

Norfolk Boreas Offshore Wind Farm

Appendix 6.1

Habitats Regulations Assessment Integrity Matrices

Applicant: Norfolk Boreas Limited
Document Reference: 5.3.6.1
Pursuant to: APFP Regulation: 5(2)(q)

Author: Royal HaskoningDHV
Revision: Version 1
Date: June 2019

Photo: Ormonde Offshore Wind Farm

Date	Issue No.	Remarks / Reason for Issue	Author	Checked	Approved
25/03/2019	01D	First draft for Norfolk Boreas Limited review	GS/JL/MT	DT	AD
15/05/2019	02D	Second draft for Norfolk Boreas Limited Review	GS/JL/MT	DT	JL
17/05/2019	01F	Final for DCO submission	GS/JL/MT	DT/VR/KC	JL

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1 INTRODUCTION

1. This document provides the Habitats Regulations Assessment (HRA) integrity matrices for Norfolk Boreas Offshore Wind Farm. The matrices summarise information provided in the Information to Support HRA report (document 5.3 of the application).
2. Norfolk Boreas Limited have included two scenarios within the DCO application; Scenario 1 where Norfolk Vanguard and Norfolk Boreas proceed to construction and Scenario 2 where Norfolk Vanguard does not. These two scenarios are summarised in the Information to support HRA report (section 3) and presented in more detail in Chapter 5 Project Description of the ES (document reference 6.1.5). As described in section 3 of the Information to support HRA report (section 3) the two scenarios have not materially affected the way the Stage 1: Screening has been undertaken nor have they affected Stage 2 when assessing potential effects linked with the offshore parts of the Project as the Project would be very similar in the offshore environment regardless of the two different scenarios. However, the Stage 2 assessment of onshore Natura 2000 sites (section 9 of the Information to support HRA report) does undertake separate assessments for Scenario 1 and Scenario 2, and those assessments are reflected in the integrity matrices (sections 2.8, 2.10, 2.11 and 2.13) provided within this appendix.

2 INTEGRITY MATRICIES

3. Following screening of potential impacts of Norfolk Boreas on European designated sites (as presented in Appendix 5.1 and Appendix 5.2 of the Information to Support the HRA Report (document 5.3 of the DCO application)), the following features of European Sites were assessed to determine if there was a risk of Adverse Effects on the Integrity (AEOI) of their qualifying features in the Information for Habitats Regulations Report.

Table 2.1 European designated sites and qualifying features screened in

Site	Qualifying feature
Alde-Ore Estuary Special Protected Area (SPA) and Ramsar	<ul style="list-style-type: none"> Breeding lesser black-backed gull <i>Larus fuscus</i>
Breydon Water SPA and Ramsar	<ul style="list-style-type: none"> Wintering and passage waterbird assemblage including as named features Bewick's swan, ruff, golden plover, avocet, lapwing.
Broadland SPA and Ramsar	<ul style="list-style-type: none"> Wintering and passage waterbird assemblage including as named features shoveler, wigeon, gadwall, Bewick's swan, whooper swan, ruff.
Flamborough and Filey Coast SPA	<ul style="list-style-type: none"> Breeding kittiwake <i>Rissa tridactyla</i> Breeding gannet <i>Morus bassanus</i> Breeding common guillemot <i>Uria aalge</i> Breeding razorbill <i>Alca torda</i>
Greater Wash SPA	<ul style="list-style-type: none"> Non-breeding red-throated diver <i>Gavia stellata</i> Non-breeding little gull <i>Hydrocoloeus minutus</i>
Haisborough Hammond and Winterton Special Area of Conservation (SAC)	<ul style="list-style-type: none"> Reef Sandbanks slightly covered by seawater all the time
Humber Estuary SAC	<ul style="list-style-type: none"> Grey seal <i>Halichoerus grypus</i>
Klaverbank SAC	<ul style="list-style-type: none"> Grey seal Harbour seal <i>Phoca vitulina</i>
Noordzeekustzone SAC	<ul style="list-style-type: none"> Grey seal
Norfolk Valley Fens SAC	<ul style="list-style-type: none"> Alkaline fens Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> Calcareous fens <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> European dry heaths Molinia meadows on calcareous peaty or clayey-silt-laden soils Northern Atlantic wet heaths with <i>Erica tetralix</i>
North Norfolk Coast SPA and Ramsar	<ul style="list-style-type: none"> Wintering and passage waterbird assemblage including as named features shoveler, wigeon, gadwall, Bewick's swan, whooper swan, ruff.
Outer Thames Estuary SPA	<ul style="list-style-type: none"> Nonbreeding red-throated divers.

Site	Qualifying feature
Paston Great Barn SAC	<ul style="list-style-type: none"> • Barbastelle bat <i>Barbastella barbastellus</i>
River Wensum SAC	<ul style="list-style-type: none"> • Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation • Desmoulin's whorl snail <i>Vertigo moulinsiana</i>
Southern North Sea SAC	<ul style="list-style-type: none"> • Harbour porpoise <i>Phocoena phocoena</i>
The Broads SAC	<ul style="list-style-type: none"> • Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. • Natural eutrophic lakes with Magnopotamion or Hydrocharition – type vegetation • Transition mires and quaking bogs • Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> • Alkaline fens • Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) • Desmoulin's whorl snail • Fen orchid <i>Liparis loeselii</i> • Ramshorn snail <i>Anisus vorticulus</i> • Otter <i>Lutra lutra</i>
The Wash and North Norfolk SAC	<ul style="list-style-type: none"> • Grey seal • Harbour seal
Winterton-Horsey Dunes SAC	<ul style="list-style-type: none"> • Grey seal

4. A summary of the evidence presented in the determination of the risk of AEOI on the relevant qualifying features is detailed within the footnotes to the integrity matrices below.
5. The following abbreviations are used within the integrity matrices:
 - Y – AEOI **cannot** be excluded
 - N - AEOI **can** be excluded
 - C = construction
 - O = operation
 - D = decommissioning
6. Where effects are not applicable to a particular feature they are greyed out.

2.1 Alde-Ore Estuary SPA and Ramsar

Name of European Site: Alde-Ore Estuary SPA and Ramsar									
Distance to Norfolk Boreas Site: 92km									
Site Features	Adverse Effect on Integrity due to Norfolk Boreas								
	Collision mortality (in-combination)			Displacement/Disturbance			Barrier Effect		
	C	O	D	C	O	D	C	O	D
Breeding lesser black-backed gulls		N (a)							
<p>a) Band model predictions of collision mortality suggest a maximum of 40 collisions per year for lesser black-backed gulls (5.03 HRA Norfolk Boreas Table 6.4). A review of population estimates in Norfolk and Suffolk, combined with use of the Scottish Natural Heritage (SNH) apportioning method suggested that 12% of the collisions at Norfolk Boreas would be attributed to the Alde Ore Estuary SPA population (5.03 HRA Norfolk Boreas paragraph 191).</p> <p>During the autumn and spring migration periods birds from Alde-Ore Estuary SPA make up 3.3% of the Biologically Defined Minimum Population Scales (BDMPS) population, and in winter these birds make up 5% of the BDMPS (5.03 HRA Norfolk Boreas paragraph 194). Applying these percentages to the maximum collision predictions indicates a maximum Alde-Ore Estuary SPA mortality of 3 (using the extended breeding season; 5.03 HRA Norfolk Boreas paragraph 198). This represents an increase of 0.6% on natural mortality which is below detection limits (taken as 1%). Population modelling indicates that this level of mortality would have a very small effect on the population growth rate (5.03 HRA Norfolk Boreas paragraph 199). Consequently, there will be no adverse effect on the integrity of the Alde-Ore Estuary SPA as a result of lesser black-backed gull collisions at the proposed Norfolk Boreas project alone (5.03 HRA Norfolk Boreas paragraph 203).</p> <p>In-combination assessment suggests mortality of up to 42 birds attributable to the Alde-Ore SPA population of lesser black-backed gulls (calculated on the basis of the Alde-Ore proportion of the wider population of lesser black-backed gulls, 5.03 HRA Norfolk Boreas paragraph 208). Compared with estimated natural mortality of about 460 birds per year, the additional in-combination mortality would increase the mortality rate by 9.1%. However, this mortality rate falls to 25, equating to an increase in mortality of 5.4% if as-built wind farm designs are used in place of consented designs (5.03 HRA Norfolk Boreas paragraph 210).</p> <p>A population model was developed (MacArthur Green 2019) to predict the consequences of additional mortality on the population. At an adult mortality of 40 the growth rate of the population was reduced by 0.4% to 1.3% (for density dependent and density independent simulations respectively) (5.03 HRA Norfolk Boreas paragraph 213). Thus, even the more precautionary, density independent prediction, based on consented rather than built wind farms and over-estimated nocturnal activity, was for a growth rate reduction of only just over 1%. This is considered very unlikely to cause a population decline (5.03 HRA Norfolk Boreas paragraph 210). Use of collision estimates for built wind farms generates a density independent prediction of a 0.9% growth rate reduction, which further reduces concerns that in-combination collision would result in a population decline (5.03 HRA Norfolk Boreas paragraph 213). The breeding success, and hence the population trend, of lesser black-backed gulls in the Alde-Ore Estuary SPA population appears to be mainly determined by the amount of predation, disturbance and flooding occurring at this site (Department of Energy and Climate Change 2013a, Thaxter et al. 2015, 5.03 HRA Norfolk Boreas paragraph 217). Increased predation and disturbance by foxes has been considered the main factor causing reductions in breeding numbers. Management measures to reduce access by foxes has resulted in some recovery in the numbers of gulls. The main driver of gull numbers in this SPA therefore appears to be suitable management at the colonies to protect gulls from predators (Department of Energy</p>									

Name of European Site: Alde-Ore Estuary SPA and Ramsar

Distance to Norfolk Boreas Site: 92km

and Climate Change 2013a). This aspect, taken together with the degree of precaution in reported collision assessments for other offshore wind farms, including the use of the much higher mortality predictions estimated for consented wind farm designs rather than for the as built wind farm designs, means the likelihood of an adverse effect on the integrity of the SPA due to in-combination collisions of lesser black-backed gulls is considered sufficiently small that it can be ruled out (5.03 HRA Norfolk Boreas paragraph 216).

