m, Total 110m
Cromer to Winterton Ness Coastal Management Study (NNDC, 2013)	2016 - 2035	25m
	2035 - 2065	NNDC, 2013 predict further erosion to be limited as a result of expected increase of sediment supply from the north-west.
Royal HaskoningDHV (2018b)	2016 - 2035	25m
	2035 - 2065	A further 25m, Total 50m

As well as the eroding cliffs, beach erosion is expressed as the vertical downward movement of the average beach surface level. Expected beach level is important for determining depth, trajectory and exit point of the Norfolk Vanguard export cables at landfall (Figure 1). Beach level at Happisburgh South has

significant natural variation; on a seasonal / annual basis it can vary in the order of 1-2m, and in addition there is short-term scour during storms in the same order of magnitude (see ES Appendix 4.3).

Figure 1 graphically illustrates the existing and predicted shoreline position and beach levels at Happisburgh South in 2025, 2055 and 2105 based on the NNDC SMP (the most conservative forecast as shown in Table 2) alongside an indicative landfall drill profile. Figure 1 clearly shows the cables will remain buried beyond the predicted erosion levels up to 2105. Due to the proposed burial depth, Norfolk Vanguard Ltd is confident that the cables will remain buried despite potential vertical erosion fluctuations, with burial depths also including a conservative risk mitigation of unexpected accelerated erosion rates. This therefore represents a highly precautionary cable burial as the life of Norfolk Vanguard is expected to be around 35 years.

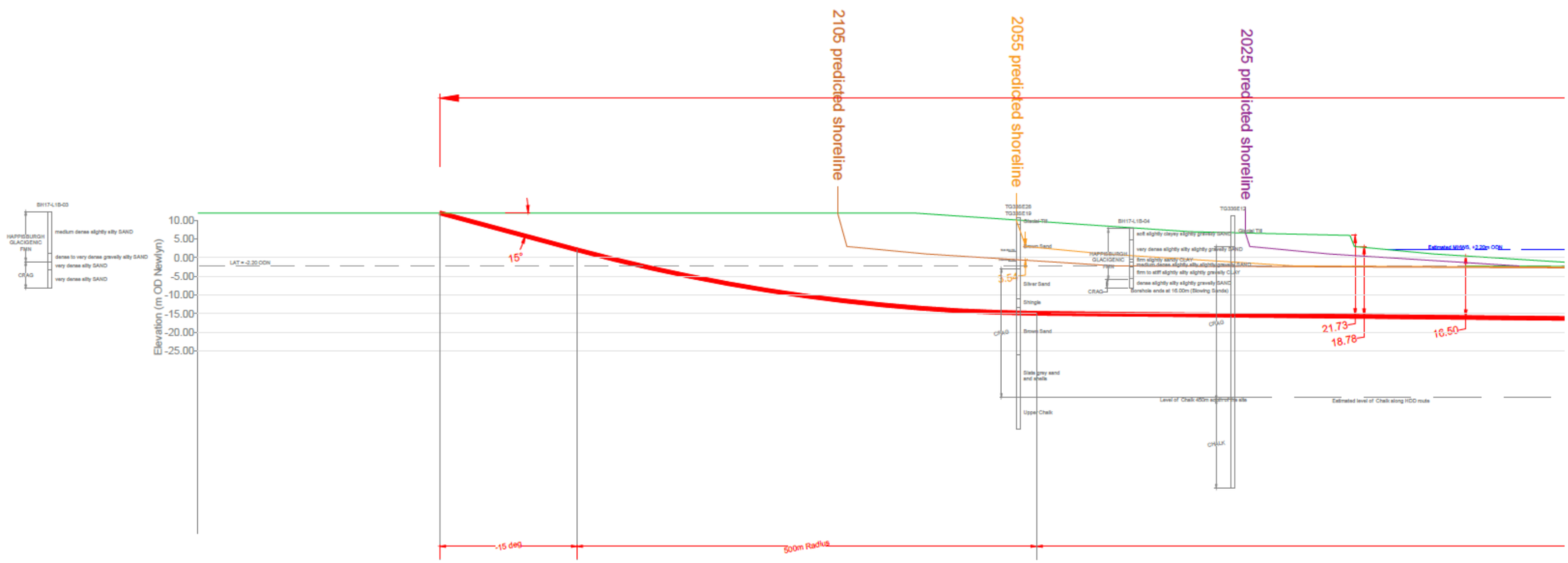

Figure 1 Predicted beach levels in 2025, 2055 and 2105 with indicative cable depth and angle shown.