2.2 Flamborough and Filey Coast SPA

Name of European Site: Flamborough & Filey Coast SPA

Distance to Norfolk Boreas Site: 205km

Site Features	Adverse Effect on Integrity due to Norfolk Boreas								
	Collision mortality (in-combination)			Displacement/Disturbance			Barrier Effect		
	C	O	D	C	O	D	C	O	D
Breeding kittiwake		N (a)							
Breeding gannet		N (b)			N (c, f)				
Breeding razorbill					N (d)				
Breeding guillemot					N (e)				

a) Collision mortality of kittiwakes at the Norfolk Boreas site was estimated at 203 birds per year. Following a review of tracking data, the number of kittiwakes apportioned to the Flamborough & Filey Coast SPA population was 21.4 using the full breeding season and 18.2 using the migration-free breeding season (5.03 Norfolk Boreas HRA Table 6.16). From a population of approximately 89,040 this would increase the background mortality rate by 0.02 which represents a negligible addition to natural mortality. Kittiwake collision mortality due to Norfolk Boreas alone will therefore have no adverse effect on the integrity of this SPA (5.03 Norfolk Boreas HRA paragraph 281). The in-combination assessment suggests a collision mortality of 522.5. At the adult mortality rate of 0.146, the natural mortality of the population is 13,000. An addition of up to 522.5 to this would increase the mortality rate by 4% (5.03 Norfolk Boreas HRA, paragraph 284%

). Precautionary, density independent population modelling has found that this level of mortality would reduce the median population growth rate by a maximum of 0.6% (note the reduction in growth rate is 0.1% with the inclusion of density dependence, 5.03 Norfolk Boreas HRA, paragraph 286). These reductions represent a very small risk to the population's conservation status, which has grown over the last 20 years (5.03 Norfolk Boreas HRA, paragraph 287). When allowance is made for the

Name of European Site: Flamborough & Filey Coast SPA

Distance to Norfolk Boreas Site: 205km

over-precaution in the assessment (e.g. consented designs compared with as-built, over-estimated nocturnal activity rates and density independent model predictions) the predicted impacts on the population are very small (no more than a 0.1% reduction in the population growth rate). Therefore, it can be concluded that there will be no adverse effect on the integrity of Flamborough & Filey Coast SPA from impacts on kittiwake due to Norfolk Boreas in-combination with other plans and projects (5.03 Norfolk Boreas HRA, paragraph 289).

b) Collision mortality of gannets at the Norfolk Boreas site was estimated at 118 birds per year. Apportioning to the Flamborough and Filey Coast SPA population gives an annual mortality of 57.4 individuals, from a population of approximately 22,122 birds (5.03 Norfolk Boreas HRA, paragraph 229). At an adult natural mortality rate of 0.081, the baseline mortality is approximately 1,792. An addition of 57.4 to this increases the mortality rate by 3.2%. Precautionary, density independent population modelling has found that this level of mortality would reduce the median population growth rate by a maximum of 0.2%, which compares with the actual annual growth rate of this population over the last 25 years of 10% (5.03 Norfolk Boreas HRA, paragraph 233). This indicates that this level of mortality at the project alone represents a negligible risk to this population's status. The in-combination assessment suggests a maximum collision mortality of 323 birds from Flamborough & Filey Coast SPA population per year. This additional mortality would increase the background mortality rate by more than 1% (5.03 Norfolk Boreas HRA, paragraph 238). Precautionary, density independent population modelling has found that this level of mortality would reduce the median population growth rate by a maximum of 1.5%, which compares with the actual annual growth rate of this population over the last 25 years of 10% (5.03 Norfolk Boreas HRA, paragraph 240). This indicates that this level of in-combination mortality represents a negligible risk to this population's status. The number of predicted in-combination gannet collisions attributed to the Flamborough & Filey Coast SPA is not at a level which would trigger a risk of population decline, and population modelling in fact indicates that the in-combination mortality predicted would only slow, rather than halt, the population increase currently seen at this colony. Therefore, it can be concluded that there will be no adverse effect on the integrity of Flamborough & Filey Coast SPA from impacts on gannet due to Norfolk Boreas in-combination with other projects (5.03 Norfolk Boreas HRA, paragraph 243).

c) Annual displacement mortality of gannet at Norfolk Boreas apportioned to the Flamborough and Filey Coast SPA population was estimated at between 8.1 (60% displaced, 1% mortality) and 10.8 (80% displaced, 1% mortality) (5.03 Norfolk Boreas HRA, Table 6.9). This would increase the background mortality by a maximum of 0.1% (5.03 Norfolk Boreas HRA, paragraph 221) which is less than the threshold for detectability (1%). It is therefore reasonable to conclude that there will be no adverse effect on the integrity of Flamborough and Filey Coast SPA as a result of gannet displacement from Norfolk Vanguard alone (5.03 Norfolk Boreas HRA, paragraph 221). In-combination displacement mortality of gannets apportioned to the Flamborough and Filey Coast SPA population was estimated at between 57 (60% displaced, 1% mortality) and 76 (80% displaced, 1% mortality) (5.03 Norfolk Boreas HRA, Table 6.9). This would increase the background mortality by a maximum of 0.99% which is less than the threshold for detectability (1%). It is therefore reasonable to conclude that there will be no adverse effect on the integrity of Flamborough and Filey Coast SPA as a result of gannet displacement from Norfolk Boreas in-combination with other projects (5.03 Norfolk Boreas HRA, paragraph 222).

d) Annual displacement mortality of razorbills at Norfolk Boreas apportioned to the Flamborough and Filey Coast SPA population was estimated at between 0.7 (30% displaced, 1% mortality) and 15.3 (70% displaced, 10% mortality) with an evidence based estimate of 1.1 (50% displaced, 1% mortality) (5.03 Norfolk Boreas HRA, Table 6.21). This would increase the background mortality by a maximum of 0.2% (5.03 Norfolk Boreas HRA, paragraph 301) which is less than the threshold for detectability (1%). It is therefore reasonable to conclude that there will be no adverse effect on the integrity of Flamborough and Filey Coast SPA as a result of razorbill displacement from Norfolk Vanguard alone (5.03 Norfolk Boreas HRA, paragraph 301). In-combination displacement mortality of razorbills apportioned to the Flamborough and Filey

Coast SPA population was estimated at between 22 (30% displaced, 1% mortality) and 529 (70% displaced, 10% mortality) with an evidence based estimate of 37 (50% displaced, 1% mortality) (5.03 Norfolk Boreas HRA, Table 6.21). This would increase the background mortality by a maximum of 8.1% (5.03 Norfolk Boreas HRA, paragraph 302). These were converted to adult only estimates using an adult proportion of 0.57, giving a worst case (70% displaced, 10% mortality) estimate of 301 (5.03 Norfolk Boreas HRA, paragraph 305). Precautionary, density independent population modelling has found that this level of mortality would reduce the median population growth rate by a maximum of 1.4%, which compares with the actual annual growth rate of this population between 2000 and 2017 of 7.2% (5.03 Norfolk Boreas HRA, paragraph 311). This indicates that this level of in-combination mortality represents a negligible risk to this population's status. The number of predicted in-combination razorbill displacement mortalities attributed to the Flamborough & Filey Coast SPA is not at a level which would trigger a risk of population decline. Therefore, it can be concluded that there will be no adverse effect on the integrity of Flamborough & Filey Coast SPA from displacement impacts on razorbill due to Norfolk Boreas in-combination with other plans and projects (5.03 Norfolk Boreas HRA, paragraph 311).

e) Annual displacement mortality of guillemots at Norfolk Boreas apportioned to the Flamborough and Filey Coast SPA population was estimated at between 1.1 (30% displaced, 1% mortality) and 24.5 (70% displaced, 10% mortality) with an evidence based estimate of 1.8 (50% displaced, 1% mortality) (5.03 Norfolk Boreas HRA, Table 6.24). This would increase the background mortality by a maximum of 0.14% (5.03 Norfolk Boreas HRA, paragraph 312) which is less than the threshold for detectability (1%). It is therefore reasonable to conclude that there will be no adverse effect on the integrity of Flamborough and Filey Coast SPA as a result of guillemot displacement from Norfolk Vanguard alone (5.03 Norfolk Boreas HRA, paragraph 312). In-combination displacement mortality of guillemots apportioned to the Flamborough and Filey Coast SPA population was estimated at between 24 (30% displaced, 1% mortality) and 566 (70% displaced, 10% mortality) with an evidence based estimate of 40 (50% displaced, 1% mortality) (5.03 Norfolk Boreas HRA, Table 6.24). This would increase the background mortality by a maximum of 3.2% (5.03 Norfolk Boreas HRA, paragraph 310). These were converted to adult only estimates using an adult proportion of 0.57, giving a worst case (70% displaced, 10% mortality) range of between 283 and 323 (5.03 Norfolk Boreas HRA, paragraph 314). Precautionary, density independent population modelling has found that this level of mortality would reduce the median population growth rate by a maximum of 0.4%, which compares with the actual annual growth rate of this population between 2000 and 2008 of 3.0% and between 2008 and 2017 of 4.0% (5.03 Norfolk Boreas HRA, paragraph 315). This indicates that this level of in-combination mortality represents a negligible risk to this population's status. The number of predicted in-combination guillemot displacement mortalities attributed to the Flamborough & Filey Coast SPA is not at a level which would trigger a risk of population decline. Therefore, it can be concluded that there will be no adverse effect on the integrity of Flamborough & Filey Coast SPA from displacement impacts on guillemot due to Norfolk Boreas in-combination with other projects (5.03 Norfolk Boreas HRA, paragraph 315).

f) Combined annual gannet displacement and collision mortality (as requested by Natural England) for all projects with potential connectivity to the Flamborough and Filey Coast SPA gave a mortality estimate of 353 to 364 (5.03 Norfolk Boreas HRA, paragraph 246). This would increase the background mortality rate by more than 1% (5.03 Norfolk Boreas HRA, paragraph 247). Precautionary, density independent population modelling has found that this level of mortality would reduce the median population growth rate by a maximum of 1.7%, which compares with the actual annual growth rate of this population over the last 25 years of 10% (5.03 Norfolk Boreas HRA, paragraph 250). This indicates that this level of in-combination mortality represents a negligible risk to this population's status. The number of predicted in-combination gannet collisions and displacement mortalities attributed to the Flamborough & Filey Coast SPA is not at a level which would trigger a risk of population decline, and population modelling in fact indicates that the in-combination mortality predicted would only slow, rather than halt, the population increase currently seen at this colony. Therefore, it can be concluded that there will be no adverse effect on the integrity of Flamborough & Filey Coast SPA from impacts on gannet due to this highly precautionary combined assessment of displacement and collision risk for Norfolk Boreas in-combination with other projects (5.03 Norfolk Boreas HRA, paragraph 254).

2.3 Greater Wash SPA

Name of European Site: Greater Wash SPA									
Distance to Norfolk Boreas Site: 36km (a)									
Site Features	Adverse Effect on Integrity due to Norfolk Boreas								
	Collision mortality			Displacement/Disturbance			Barrier Effect		
	C	O	D	C	O	D	C	O	D
Nonbreeding red-throated divers				N (b)	N (c)				
Nonbreeding little gull		N (d)							

a) Note that this distance refers to the offshore wind farm itself. The export cable will pass through the SPA.

b) Cable laying operations during construction will disturb birds from the immediate vicinity of (up to two) cable-laying vessels (5.03 HRA Norfolk Boreas, paragraph 336). Assessment indicates that between 34 and 85 red-throated divers could be displaced at any one time during cable laying, but only if both vessels are operating within the SPA at the same time (5.03 HRA Norfolk Boreas, paragraph 338). This would lead to a 0.7% increase in diver density in other parts of the SPA, and on the basis of a highly precautionary maximum mortality rate associated with the displacement of red-throated diver by vessels in the wintering period of 10% (i.e. 10% of displaced individuals suffer mortality as a direct consequence). This leads to a highly precautionary assumption that a single instance of displacement is equivalent to nearly half the total annual adult mortality rate. At this level of additional mortality, a maximum of between 4 and 8 birds could be at risk of mortality across the entire winter period (September to April) as a result of any potential displacement effects from the offshore cable installation activities. However, owing to the Rochdale envelope approach and the nature of the calculations employed, this almost certainly over-estimates the duration of cable laying by a factor of around 7, since even travelling at the minimum speed of 30m per hour, if a working day lasts for 12 hours the vessel would traverse the SPA in approximately 40 days (assuming the cable route through the SPA is around 15km). Baseline average mortality is 0.228, therefore the estimated natural mortality for the SPA population (1,407), would be 321. The addition of a maximum of 4 to 8 to this total during a single year would increase the mortality rate in that year by approximately 1.3% to 2.6% (5.03 HRA Norfolk Boreas, paragraph 345). However, as this is based on highly precautionary assumptions about the magnitude and impact of displacement and would only be expected to apply during a single nonbreeding season (and only then if cable laying by two vessels occurs simultaneously within the SPA during the nonbreeding period), it is reasonable to conclude that there will be no adverse effect on the integrity of the Greater Wash SPA as a result of red-throated diver displacement due to cable laying for Norfolk Boreas alone (5.03 HRA Norfolk Boreas, paragraph 346). There is potential that the export cable for Hornsea Project Three could be installed during the same period as for Norfolk Boreas (however it should be noted that the cable for Norfolk Vanguard would not be installed at the same time), giving rise to a potential in-combination effect. The in-combination mortality for Norfolk Boreas and Hornsea Project Three is between 6 and 10 individuals, although the likelihood of construction occurring over the same period is considered to be very small. The addition of a maximum of 6 to 10 to the baseline mortality of 300 during a single year would increase the mortality rate in that year by approximately 2% to 3.3%, while at the Applicant's evidence based rates this would be 0.3% (5.03 HRA Norfolk Boreas, paragraph 352). However, this assessment is based on a combination of highly precautionary assumptions about the magnitude and impact of displacement and the potential for temporal overlap between the projects. This in-combination effect would only be expected to occur during a single nonbreeding season, if both cable laying vessels planned for Norfolk Boreas are

Name of European Site: Greater Wash SPA

Distance to Norfolk Boreas Site: 36km (a)

present at the same time, and this was also at the same time when those for Hornsea Project Three are present, and furthermore that this combination of events occurs within the SPA during the nonbreeding period (which is the least favoured period for such work due to less suitable weather conditions). If any of these conditions is not met, then there would not be an in-combination impact (5.03 HRA Norfolk Boreas, paragraph 354). Therefore, it is concluded that there is a negligible risk of an adverse effect on the integrity of the Greater Wash SPA due to this potential in-combination construction impact.

c) Natural England consider that vessels transiting the Greater Wash SPA between the operations and maintenance port (the location of which is not yet confirmed) and the wind farm site could cause disturbance to red-throated divers. However, for other recent projects Natural England has stated that their concerns would be removed if best practice management measures were put in place to minimise such risks (see Norfolk Vanguard assessment). The Applicant will engage with Natural England to ensure that such measures will be included in the DCO. As a consequence, there will be no adverse effect on the integrity of the Greater Wash SPA due to operation and maintenance vessel traffic (5.03 HRA Norfolk Boreas, paragraph 335).

d) Collision mortality of little gull at the Norfolk Boreas site was estimated to be 4 individuals. The estimated regional population of little gull is approximately 10,000 to 20,000, of which the Greater Wash SPA population of 1,255 represents 6.3% to 12.6%. Collisions at Norfolk Boreas would therefore affect between 0.26 and 0.5 individuals from the Greater Wash SPA. This would increase the background mortality rate for the SPA population by 0.1% to 0.2%. This level of additional mortality due to collisions at Norfolk Boreas alone will have an undetectable effect on the population and would not result in an adverse effect on the integrity of the Greater Wash SPA. An in-combination assessment estimated the total collision mortality for wind farms in the southern North Sea with potential connectivity to the Greater Wash SPA to be 67.2 (5.03 HRA Norfolk Boreas, paragraph 327), of which a maximum of 8.5 would be attributed to the SPA population (5.03 HRA Norfolk Boreas, paragraph 328). For wider population estimates of 10,000, 20,000 and 75,000 this would increase the background mortality for the SPA population by 3.3%, 1.7% and 0.5% respectively (5.03 HRA Norfolk Boreas, paragraph 328). This increase in mortality rate is based on consented wind farm designs rather than as-built ones. Updating for this, and also the recently revised design for Triton Knoll (turbine number reduction from 288 to 90) would reduce the increase in background mortality to 1.1% (5.03 HRA Norfolk Boreas, paragraph 328). The Secretary of State assessed an in-combination total mortality of 7 for the Greater Wash SPA population in relation to the application for a non-material change at Triton Knoll and concluded that *'such a small impact would be undetectable in the SPA population'* (5.03 HRA Norfolk Boreas, paragraph 329). Thus, on the basis of the very small magnitude of impact on the little gull population of the Greater Wash SPA and given the extremely low level of impacts at the Norfolk Boreas site, it is considered that the project will not contribute to an in-combination impact. Thus, the likelihood of an adverse effect on the integrity of the Greater Wash SPA population of little gull can be ruled out for Norfolk Boreas in-combination with other projects (5.03 HRA Norfolk Boreas, paragraph 330).