5 Sea level rise

It is likely that the future erosion rate of the coast at Happisburgh South will be affected by the higher rates of sea-level rise than historically. Higher baseline water levels would result in a greater occurrence of waves impacting the toes of the cliffs, increasing their susceptibility to erosion as identified in Chapter 8 of the Norfolk Vanguard ES (document reference 6.1.8).

The allowance for sea-level rise due to climate change up to 2065 is estimated to be 0.42m. This is based on the recent update of the Environment Agency's guidance for climate change allowances (Environment Agency, 2016) using the range of published allowances and scenarios in UK Climate Projections 2009 (UKCP09).

With respect to waves, climate projections indicate that wave heights in the southern North Sea will only increase by between 0 and 0.05m by 2100 and there is predicted to be an insignificant effect on storm surges over the lifetime of Norfolk Vanguard (Lowe *et al.,* 2009).

6 Site Selection

The Haisborough landfall site was selected in consultation with the public and stakeholders, including Natural England. A number of factors were assessed during the site selection process, including coastal erosion, these are discussed in Chapter 4 of the ES.

7 Mitigation through Design

The landfall design will mitigate against impacts to or from coastal erosion processes over the lifetime of the project. The methodology is underpinned by the following principles and decisions which have been informed by a Horizontal Directional Drilling (HDD) feasibility study by Riggal & Associates (2018 unpublished). These principles will ensure the export cables remain buried at landfall during the life of the project and will have no significant impact on either the cliffs or the beach:

- Use of a long Horizontal Directional Drilling (HDD) method prevents the requirement for surface excavations on the beach or at the existing cliff face.
- Ground investigations within the landfall compound zone, to a depth of 20m below ground level, have shown that the land is primarily dense sands and clay soils, which are suitable for the HDD installation method. Research into the stability of HDD installations has found the integrity of the annular space is maintained and the strength properties increased over time through consolidation, or equalization, with the native soil.
- The HDD entry point will be set back from the existing cliff-line by at least 125m. Furthermore, the landfall compound zone currently extends a further 200m inland, to allow flexibility in the siting of the landfall post consent, using the most up to date information and forecasts.
- The HDD will be secured beneath the surface of the shore platform and the base of the cliff. The cable will additionally be located at sufficient depth to account for downcutting as cliff erosion progresses (Figure 1), and so will not become exposed during the design life of the project.