2.4 Haisborough Hammond and Winterton SAC

Name of European Site: Haisborough Hammond and Winterton SAC															
Distance to Norfolk Boreas: 0km (cable route intersects the SAC)															
Site Features	Adverse Effect on Integrity due to Norfolk Boreas														
	Temporary physical disturbance			Habitat loss			New substrate			Increased suspended sediment and smothering			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Annex I Sandbank slightly covered by seawater all the time	N (a)	N (b)	N (h)		N (c)			N (c)					N (d)	N (d)	N (h)
Annex I Reef (<i>Sabellaria spinulosa</i> reefs)	N (e)	N (e)	N (h)					N (f)		N (g)		N (h)	N (a)	N (a)	N (h)

a) The wording of Condition 9(1)(m) of Schedules 11 and 12 (the Transmission DMLs) of the DCO, ensures that a conclusion of no AEIOI can be made at the consenting stage as construction cannot commence until the MMO is satisfied, in consultation with Natural England, that there is ‘no adverse effect beyond reasonable scientific doubt’ on the Haisborough, Hammond and Winterton (HHW) SAC. The condition requires that a HHW SAC Site Integrity Plan (SIP), in accordance with the Outline HHW SAC SIP (document reference 8.20), is agreed with the MMO in consultation with Natural England prior to construction.

b) The Outline HHW SAC SIP (document reference 8.20) shows that the aim of the installation strategy for cables in the SAC would be to bury cables below the mobile sandwaves to avoid or minimise the requirement for routine re-burial of cables during the operational phase to ensure the effects are localised and temporary. Sediment arising from any pre-sweeping (a discrete dredging operation designed to lower the seabed level within a distinct identified channel to enable marine cables to be installed to a depth which reduces the risk of cable exposure and minimises the likelihood of reburial operations) within the SAC must be deposited within the SAC in accordance with section 5.4 of the Outline HHW SAC SIP. A Sandwave study by ABPmer (Appendix 7.1 of the Information to Support HRA Report) concluded that, as sediment will remain within the boundaries of the SAC within the natural limits, there will be no significant change to sandbank extent, topography and sediment composition. Once re-deposited on the seabed, the sediment will immediately re-join the local and regional sediment transport system and therefore the dredging and associated disposal will not affect the form or function of the sandbanks or the sandbank communities which are adapted to natural disturbance and are therefore likely to be able to recover within a few tidal cycles. The location(s) of sediment disposal will be informed by the pre-construction surveys and a primary aim of the sediment disposal strategy (i.e. locations and methodology for disposal) will be to facilitate recovery. The strategy will also be informed by any available evidence regarding recovery from other relevant projects. The cable installation strategy and the location(s) and methodology for disposal must be agreed with the MMO in consultation with Natural England through the Outline HHW SAC SIP before works can commence.

Name of European Site: Haisborough Hammond and Winterton SAC

Distance to Norfolk Boreas: 0km (cable route intersects the SAC)

The maximum area of temporary physical disturbance (2.45km²) due to cable laying operations, including pre-sweeping equates to 0.37% of the sandbanks¹ and 0.17% of the total area of the SAC². Any additional area associated with sediment disposal will be a factor of the disposal areas to be agreed with the MMO in consultation with Natural England and as discussed above, deposited sediment will immediately re-join the local and regional sediment transport system. The ABPmer study (Appendix 7.1 of the Information to Support HRA report) concluded that as the cable corridor is oriented in most cases transverse to the sand wave crests which require levelling, only a small width of each sand wave would be disturbed with the sand wave continuing to evolve and migrate along most of its length. As a result, the overall form and function of any particular sand wave, or the SAC sandbank system as a whole, would not be disrupted by cable installation activities. The cable corridor is in an active and highly dynamic environment, governed by current flow speeds, water depth and sediment supply, all of which are conducive for the development and maintenance of sandbanks. As a result, there would be no adverse effect on site integrity.

c) The Outline HHW SAC SIP (document reference 8.20) shows that the aim of the installation strategy for cables in the SAC would be to bury cables below the mobile sandwaves to avoid or minimise the requirement for routine re-burial of cables during the operational phase to ensure the effects are localised and temporary. The Information to Support HRA report (document 5.3) considers a worst case scenario disturbance area for cable reburial activities within the SAC which equates to 0.4km² over the life of the project (0.03% of the total area of the SAC or 0.07% of the sandbank area). This is estimated from 4km per cable pair within the SAC, with a disturbance width of 10m. However, if reburial is required, it is likely that this would be for shorter sections (e.g. 1km) at any one time (Information to Support HRA report, paragraph 476) and recovery would occur between any reburial operations.

While it is not possible to determine the number and location of any repair works that may be required during the life of the project, an estimated average of one export cable repair every 10 years within the SAC is included in the Information to Support HRA (document reference 5.3). It is estimated that 300m sections would be removed and replaced per repair with a disturbance width of 10m and therefore an area of 3,000m² (0.003km²) per repair combined with approximately 150m² for any anchor placement associated with repair works (based on 6 anchors per vessel). Due to the short term, temporary and small scale nature of any maintenance works (if required) there would be no effect on the form or function of the sandbank systems or on the sandbank communities and therefore no adverse effect on site integrity.

c) The worst case total area of cable protection installed within the SAC could be 0.05km² which includes cable protection required for crossing existing cables as well as a contingency in the unlikely event that cable burial is not possible. Analysis of geophysical data has shown that the substrate along the vast majority of the offshore cable corridor is expected to be suitable for cable burial. The total worst case scenario footprint of cable protection equates to less than 0.004% of the total area of the SAC (1,468km²)¹ and 0.008% of the area of sandbanks within the SAC (669km²)². Due to the very small extent of potential persistent loss of Sandbank within the SAC, there would be no change to the physical processes associated with the sandbank form and function and no significant loss of the low abundance and low diversity sandbank communities. As a result, there would be no AEIOI on the Annex 1 Sandbank.

d) Chapter 8 Marine Geology, Oceanography and Physical Processes of the Norfolk Boreas ES (DCO document reference 6.1.8) states that theoretical bed level changes of

¹ The area of the Annex 1 Sandbank feature in the Haisborough, Hammond and Winterton SAC is 668.928km² (66,892.8ha) as quoted in the Natura 2000 Standard Data Form <http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=UK0030369>

² The Haisborough, Hammond and Winterton SAC is 1,467.59 km²

Name of European Site: Haisborough Hammond and Winterton SAC

Distance to Norfolk Boreas: 0km (cable route intersects the SAC)

up to 2mm are estimated as a result of cumulative effects of Norfolk Boreas cable installation and dredging at nearby aggregate sites. This level of effect has no potential to affect the SAC and therefore the only project screened in to the in-combination assessment is Norfolk Vanguard. As Norfolk Boreas and Norfolk Vanguard share an offshore cable corridor there is potential for in-combination effects associated with construction, operation and maintenance, and decommissioning of the projects. It is likely that installation of the Norfolk Boreas export cables will follow the Norfolk Vanguard export cables with no temporal overlap. There will be a minimum separation of 75m between cable pairs (as shown in Figure 11 of the Export Cable Installation Study, ES Appendix 5.2) and the maximum width of disturbance from pre-sweeping is 37m (section 7.3.3.2.1 of the Information to Support HRA report), therefore there would be no repeated disturbance of the same footprint during construction. The spatial footprint of installation works for both Norfolk Boreas and Norfolk Vanguard is likely to be double that of Norfolk Boreas alone as a worst case scenario, however the Sandwave study by ABPmer (Appendix 7.1 of the Information to Support HRA report) considered Norfolk Boreas and Norfolk Vanguard, and as discussed above, the study concluded that as the cable corridor is oriented in most cases transverse to the sand wave crests which require levelling, only a small width of each sand wave would be disturbed, with the sand wave continuing to evolve and migrate along most of its length. As a result, the overall form and function of any particular sand wave, or the SAC sandbank system as a whole, would not be disrupted by cable installation activities of Norfolk Boreas and Norfolk Vanguard. The cable corridor is in an active and highly dynamic environment, governed by current flow speeds, water depth and sediment supply, all of which are conducive for the development and maintenance of sandbanks. As a result, there would be no adverse effect on site integrity.

e) Due to the width available for micro-siting to avoid *S. spinulosa* reef where identified during pre-construction surveys, it is likely that no physical disturbance will occur in the offshore cable corridor. In the unlikely event of disturbance, *S. spinulosa* shows good recoverability to disturbance, depending on the degree of impact and local conditions. Due to the existing presence of *S. spinulosa* reef, local environmental conditions in the area are suitable for *S. spinulosa* growth and therefore recovery. Condition 9(1)(m) of Schedules 11 and 12 (the Transmission DMLs) of the DCO requires that the cable route through the HHW SAC, including any micro-siting must be agreed with the MMO in consultation with Natural England, through the HHW SAC SIP in accordance with the Outline HHW SAC SIP.

f) Any new substrata created by cable protection may provide a larger area of suitable *S. spinulosa* substrate than was previously present. Therefore, there is no adverse effect on the integrity of the SAC in relation to the conservation objectives for Annex I *S. spinulosa* reefs due to introduction of a new substrate during operation. As discussed in d) Norfolk Boreas Limited recognises that Natural England does not consider reef on artificial substrate (i.e. cable protection) to be Annex 1 reef, however Norfolk Boreas Limited maintains that any reef, regardless of what it is growing on, would have the same effect on biodiversity. The large area to be managed as reef which has been identified in relation to the DEFRA joint recommendation area is located on existing pipelines and Annex B of Natural England's Deadline 6 submission for Norfolk Vanguard's Examination, in relation to The Joint Nature Conservation Committee's and Natural England's advice to the MMO for protecting designated features in Haisborough Hammond and Winterton SCI/cSAC (document reference Rep6-032) states that "*Sabellaria spinulosa* reef extent is identified along the Baird Bacton pipeline, as in the HHW SAC SAD [Selection Assessment Document] and Regulation 35 package".

g) As part of the embedded mitigation, sediment would not be disposed of within 50m of *S. spinulosa* reef and therefore changes to the extent or structure of the reef due to increased suspended solids and smothering are not anticipated. The location(s) and methodology for disposal (i.e. release near the seabed or water surface) must be agreed with the MMO in consultation with Natural England before works can commence in accordance with the Outline HHW SAC (secured by Condition 9(1)(m) of Schedules 11 and 12 (the Transmission DMLs)) of the DCO.

Name of European Site: Haisborough Hammond and Winterton SAC

Distance to Norfolk Boreas: 0km (cable route intersects the SAC)

h) It is expected that the potential effects during decommissioning will be no worse than construction. The effect of leaving cable protection in situ is captured in the consideration of permanent impacts above.

2.5 Humber Estuary SAC

Name of European Site: Humber Estuary SAC

Distance to Norfolk Boreas 112km

Site Features	Adverse Effect on Integrity due to Norfolk Boreas																	
	Disturbance of seals foraging at sea			Disturbance at seal haul out sites			Vessel interaction (collision risk)			Changes in water quality			Changes in prey availability			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	N(a)	N(b)	N(a)	N(c)	N(c)	N(c)	N(d)	N(d)	N(d)	N(e)		N(e)	N(f)	N(f)	N(f)	N(g)	N(g)	N(g)

- a) The maximum potential area of disturbance is based on a 26km range for piling and Unexploded Ordnance (UXO). The Humber Estuary SAC is located 175km from Norfolk Boreas site and 112km from the offshore cable corridor (at its closest point). It is highly unlikely, especially taking into account the movements of tagged seals, that all grey seal in the offshore development area are from the Humber Estuary SAC. Therefore, there is no AEIOI of the Humber Estuary SAC in relation to the conservation objectives for grey seal.
- b) Current data suggests that there is no lasting disturbance or exclusion of grey seal around wind farm sites during operation. In addition, as stated above, it is highly unlikely that all grey seal in the offshore project area are from the Humber Estuary SAC, therefore there is no AEIOI of the Humber Estuary SAC in relation to the conservation objectives for grey seal.
- c) Whether during construction, operation or decommissioning phases of the project, when approaching the port, vessels would likely be within existing shipping routes and would be highly unlikely to be within 300m of the coast where seals are hauled out, therefore there would be no potential to directly disturb seals hauled out at sites such as Donna Nook in the Humber Estuary SAC. Therefore, it is concluded that there would be no AEIOI of the Humber Estuary SAC in relation to the conservation objectives for grey seal.
- d) Approximately 1,180 vessel movements are estimated over the two to four year indicative offshore construction window, an average of approximately two movements per day. Therefore, the increase in vessel movements during construction would be relatively small compared to existing vessel traffic. It is expected that seals would be able to detect the presence of vessels and, given that they are highly mobile, would be able to largely avoid vessel collision. Taking into account good practice, any increased collision risk is highly unlikely. Therefore, it is concluded that there would be no AEIOI of the Humber

Name of European Site: Humber Estuary SAC

Distance to Norfolk Boreas 112km

Estuary SAC in relation to the conservation objectives for grey seal.

- e) The risk of any changes to water quality as a result of any accidental release of contaminants (e.g. through spillage or vessel collision) is negligible and the re-suspension of contaminated sediment from construction activities is anticipated to be negligible. Any increase in suspended sediments as a result of construction activities, such as installation of foundations, cable installation and during any levelling or dredging activities, would be temporary and over a relatively small area, as the majority of the sediment released during seabed preparation would be coarse and would fall within seconds / minutes) to the seabed as a highly turbid dynamic plume immediately upon its discharge (within tens of metres along the axis of tidal flow). Therefore, any changes to water quality during construction or decommissioning is highly unlikely to have a significant, if any, impact on foraging grey seal. Therefore, it is concluded that there would be no adverse effect on the integrity of the SAC in relation to the conservation objectives for grey seal.
- f) The maximum (worst-case scenario) potential area of physical disturbance and/or temporary loss of habitat to fish during construction could be 15.4km² in total for the wind farm site and the total area of potential habitat loss during construction is estimated to be up to 23.31km². During operation, the worst-case total area of habitat loss has been estimated to be up to 11.75km² in total. The potential for effect on prey from any increased suspended sediment concentrations and sediment re-deposition would be low, with only a small proportion of fine sand and mud staying in suspension long enough to form a passive plume. Any increase in noise above background noise levels during operation is expected to be small and localised, therefore there would be no significant effect on fish species. EMFs are expected to attenuate rapidly in both horizontal and vertical plains with distance from the source. Therefore, there is no AEOI of the Humber Estuary SAC in relation to the conservation objectives for grey seal.
- g) Given the wide range of locations over the southern North Sea area used in the in-combination assessment, it is highly unlikely that the grey seal that could potentially be disturbed would all be from the Humber Estuary SAC. In addition, considering the distance between the projects offshore and their distance from the coast, it is not anticipated that foraging grey seal would be significantly displaced from foraging areas or moving between haul-out sites and foraging areas, therefore there is no AEOI of the Humber Estuary SAC in relation to the conservation objectives for grey seal.

2.6 Klaverbank SAC

Name of European Site: Klaverbank SAC															
Distance to Norfolk Boreas: 67km															
Site Features	Adverse Effect on Integrity due to Norfolk Boreas														
	Disturbance of seals foraging at sea			Vessel interactions			Indirect effects on prey			Changes in water quality			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	N(a)	N(a)	N(a)												
Harbour seal	N(a)	N(a)	N(a)												
<p>a) In total, piling at offshore windfarm projects, offshore windfarm construction activities and vessels, offshore windfarm operation and maintenance, including vessels, up to two UXO clearance operations, and up to two seismic surveys has a maximum total area of up to 19,440km², as a worst-case scenario. Disturbance from in-combination effects, including Norfolk Boreas, of underwater noise is unlikely to have any significant disturbance or barrier effects for foraging harbour and grey seal, especially taking into account the SIP proposed for harbour porpoise in the Southern North Sea SAC. Under these circumstances, there is no AEI of the Klaverbank SAC in relation to the conservation objectives for grey seal and harbour seal.</p>															

2.7 Noordzeekustzone SAC

Name of European Site: Noordzeekustzone SAC															
Distance to Norfolk Boreas: 94km															
Site Features	Adverse Effect on Integrity due to Norfolk Boreas														
	Disturbance of seals foraging at sea			Vessel interactions			Indirect effects on prey			Changes in water quality			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	N(a)	N(a)	N(a)												
<p>a) In total, piling at offshore windfarm projects, offshore windfarm construction activities and vessels, offshore windfarm operation and maintenance, including vessels, up to two UXO clearance operations, and up to two seismic surveys has a maximum total area of up to 19,440km², as a worst-case scenario. Disturbance from in-combination effects, including Norfolk Boreas, of underwater noise is unlikely to have any significant disturbance or barrier effects for foraging grey seal, especially taking into account the SIP proposed for harbour porpoise in the Southern North Sea SAC. Under these circumstances, there is no AEOI of the Noordzeekustzone SAC in relation to the conservation objectives for grey seal.</p>															

2.8 Norfolk Valley Fens SAC

Name of European Site: Norfolk Valley Fens SAC						
Distance to Norfolk Boreas 0.6 – 5km (5 sites within 5km)						
Site Features	Adverse Effect on Integrity due to Norfolk Boreas					
	Indirect effects on features present within ex-situ habitats of the SAC arising from air quality and groundwater / hydrology effects			In-combination		
	C	O	D	C	O	D
Alkaline fens	N (a)	N (a)	N (a)	N (b)	N (b)	N (b)
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i>	N (a)	N (a)	N (a)	N (b)	N (b)	N (b)
Calcareous fens <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>	N (a)	N (a)	N (a)	N (b)	N (b)	N (b)
European dry heaths	N (a)	N (a)	N (a)	N (b)	N (b)	N (b)
Molinia meadows on calcareous, peaty or clayey-silt-laden soils	N (a)	N (a)	N (a)	N (b)	N (b)	N (b)
Northern Atlantic wet heaths with <i>Erica tetralix</i>	N (a)	N (a)	N (a)	N (b)	N (b)	N (b)

a) Out of the five component SSSIs, only one (Booton Common) has a functional connection to the onshore project area. Under Scenario 2, where the onshore cable route crosses two tributaries of the Blackwater Drain, trenched crossing techniques are proposed. Following construction at these locations, reinstatement of the trench would be conducted to the pre-construction depth of the watercourse and the dams removed. As water flow would be maintained, and given the distance of these sites from Booton Common, effects from trenching works at these locations upon the Blackwater Drain will be minimal. Furthermore, given that Booton Common is predominantly groundwater-fed from the underlying Chalk aquifer and there will be no excavation into or within 7m depth of the Chalk aquifer during construction of the works, there will be no direct and indirect interaction between cable installation works for Norfolk Boreas and the groundwater supply mechanisms to Booton Common. Under Scenario 1, a haul road only is required within the catchment of the Blackwater Drain, so works are localised and fit within the design envelope for Scenario 2. As a result, there would be no AEOI for either Scenario 1 or Scenario 2.