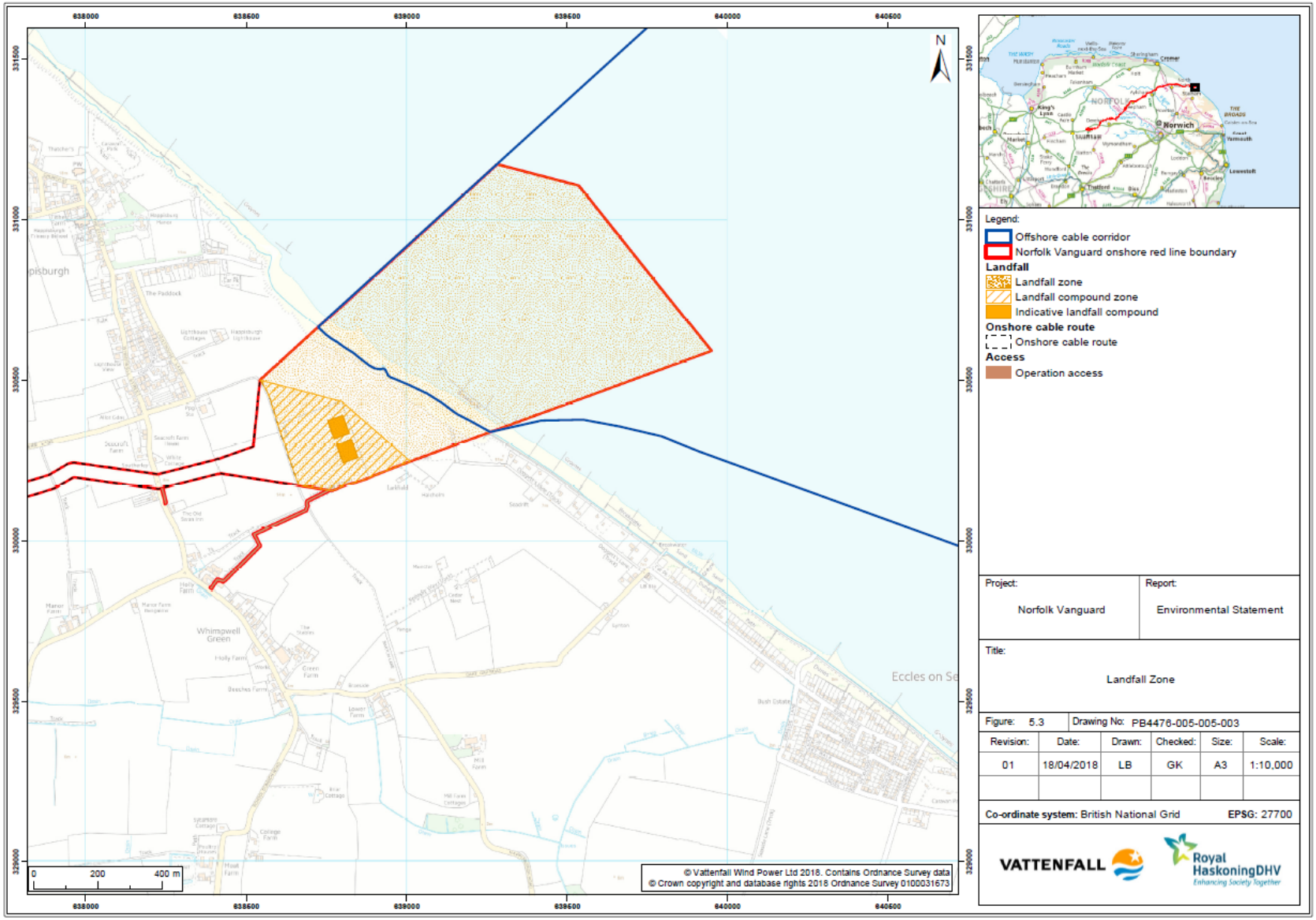

Figure 2 Indicative location of landfall compound within the landfall compound zone.

8 Summary

While cliff erosion can be episodic and unpredictable, research suggests that the erosion is slowing at Happisburgh South. The depths and distances which HDD will be conducted at from the shore are highly precautionary, accounting for the conservative erosion estimates of both the cliffs and beach level.

Sea level rise due to climate change has been considered during the planning of HDD, and estimates have shown that increases in both sea level and storm events will not have a significant impact on the project throughout its lifespan.

The drilling depth and distance from the coast at which the cables will be buried are highly conservative based on the future predictions discussed in Section 3, and as such no cable exposure is predicted.

9 References

Environment Agency 2011 Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities);

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Riggall & Associates Ltd. (2018 unpublished). HDD Feasibility Report: Cable Landfall site at Happisburgh for Vanguard and Boreas Windfarms, U.K.

Appendix 2
Clarification Note: Norfolk Vanguard Water Dependent Designated Sites

HaskoningDHV

Natural England within their Relevant Representation to the Norfolk Vanguard Offshore Wind Farm Development Consent Order (DCO) application stated:
"*From the information provided, we are not able to agree with this conclusion [of no impact to Norfolk Valley Fens Special Area of Conservation (SAC) and The Broads SAC] as all sites are dependent on groundwater supply. We advise that further information is obtained from Environment Agency and used in a detailed appraisal of groundwater effects, e.g. WetMex* [sic] *data showing the water supply mechanism for all the component sites and/or Environment Agency's groundwater modelling. If the installation of the cable route would affect the groundwater supply to these sites, then a detailed assessment should be undertaken and mitigation measures implemented to minimise any identified effects*."

"*Natural England notes that nationally designated sites over 500m from the project area have been screened out, however on that basis, Dereham Rush Meadow SSSI should have been screened in. We suggest the following wetland sites should be screened in for further consideration of impacts on groundwater supply and surface water quality:*

- *Dereham Rush Meadow SSSI (0.4km away);*
- *Holly Farm Meadow, Wendling SSSI (0.9km away);*
- *Whitwell Common SSSI (1.2 km away)*"

The information within this note provides clarification of the groundwater supply to these identified designated sites and the potential for the installation of the onshore cables for Norfolk Vanguard to affect this groundwater supply. In addition, clarification is also provided within regard to surface water quality impacts to Dereham Rush Meadow Site of Special Scientific Interest (SSSI), Holly Farm Meadow, Wendling SSSI and Whitwell Common SSSI.