Name of European Site: Norfolk Valley Fens SAC

Distance to Norfolk Boreas 0.6 – 5km (5 sites within 5km)

Under Scenarios 1 and 2, an air quality impact assessment in line with IAQM guidance (IAQM, 2014) has been conducted for Norfolk Boreas to understand the potential effects of dust and fine particle emissions. Booton Common is located approximately 1.4km south of the nearest access route for construction vehicles for the proposed project, and is located 600m from the onshore project area. As such, following IAQM guidance, it is considered to be outside the potential zone of influence of the project in terms of air quality emissions. As a result, there would be no AEOI for either Scenario 1 or Scenario 2.

- b) The in-combination assessment for the onshore elements of this assessment for potential for adverse effect upon site integrity has adopted the following principle: in order for Norfolk Boreas to be considered to have the potential to contribute to in-combination effects, there must be sufficient cause to consider that a relevant habitat or species is sensitive to effects due to the project itself. If a potential for adverse effect upon site integrity was not determined with respect to a site due to Norfolk Boreas, there is no real prospect of an in-combination effect occurring with another plan or project. Therefore, under Scenarios 1 and 2 as there is no effect from Norfolk Boreas alone, there is no potential for in-combination effects.

2.9 Outer Thames Estuary SPA

Name of European Site: Outer Thames Estuary SPA

Distance to Norfolk Vanguard Site: 40km

Site Features	Adverse Effect on Integrity due to Norfolk Vanguard								
	Collision mortality			Displacement/Disturbance			Barrier Effect		
	C	O	D	C	O	D	C	O	D
Nonbreeding red-throated divers	N/A	N/A	N/A	N/A	N (a)				

- a) Natural England consider that vessels transiting the Greater Wash SPA between the operations and maintenance port (the location of which is not yet confirmed) and the wind farm site could cause disturbance to red-throated divers. However, for other recent projects Natural England has stated that their concerns would be removed if best practice management measures were put in place to minimise such risks (see Norfolk Vanguard assessment). The Applicant will engage with Natural England to ensure that such measures will be included in the DCO. As a consequence, there will be no adverse effect on the integrity of the Greater Wash SPA due to operation and maintenance vessel traffic (5.03 HRA Norfolk Boreas, paragraph 355).

2.10 Paston Great Barn SAC

Name of European Site: Paston Great Barn SAC									
Distance to Norfolk Boreas 2.9km									
Site Features	Adverse Effect on Integrity due to proposed Norfolk Boreas project								
	Direct effects on barbastelle present in ex-situ habitats of the SAC (hedgerows / watercourses)			Indirect effects on barbastelle present within ex-situ habitats of the SAC (hedgerows / watercourses) arising from light and groundwater / hydrology effects			In-combination		
	C	O	D	C	O	D	C	O	D
Barbastelle bats	N (a)	N (a)	N (a)	N (b)	N (b)	N (b)	N (c)	N (c)	N (c)
<p>a) Under Scenario 2, hedgerows to be removed as part of pre-construction and construction works will be minimised by reducing the cable corridor working width at these locations to 13m (at perpendicular crossings with the cable) and a maximum of 16.5m (where the cable crosses at a diagonal). The hedgerow will be removed in advance of construction phase works at each important barbastelle feature, and the land will remain open during the construction phase works at each location (for approximately one week, with the exception of Dilham Canal and land east of Dilham Canal, where works will take place over up to eight weeks due to trenchless drilling techniques at this location). Hedgerows will be replanted following works at each location. To minimise the potential effect upon commuting and foraging barbastelle arising from this temporary loss of habitat, several mitigation measures will be implemented as set out in a Hedgerow Mitigation Plan to be agreed post-consent and Norfolk Boreas will seek to avoid mature trees within hedgerows through the micro-siting of individual cables where possible. Once replanted hedgerows have reached maturity (expected to be 3-7 years following planting on completion of construction), they will provide an improved commuting and foraging habitat for bats.</p> <p>Across the five important barbastelle habitat features potentially present within the onshore project area, a total of approximately 11ha of habitat used by barbastelles of the Paston Great Barn maternity colony is anticipated to be isolated by hedgerow removal during the project construction phase. This represents approximately 0.6% of the home range of the Paston Great Barn maternity colony.</p> <p>Following mitigation, these small-scale, temporary effects are not anticipated to result in any potential for adverse effect on site integrity upon the qualifying habitats and species of the Paston Great Barn SAC.</p> <p>Under Scenario 1, any hedgerow removal required within the onshore project area to facilitate construction of the Norfolk Boreas project will have been undertaken by the Norfolk Vanguard project. Approximately 20% of the running track originally installed to facilitate construction of Norfolk Vanguard is to remain in place to facilitate construction of Norfolk Boreas. This will include retention of a 6m gap in 20% of hedgerows along the route. These gaps will be reinstated following the same mitigation for Scenario 2. All UK bat species are considered able to traverse gaps of 10m or less, and retention of this 6m gap for</p>									

Name of European Site: Paston Great Barn SAC

Distance to Norfolk Boreas 2.9km

up to 2 years following completion of the Norfolk Vanguard project is not anticipated to result in any potential for adverse effect on site integrity upon the qualifying habitats and species of the Paston Great Barn SAC.

- b) Under Scenarios 1 and 2, the proposed works will involve ground excavation, and therefore will have a small, localised effect upon surface water flows. However, due to removal of hedgerows, commuting and foraging habitats will not be present in these locations during the construction phase, and therefore the habitat within this location will not be affected. Furthermore, a pre-construction drainage plan will also be developed and implemented to minimise water within the cable trench and ensure ongoing drainage of surrounding land. As a result, there would be no AEOI

Under Scenarios 1 and 2, construction phase lighting for cable duct installation and cable jointing will be used between 7am-7pm, only if required (i.e. in low light conditions). Lighting will not be used overnight, except at trenchless crossing locations (Scenario 2 only). In these instances, lighting may be needed for eight weeks at Dilham Canal and land east of Dilham Canal. Any lighting used will be directional i.e. angled downwards and a cowl provided for the light to minimise light spill. There will be no lighting required during the operational phase of Norfolk Boreas. As a result, there would be no AEOI.

- c) The in-combination assessment for the onshore elements of this assessment for potential for adverse effect upon site integrity has adopted the following principle: in order for Norfolk Boreas to be considered to have the potential to contribute to in-combination effects, there must be sufficient cause to consider that a relevant habitat or species is sensitive to effects due to the project itself. If a potential for adverse effect upon site integrity was not determined with respect to a site due to Norfolk Boreas, there is no real prospect of an in-combination effect occurring with another plan or project. Therefore, under Scenarios 1 and 2 as there is no effect from Norfolk Boreas alone, there is no potential for in-combination effects.

2.11 River Wensum SAC

Name of European Site: River Wensum SAC												
Distance to Norfolk Boreas 0km (onshore cable route intersects the SAC)												
Site Features	Adverse Effect on Integrity due to Norfolk Boreas											
	Direct effects within ex-situ habitats of the SAC			Indirect effects within the SAC arising from geology / contamination and groundwater / hydrology effects			Indirect effects within ex-situ habitats of the SAC arising from geology / contamination and groundwater / hydrology effects			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	N (a)	N (a)	N (a)	N (b)	N (b)	N (b)	N (b)	N (b)	N (b)	N (c)	N (c)	N (c)
Desmoulin's whorl snail	N (a)	N (a)	N (a)	N (b)	N (b)	N (b)	N (b)	N (b)	N (b)	N (c)	N (c)	N (c)
<p>a) Site features are not present within the drains and ditches of the floodplain habitats of the River Wensum or in the drains and ditches of the floodplain habitats of the River Wensum on the right-hand (southern) bank or left-hand (northern) bank of the river. Therefore, under Scenario 1 and 2 potential direct effects upon this habitat have been avoided at this location.</p> <p>b) There are no springs or seepages located within the floodplain habitats on the right-hand bank or left-hand bank of the River Wensum. As such, Under Scenario 2 works in this area will not result in direct changes to any springs directly connected to the River Wensum. Introduction of cable ducts is not anticipated to have any effect upon groundwater flows for the River Wensum. Furthermore, for a river crossing, trenchless crossing ducts would be installed 5-15m below the floodplain, and at least 2m below the river bed. As a result, the buried ducts will have no effect upon surface water flows and no adverse effect on integrity. Under Scenario 2, mitigation measures will be put in place to minimise the risk of sediment or pollutant release into the watercourses which are functionally connected to the River Wensum. These are considered suitable for minimising the risk of sediment / pollutant release (including bentonite breakout) into watercourses functionally connected with the River Wensum to a negligible level, such that there will be no adverse effect on integrity.</p> <p>Under Scenario 1, a small area of 6m wide running track will be required within other areas of the River Wensum catchment. The mitigation measures in place for Scenario 2 will also be applied under Scenario 1.</p>												

Name of European Site: River Wensum SAC

Distance to Norfolk Boreas 0km (onshore cable route intersects the SAC)

- c) The in-combination assessment for the onshore elements of the assessment for potential for adverse effect upon site integrity has adopted the following principle: in order for Norfolk Boreas to be considered to have the potential to contribute to in-combination effects, there must be sufficient cause to consider that a relevant habitat or species is sensitive to effects due to the project alone. If a potential for adverse effect upon site integrity is not determined with respect to a site due to Norfolk Boreas alone, there is no real prospect of an in-combination effect occurring with another plan or project. Therefore, under Scenarios 1 and 2 as there is no effect from Norfolk Boreas alone, there is no potential for in-combination effects.

2.12 Southern North Sea SAC

Name of European Site: Southern North Sea SAC

Distance to Norfolk Boreas 0km (the site is within the Southern North Sea SAC)

Site Features	Adverse Effect on Integrity due to Norfolk Boreas																	
	Disturbance from underwater noise			Disturbance from vessels			Collision risk			Changes to prey resource			Changes to water quality			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	N (a)	N (b)	N (c)	N (d)	N (b, d)	N (c, d)	N (e)	N (b)	N (c, e)	N (f)	N (b, f)	N (c, f)	N (g)	N/A	N (c, g)	N (h)	N (i)	N (c, h)

a) Noise disturbance during piling and other construction activities is anticipated to be low, with a worst-case scenario of up to 2.2% overlap with the Southern North Sea (SNS) SAC winter area or up to 9.0% overlap with the summer SNS SAC area and a 1.3% seasonal average for the summer or winter areas. Therefore, temporary disturbance of harbour porpoise would be less than thresholds recommended by the Joint Nature Conservation Committee (JNCC) and Natural England of 20% of the seasonal component of the SAC area at any one time and less than 10% of the average seasonal component of the SAC area over the duration of that season.

b) Operational and maintenance impacts are likely to be highly localised around the project infrastructure, and any maintenance impacts would be intermittent and temporary, therefore no AEOI would occur.

c) It expected that the activity levels and potential effects during decommissioning will be no worse than construction (with no pile driving).

d) The Norfolk Boreas offshore project area (1,178km²) is approximately 4% of the summer SNS SAC area 1.31% of the winter SAC area. It is unlikely that vessels would cause disturbance from the whole project areas and therefore this provides a conservative assessment. Disturbance from vessels is likely to be localised to areas of activity, thus there would be no exceedance of the 20% seasonal component at any one time or 10% of the average seasonal component thresholds and therefore there will be no AEOI.

Name of European Site: Southern North Sea SAC

Distance to Norfolk Boreas 0km (the site is within the Southern North Sea SAC)

- e) Approximately 1,180 vessel movements are estimated over the two to four year indicative offshore construction window, an average of approximately two vessel movements per day. Therefore, the increase in vessel movements during construction would be relatively small compared to existing vessel traffic. It is expected that harbour porpoise would be able to detect the presence of vessels and, given that they are highly mobile, would be able to largely avoid vessel collision, therefore there would be no AEOI.
- f) Potential effects on fish species include physical disturbance, loss or changes of habitat, increased suspended sediment concentrations, and underwater noise. It is anticipated that as a worst-case scenario effects from the Norfolk Boreas offshore project area (1,178km²) would impact approximately 4% of the SNS SAC area, and 1.31% of the winter SAC area. However, it is more likely that effects would be restricted to an area around the working sites, therefore there will be no AEOI.
- g) The Norfolk Boreas offshore project area (1,178km²) would impact approximately 4% of the SNS SAC area, and 1.31% of the winter SAC area. It is highly unlikely that any changes in water quality (suspended sediment) could occur over the entire offshore development area during construction therefore this is a highly conservative assessment. It is more likely that effects would be restricted to an area around the working sites, therefore there would be no exceedance of the 20% seasonal component at any one time or 10% of the average seasonal component thresholds and therefore there will be no AEOI.
- h) It is anticipated that through the Site Integrity Plan (SIP), impacts of underwater noise from construction and decommissioning will be mitigated. The SIP will set out the approach for Norfolk Boreas Limited to deliver any project mitigation or management measures in relation to the SNS SAC in agreement with the Marine Management Organisation (MMO) and relevant Statutory Nature Conservation Bodies (SNCBs) to an extent whereby no AEOI is expected.
- (i) Current data suggests that there is no lasting disturbance or exclusion of harbour porpoise around wind farm sites during operation and therefore there would be no AEOI.

2.13 The Broads SAC

Name of European Site: The Broads SAC												
Distance to Norfolk Boreas 3.6km												
Site Features	Adverse Effect on Integrity due to proposed Norfolk Boreas project											
	Direct effects upon ex-situ habitats which may support the qualifying feature otter, due to suitable ex-situ habitats for this feature being present			Indirect effects upon habitats and species within the SAC boundary arising from changes in local groundwater / hydrology conditions			Indirect effects upon ex-situ habitats which may support the qualifying feature otter, arising from changes in groundwater / hydrology conditions			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara spp.</i>				N (a)						N (a)		
Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation				N (a)						N (c)		
Transition mires and quaking bogs				N (a)						N (c)		
Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [Priority feature]				N (a)						N (c)		
Alkaline fens				N (a)						N (c)		

Name of European Site: The Broads SAC

Distance to Norfolk Boreas 3.6km

Site Features	Adverse Effect on Integrity due to proposed Norfolk Boreas project														
	Direct effects upon ex-situ habitats which may support the qualifying feature otter, due to suitable ex-situ habitats for this feature being present			Indirect effects upon habitats and species within the SAC boundary arising from changes in local groundwater / hydrology conditions			Indirect effects upon ex-situ habitats which may support the qualifying feature otter, arising from changes in groundwater / hydrology conditions			In-combination					
	C	O	D	C	O	D	C	O	D	C	O	D			
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [Priority feature]				N (a)									N (c)		
<i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>)				N (a)									N (c)		
Desmoulin's whorl snail				N (a)									N (c)		
Fen orchid				N (a)									N (c)		
Ramshorn snail				N (a)									N (c)		
Otter	N (b)	N (b)	N (b)				N (b)	N (b)	N (b)	N (c)	N (c)	N (c)			

a) As part of the project's embedded mitigation, under Scenario 2 the North Walsham and Dilham Canal will be crossed using a trenchless crossing technique (e.g. HDD). This means that the North Walsham and Dilham Canal will be avoided, and no works will take place within this watercourse. The East Ruston Stream is

Name of European Site: The Broads SAC

Distance to Norfolk Boreas 3.6km

Site Features	Adverse Effect on Integrity due to proposed Norfolk Boreas project											
	Direct effects upon ex-situ habitats which may support the qualifying feature otter, due to suitable ex-situ habitats for this feature being present			Indirect effects upon habitats and species within the SAC boundary arising from changes in local groundwater / hydrology conditions			Indirect effects upon ex-situ habitats which may support the qualifying feature otter, arising from changes in groundwater / hydrology conditions			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
	<p>proposed to be crossed using a trenching methodology, however, given the distance to The Broads SAC (4.6km), the risk of groundwater pollution of The Broads SAC is low. Good practice pollution prevention measures will also be employed. For watercourses which are shallower than 1.5m, temporary damming and diverting of the watercourse may be employed during trenching works. The suitability of this method would be advised at detailed design. Several mitigation measures will be employed, and the trench would be reinstated to the pre-construction depth of the watercourse. Where culverts may be required, additional mitigation measures will be employed. Under Scenario 1, works to install ducts will have already taken place as part of the Norfolk Vanguard project, and only joint pits and a 6m wide haul road will be required within the North Walsham and Dilham Canal and Hundred Stream catchments, so works are localised and fit within the design envelope for Scenario 2. As a result, there would be no AEIOI.</p> <p>b) A review of the desk-based records obtained from Norfolk Biodiversity Information Service (NBIS) in July 2016 indicates that there are no records of otter on the Hundred Stream. There is one record of an otter spraint on the North Walsham and Dilham Canal, recorded in 2015 and located at TG28863183. This is located approximately 700m upstream of the onshore project area. The absence of records of otter on the Hundred Stream is not conclusive proof of the absence of this species from the watercourse. However, water depths are likely to be too shallow to form part of an otter's home range, especially given the superior habitat available downstream on other parts of the river network connected to The Broads SAC. In light of this it is considered unlikely that otter are present within the reaches of the Hundred Stream in which the onshore project area is located.</p> <p>It is considered that otters may be commuting along the North Walsham and Dilham Canal within the onshore project area, but that they are not resting or making other use of bankside habitat in these locations. Under Scenario 2, as part of the project's embedded mitigation, the North Walsham and Dilham Canal will be crossed using a trenchless crossing technique (e.g. HDD), to minimise impacts to the watercourse at this location. This means that the North Walsham and Dilham Canal and its immediate bankside habitat will be avoided, and no works will take place within these habitats. As a precaution, while works are taking place within 100m of North Walsham and Dilham Canal, all excavations will be either covered overnight or left with escape ramps to allow otters to escape if they enter, and all vehicles wheels / tracks will be checked in the morning for the presence of sleeping otter. Under Scenario 1, no works are taking place within 100m of the North Walsham and Dilham Canal and no impact pathway is present. As a result, there would be no AEIOI for either Scenario 1 or Scenario 2.</p> <p>c) Assessment for the onshore elements of the assessment for potential for adverse effect upon site integrity has adopted the following principle: in order for Norfolk Boreas to be considered to have the potential to contribute to in-combination effects, there must be sufficient cause to consider that a relevant habitat</p>											

Name of European Site: The Broads SAC

Distance to Norfolk Boreas 3.6km

Site Features	Adverse Effect on Integrity due to proposed Norfolk Boreas project											
	Direct effects upon ex-situ habitats which may support the qualifying feature otter, due to suitable ex-situ habitats for this feature being present			Indirect effects upon habitats and species within the SAC boundary arising from changes in local groundwater / hydrology conditions			Indirect effects upon ex-situ habitats which may support the qualifying feature otter, arising from changes in groundwater / hydrology conditions			In-combination		
	C	O	D	C	O	D	C	O	D	C	O	D
<p>or species is sensitive to effects due to the project alone. If a potential for adverse effect upon site integrity is not determined with respect to a site due to Norfolk Boreas alone, there is no real prospect of an in-combination effect occurring with another plan or project. Therefore, under Scenarios 1 and 2 as there is no effect from Norfolk Boreas alone, there is no potential for in-combination effects.</p>												