Groundwater supply

Table 1 provides details of each water dependent designated site, their proximity to the buried onshore cables (both shallow trenched installation and deeper trenchless installation). It also contains descriptive information regarding the groundwater supply to these designated sites (sourced from WETMECs), and the depth of the water bearing strata in proximity to the construction works, sourced from British Geological Survey (BGS) borehole online data.

The locations of these designated sites are shown on Figure 22.2 of Environmental Statement (ES) Chapter 22 Onshore Ecology (DCO document 6.2) and Figure 5.5 of Information to Support Habitats Regulation Assessment (DCO document 5.3).

The underlying solid geology throughout this part of Norfolk is chalk overlain by diamicton (boulder clay). The solid geology and drift geology are presented on Figures 19.1 and 19.2 of ES Chapter 19 Ground Conditions and Contamination (DCO document 6.2). The depth of the chalk aquifer along the cable route is identified within Table 1.

Table 1: Water dependent designated sites proximity to Norfolk Vanguard onshore buried cables

Designated site	Distance to nearest trenching works	Distance to nearest trenchless crossing	Designated site water supply (WETMECs data)	Approximate depth of chalk aquifer at nearest trenchless crossing (based on BGS boreholes)
Norfolk Valley Fens SAC (Booton Common component SSSI)	0.6km	0.6km	Fed by artesian water from the semi-confined Chalk aquifer (vertical flows).	15m
The Broads SAC (Broad Fen, Dilham component SSSI)	3.6km	4km	Predominantly surface water fed and regularly flooded in winter. Possibility of groundwater upflow from the underlying Chalk aquifer (vertical flows) although this is considered unlikely most times of the year.	40m
Dereham Rush Meadow SSSI	0.4km	0.4km	Surface water – seasonal flooding (taken from SSSI citation).	18m
Holly Farm Meadow, Wendling SSSI	0.9km	0.9km	Fed by upward leakage from underlying Chalk aquifer (vertical flows).	17m
Whitwell Common SSSI	1.2km	1.6km	Groundwater appears to be the main source of water (vertical flows). The main aquifer beneath the site is Chalk.	24m

Along the onshore cable route the chalk aquifer is present at depths of 15-40m below ground level and overlain by diamicton (boulder clay). Site investigations have been undertaken at the majority of the trenchless crossing locations along the onshore cable route and a description of the geological horizons is provided within ES Chapter 19 Ground Conditions and Contamination – section 19.6.2.1. BGS borehole data has also been included in Table 1 for added context as the chalk aquifieris deeper than most of the site investigation boreholes that were installed for the project.

The onshore cable installation works comprise open cut trenching (to 1.5m) and a number of trenchless crossings (typically 6-8m below ground level) at key sensitive features. Based on the known depths of the chalk aquifer, this would locate the installation of the cables at least 7m above the chalk aquifer at the shallowest point. In addition, the groundwater flows supplying the designated sites (as identified in Table 1) are vertical, with no evidence of lateral flows through the drift deposits. As such, impacts would be limited to direct interaction with the underlying chalk.

Given the depth of the underlying chalk, there will be no direct interaction between cable installation works for Norfolk Vanguard and the groundwater supply mechanisms to these designated sites. On this basis, detailed groundwater assessment is not deemed necessary.

Surface water supply

Dereham Rush Meadow SSSI and Holly Farm Meadow SSSI are both located upstream of the watercourse crossing works associated with Norfolk Vanguard. On this basis, there would be no direct pathway for pollutants between these sites and the onshore construction works.

Surface water impacts to Booton Common SSSI are considered in detail within the Information to Support Habitats Regulation Assessment (DCO document 5.3) at Section 9.3.3.2, which concludes no adverse effect on integrity. Whitwell Common SSSI is fed by Booton Common SSSI and the findings for Booton Common SSSI would be equally applicable to Whitwell Common SSSI, i.e. no adverse effect on integrity.

In addition, the Applicant has committed to develop a scheme and programme for each watercourse crossing, diversion and reinstatement, which will include site specific details regarding sediment management and pollution prevention measures. This scheme will be submitted to and, approved by the relevant planning authority in consultation with Natural England. This commitment is secured through Requirement 25 (Watercourse Crossings) of the draft DCO.

With these commitments in place there will be sufficient control measures to safeguard designated sites in relation to sediment control, pollution prevention and reinstatement of all work areas at watercourse crossings.

Appendix 3 **HaskoningDHV**
Clarification Note: Norfolk Vanguard
Bat Impact Assessment – Paston Great Barn Special Area of Conservation (SAC)

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1 Introduction

This note provides clarification in relation to queries raised by Natural England in their Relevant Representation regarding the information provided for Norfolk Vanguard Offshore Wind Farm (the project) to support a Habitats Regulations Assessment (HRA) for the Paston Great Barn Special Area of Conservation (SAC) and the barbastelle bat maternity colony for which it is designated.

This note sets out the following:

- A summary of the approach to survey and assessment of the Paston Great Barn SAC undertaken for the project;
- A summary of the status of the commuting and foraging bat habitat both directly and indirectly affected by the project during construction as a result of habitat fragmentation;
- A summary of the mitigation proposed; and
- Links to where further detail on the points summarised here are presented within the Information to support Habitats Regulations Assessment and Environmental Impact Assessment (EIA).

2 Approach to survey and assessment for the Paston Great Barn SAC

The following steps were undertaken to identify the potential impacts of the project upon the barbastelle bats of the Paston Great Barn SAC maternity colony:

1. **Bat study area** - An initial bat study area of all land within the onshore project footprint and within 5km from Paston Great Barn SAC was identified as an appropriate study area for potential effects upon barbastelle bats of the Paston Great Barn SAC colony. The 5km buffer was agreed through consultation with Natural England and Norfolk County Council.

2. **Habitat assessment** – An Extended Phase 1 Habitat Survey was undertaken pre-application of all habitats located within the bat study area. This survey identified 18 hedgerows (and associated habitats) that were present within the bat study area. Landowner access was not granted to survey 5 of these 18 hedgerows. The limitations of survey access were discussed as part of the associated Expert Topic Group and it was agreed that a precautionary approach could be adopted where access was not granted. In addition, aerial photography was reviewed where access was not granted.

A habitat assessment of the accessible hedgerows was undertaken, and the quality of each hedgerow for supporting commuting or foraging bats was assessed against the criteria set out in Table 4.1 of the Bat Conservation Trust (BCT) bat surveys guidance (Collins, 2016). Through this exercise, 12 of the 13 accessible hedgerows surveyed were identified as providing moderate or high suitability for supporting commuting or foraging bats. The remaining five hedgerows which could not be surveyed were also assumed to be of moderate / high suitability for supporting commuting or foraging bats (adopting a precautionary principle), therefore 17 of the 18 hedgerows identified were classed as having moderate or high suitability.

3. **Radio-tracking data** – The Norfolk Barbastelle Study Group (NBSG) radio-tracking dataset – a dataset tracking three females of the Paston Great Barn SAC colony over a period from 2013 – 2015 – was then used to identify whether any of these hedgerows were located within known important features for barbastelles of the Paston Great Barn SAC colony. The data identified five important barbastelle features within the bat study area. These five broad features included 11 of the 17 hedgerows identified as providing moderate or high suitability.

4. **Bat activity survey data** – Bat activity survey data was collected monthly for 6 months during the 2018 bat activity season to provide a further dataset alongside the habitat assessment and radio-tracking data. Where survey access was possible, activity transects were walked to cover all the hedgerows identified as moderate or high suitability. The transects covered five of the 17 hedgerows identified. Barbastelle were recorded on all five of these hedgerows, confirming that all suitable hedgerows are likely being used by commuting / foraging barbastelle.

5. **Assessment** – Potential direct and indirect effects on barbastelle of the Paston Great Barn SAC maternity colony using the commuting and foraging habitat within the bat study area were considered. This included quantifying the following key effects:
    a. The length / area of suitable commuting / foraging habitat temporarily lost during construction (i.e. total hedgerow loss before reinstatement), and the duration of this loss, in the context of the available resource for the Paston Great Barn SAC colony.
    b. The fragmentation of the commuting / foraging habitat, and the length / area of habitat isolated by severance to linear features, in the context of the available resource for the Paston Great Barn SAC colony.
    c. Indirect effects (e.g. from construction lighting).

3 Status of hedgerow resource affected by the project

Table 1 below provides a summary of the 18 hedgerows located within the bat study area that may be affected by the project. It includes details of the quality of the habitat, and its suitability for supporting commuting / foraging bats, based on Table 4.1 of the BCT bat survey guidelines (Collins, 2016).

Table 1: Hedgerows potentially affected by the project (hedgerow numbering as shown on Important Hedgerows Plan (DCO document 2.11)

Hedgerow	Habitat assessment[1]	Assessed potential for support commuting / foraging bats[2]	Further comments
11	Species-poor	Moderate - High	Hedgerow connected to drainage ditch and rank grassland network foraging habitat at Ridlington Street, which also provides good connectivity in the wider area.
12	Species-poor with trees	Moderate - High	As above
14	N/A	Moderate - High	No assessment conducted as access was not granted. Under a precautionary principle, these hedgerows are assumed to be of moderate – high suitability for supporting commuting foraging bats.
15	N/A	Moderate - High	
17	N/A	Moderate - High	
18	N/A	Moderate - High	
19	Species-poor with trees	Moderate - High	Hedgerows with trees providing minimum shelter and isolated from higher quality areas of foraging habitat. May be important as part of wider commuting / foraging routes.
20	Species-poor with trees	Moderate - High	As above
21	N/A	Moderate - High	No assessment conducted as access was not granted. Under a precautionary principle, this hedgerow was assumed to be of moderate – high suitability for supporting commuting foraging bats.
22	Species-rich with trees	Moderate - High	Mature hedgerow with occasional gaps and mature trees. Provides good shelter between large open fields.
Unnamed	Species-rich with trees (woodland)	Moderate - High	80m wide plantation woodland block at Witton. Provides connectivity with Bacton Wood (coniferous plantation) to the south, and Northern Plantation (broadleaved plantation woodland) to the north.
25	Species-rich	Moderate - High	Narrow, low hedgerow surrounded by open arable landscapes. Provides connectivity between Bacton Wood and species-rich hedgerows at Edingthorpe.
26	Species-poor with trees	Moderate - High	Semi-mature hedgerow with gaps and trees running along North Walsham Road. Provides some connectivity with the wider hedgerow network.
27	Species-poor with trees	Moderate - High	As above.
30a	Species-poor with trees	Moderate - High	Mature hedgerow with gas adjacent to wider network for semi-improved grassland for foraging.
30b	Species-poor with trees	Moderate - High	Hedgerow with gaps adjacent to good network of superior hedgerows (species-rich with trees) and for semi-improved grassland for foraging.
Unnamed	Defunct hedgerow	Low	Defunct hedgerow, with low vegetated bank and occasional shrubs only.
31	Species-poor with trees	Moderate - High	Mature hedgerow with gaps adjacent to wider network for semi-improved grassland for foraging.

[1] Based on Extended Phase 1 Habitat Surveys conducted in February 2017 and February 2018.
[2] Based on Extended Phase 1 Habitat Surveys conducted in February 2017 and February 2018.

4 Status of habitat separated by temporary hedgerow loss

An 11ha. habitat mosaic of broadleaved woodland, rank grassland, hedgerows and drainage ditches is present at the edge of the 5km buffer from Paston Great Barn SAC, in proximity to the village of Witton. This 11ha. is potentially fragmented due to temporary crossings by the onshore cable route of two hedgerows located along the road from Bacton Wood to Witton, i.e. temporary gaps in the hedgerows that maintain connectivity to this 11ha. The potential suitability of these 11ha. has been assessed using aerial photography and using the NBSG bat radio-tracking data. This habitat mosaic feature has been assessed for its potential suitability as a foraging resource as follows:

Table 2: Suitability of habitat mosaic as a potential foraging resource (as shown on Figure 9.3 of the Information for the Habitats Regulations Assessment (DCO document 5.3)

Location	Habitat assessment	Assessed potential for support foraging bats	% of all suitable habitats located within barbastelle home range[3]
Witton	Mosaic of habitats associated within the upper reaches of the Hundred Stream. Habitats include semi-natural broadleaved woodland (approximately 7ha) and semi-improved grassland (approximately 4ha) and an intersecting drainage ditch network associated with the Hundred Stream, plus approximately 1km of species-rich hedgerow with trees.	Moderate - High	0.6%

Due to lack of survey access, no ground truthing of this habitat mosaic has been undertaken to date to confirm the assessment provided above, therefore under a precautionary principle it has been assumed that this mosaic provides moderate or high suitability for supporting foraging bats.

5 Mitigation

The following mitigation will be implemented at the important hedgerow features (a summary only is provided below – further detail is provided within Section 9.3.2.1.1 of the Information for the Habitats Regulations Assessment (DCO document 5.3) and within the Outline Landscape and Ecology Strategy (DCO document 8.7), an is secured through Requirement 24 - Ecological Management Plan (EMP):

- The width of the working corridor has been reduced from 40m to 20m[4] at hedgerow crossings to minimise impacts from hedgerow removal as far as possible.
- Mature trees in hedgerows will be avoided where possible during micrositing.
- Hedgerow removal will be programmed for winter where possible, to give bats time to adjust to the change prior to maternity period (a hedgerow removal plan will form part of the submitted EMP).

[3] Calculated using aerial imagery to identify all potentially suitable habitats for supporting commuting / foraging bats (grassland, riparian habitats, woodlands, hedgerows). It should be noted that the key foraging area identified by the radio-tracking data is the coastal cliffs at Mundesley. The inland foraging areas (including all of those listed above) were recorded during inclement weather conditions along the coast, making foraging at the cliffs unfavourable. Inland foraging was therefore also predominantly recorded in spring and autumn (NBSG, 2017).

[4] This is at perpendicular crossings – this value can be up to 25m where the project crosses hedgerows at an oblique angle.

- Replanting will follow guidance within the Norfolk Hedgerow Biodiversity Action Plan and will include appropriate species for northeast Norfolk, including ground flora planting designed to encourage insect biomass (BCT, 2012). Future hedgerow management to include allowing standard trees to develop.
- Subject to landowner permissions, for each hedgerow that is important for foraging and commuting bats up to 25m either side of the section to be removed prior to construction would be left to become overgrown to improve the quality of the surrounding hedgerow as a resource for commuting and foraging bats (Bates, 2010). These permissions are being sought as part of the ongoing landowner agreement discussions.
- Pre-construction activity surveys will be undertaken to cover any gaps within the baseline data presented within the Information for the Habitats Regulations Assessment (DCO document 5.3).

Following reinstatement, hedgerows are anticipated to take between 3-7 years to mature back to a standard whereby the hedgerow is providing value for commuting and foraging barbastelle bats (provision of shelter and invertebrate assemblage). Where the hedgerow lost is a species-rich hedgerow with trees, recovery is expected to be take the full seven years for the replacement hedgerow to reach the full value of the lost hedgerow. However, only two of the 18 hedgerows affected were identified as species rich with trees.

6 Conclusion

17 predominantly species poor hedgerows with gaps have been identified with moderate-high potential to support foraging barbastelle bats associated with the Paston Great Barn SAC. During construction, these hedgerows will be crossed and a temporary 20m gap will be created. In addition, connectively to an 11ha mosaic of woodland and grassland will be temporarily severed by crossing one of these 17 hedgerows. However, the hedgerows are at the edge of the assumed 5km range of the Paston Great Barn SAC and the effects are considered temporary and small-scale. With mitigation in place hedgerows are expected to fully recover within 3-7 years and efforts will be taken to improve the quality of the adjacent hedgerows prior to construction (allowing them to overgrow). As such, **no potential adverse effect on the integrity** of the Paston Great Barn SAC, in relation to the conservation objectives for the site are anticipated.

7 Further information

Table 3 provides a signpost to where further details of the information presented in this note can be found within the information submitted to date as part of the project DCO application.

Table 3: Further information

Topic	Document	Document Reference	Section
Methodology used for characterising hedgerows	Information for the Habitats Regulations Assessment	5.03	9.1.2.2.2, 9.3.2.1.1 9.3.2.1.2
Location of hedgerows	Important Hedgerows Plan	2.11	-
	Appendix 22.1 Extended Phase 1 Habitat Survey Report	6.2.22.1	Figure 4 (Pages 19-20, 23-24)
Habitat assessment of hedgerows	Appendix 22.1 Extended Phase 1 Habitat Survey Report	6.2.22.1	Annex C: Target Notes

Topic	Document	Document Reference	Section
Location of important barbastelle features	Information for the Habitats Regulations Assessment	5.03	Figure 9.4
Location of Verona Planation	Information for the Habitats Regulations Assessment	5.03	Figure 9.4
Bat activity survey results	Appendix 22.4 Bat Activity Survey Report	6.2.22.4	BACT 19 BACT 21 BACT 22 BACT 24 BACT 34
Results of NBSG radio-tracking data	Information for the Habitats Regulations Assessment	5.03	Figure 9.4

8 References

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