2.14 The Wash and North Norfolk Coast SAC

Name of European Site: The Wash and North Norfolk Coast SAC																		
Distance to Norfolk Boreas 33km																		
Site Features	Adverse Effect on Integrity due to Norfolk Boreas																	
	Disturbance of seals foraging at sea			Disturbance at seal haul out sites			Vessel interaction (collision risk)			Changes in water quality			Changes in prey availability			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	N(a)	N(b)	N(a)	N(c)	N(c)	N(c)	N(d)	N(d)	N(d)	N(e)		N(e)	N(f)	N(f)	N(f)	N(g)	N(g)	N(g)
Harbour seal	N(a)	N(b)	N(a)	N(c)	N(c)	N(c)	N(d)	N(d)	N(d)	N(e)		N(e)	N(f)	N(f)	N(f)	N(g)	N(g)	N(g)

a) The maximum potential area of disturbance is based on a 26km range for piling and Unexploded Ordnance (UXO). The Wash and North Norfolk Coast SAC is located 110km from Norfolk Boreas site and 33km from the offshore cable corridor (at its closest point). It is highly unlikely, especially taking into account the movements of tagged seals, that all grey and harbour seal in the offshore development area are from The Wash and North Norfolk Coast SAC. Therefore, there is no AEOI of The Wash and North Norfolk Coast in relation to the conservation objectives for grey seal or harbour seal.

b) Current data suggests that there is no lasting disturbance or exclusion of grey or harbour seal around wind farm sites during operation. In addition, as stated above, it is highly unlikely that all grey seal and harbour seal in the offshore project area are from The Wash and North Norfolk Coast, therefore there is no AEOI of The Wash and North Norfolk Coast in relation to the conservation objectives for grey seal or harbour seal.

c) Whether during construction, operation or decommissioning phases of the project, when approaching the port, vessels would likely be within existing shipping routes and would be highly unlikely to be within 300m of the coast where seals are hauled out, therefore there would be no potential to directly disturb seals hauled out at sites such as in The Wash and North Norfolk Coast. Therefore, it is concluded that there would be no AEOI of The Wash and North Norfolk Coast in relation to the conservation objectives for grey seal or harbour seal.

d) Approximately 1,180 vessel movements are estimated over the two to four year indicative offshore construction window, an average of approximately two movements per day. Therefore, the increase in vessel movements during construction would be relatively small compared to existing vessel traffic. It is expected that seals would be able to detect the presence of vessels and, given that they are highly mobile, would be able to largely avoid vessel collision. Taking into account good practice, any increased collision risk is highly unlikely. Therefore, it is concluded that there would be no AEOI of The Wash and North Norfolk Coast in relation to the conservation objectives for grey seal or harbour seal.

e) The risk of any changes to water quality as a result of any accidental release of contaminants (e.g. through spillage or vessel collision) is negligible and the re-suspension of contaminated sediment from construction activities is anticipated to be negligible. Any increase in suspended sediments as a result of construction activities, such as installation of foundations, cable installation and during any levelling or dredging activities, would be temporary and over a relatively small area, as the majority of the sediment released during seabed preparation would be coarse and would fall within seconds / minutes) to the

Name of European Site: The Wash and North Norfolk Coast SAC

Distance to Norfolk Boreas 33km

Site Features	Adverse Effect on Integrity due to Norfolk Boreas																	
	Disturbance of seals foraging at sea			Disturbance at seal haul out sites			Vessel interaction (collision risk)			Changes in water quality			Changes in prey availability			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
	<p>seabed as a highly turbid dynamic plume immediately upon its discharge (within tens of metres along the axis of tidal flow). Therefore, any changes to water quality during construction or decommissioning is highly unlikely to have a significant, if any, impact on foraging grey seal or harbour seal. Therefore, it is concluded that there would be no adverse effect on the integrity of the SAC in relation to the conservation objectives for grey seal or harbour seal.</p> <p>f) The maximum (worst-case scenario) potential area of physical disturbance and/or temporary loss of habitat to fish during construction could be 15.4km² in total for the wind farm site and the total area of potential habitat loss during construction is estimated to be up to 23.31km². During operation, the worst-case total area of habitat loss has been estimated to be up to 11.75km² in total. The potential for effect on prey from any increased suspended sediment concentrations and sediment re-deposition would be low, with only a small proportion of fine sand and mud staying in suspension long enough to form a passive plume. Any increase in noise above background noise levels during operation is expected to be small and localised, therefore there would be no significant effect on fish species. EMFs are expected to attenuate rapidly in both horizontal and vertical plains with distance from the source. Therefore, there is no AEOI of The Wash and North Norfolk Coast in relation to the conservation objectives for grey seal or harbour seal.</p> <p>g) Given the wide range of locations over the southern North Sea area used in the in-combination assessment, it is highly unlikely that the grey seal or harbour seal that could potentially be disturbed would all be from The Wash and North Norfolk Coast. In addition, considering the distance between the projects offshore and their distance from the coast, it is not anticipated that foraging grey seal or harbour seal would be significantly displaced from foraging areas or moving between haul-out sites and foraging areas. Therefore there is no AEOI of The Wash and North Norfolk Coast in relation to the conservation objectives for grey seal or harbour seal.</p>																	

2.15 Winterton-Horsey Dunes SAC

Name of European Site: Winterton-Horsey Dunes SAC																			
Distance to Norfolk Boreas 3km																			
Site Features	Adverse Effect on Integrity due to Norfolk Boreas																		
	Disturbance of seals in the cable corridor			Disturbance at seal haul out sites			Vessel interaction (collision risk)			Changes in water quality			Changes in prey availability			In-combination effects			
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	
Grey seal	N(a)	N(a)	N(a)	N(b)	N(b)	N(b)	N(c)	N(c)	N(c)	N(d)	N/A	N(d)	N(e)	N(e)	N(e)	N(f)	N(f)	N(f)	
<p>a) The landfall at Happisburgh South is approximately 9km from the Horsey seal haul-out site to the south of the landfall search area. Given the distances between the Norfolk Boreas landfall area and the nearest known seal haul-out site, there is no potential for any direct disturbance as a result of activities at the landfall site. There would be no potential for any significant effects on seals from the site. In addition, taking into account the movements of grey seal along the coast, it is unlikely that all grey seal in the offshore cable corridor area are all from the Winterton-Horsey Dunes SAC. There would be no direct effect or overlap with the Winterton-Horsey Dunes SAC area. Therefore, it is concluded that there would be no AEOI of the Winterton-Horsey Dunes SAC in relation to the conservation objectives for grey seal.</p> <p>b) Whether during construction, operation or decommissioning phases of the project, when approaching the port, vessels would likely be within existing shipping routes and would be highly unlikely to be within 300m of the coast where seals are hauled out, therefore there would be no potential to directly disturb seal haul out at sites such as Horsey in the Winterton-Horsey Dunes SAC. Therefore, it is concluded that there would be no AEOI of the Winterton-Horsey Dunes SAC in relation to the conservation objectives for grey seal.</p> <p>c) Approximately 1,180 vessel movements are estimated over the two to four year indicative offshore construction window, an average of approximately two movements per day. Therefore, the increase in vessel movements during construction would be relatively small compared to existing vessel traffic. The operational base port for the project is likely to either Great Yarmouth or Lowestoft. It is assumed that 1-2 vessel movement will be required daily during the operational phase of the project. Therefore, it is unlikely that O&M vessels would be in the vicinity of the Winterton-Horsey Dunes SAC for normal operational duties. It is expected that seals would be able to detect the presence of vessels and, given that they are highly mobile, would be able to largely avoid vessel collision. Taking into account good practice, any increased collision risk is highly unlikely. Therefore, it is concluded that there would be no AEOI of the Winterton-Horsey Dunes SAC in relation to the conservation objectives for grey seal.</p> <p>d) The risk of any changes to water quality as a result of any accidental release of contaminants (e.g. through spillage or vessel collision) is negligible and the re-suspension of contaminated sediment from construction activities is anticipated to be negligible. Any increase in suspended sediments as a result of construction activities, such as installation of foundations, cable installation and during any levelling or dredging activities, would be temporary and over a relatively small area, as the majority of the sediment released during seabed preparation would be coarse and would fall within seconds / minutes) to the seabed as a highly turbid dynamic plume immediately upon its discharge (within tens of metres along the axis of tidal flow). Therefore, any changes to water</p>																			

Name of European Site: Winterton-Horsey Dunes SAC

Distance to Norfolk Boreas 3km

Site Features	Adverse Effect on Integrity due to Norfolk Boreas																	
	Disturbance of seals in the cable corridor			Disturbance at seal haul out sites			Vessel interaction (collision risk)			Changes in water quality			Changes in prey availability			In-combination effects		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
<p>quality during construction or decommissioning is highly unlikely to have a significant, if any, impact on grey seal. Therefore, it is concluded that there would be no adverse effect on the integrity of the SAC in relation to the conservation objectives for grey seal.</p> <p>e) It is highly unlikely that any changes in prey resources could occur over the entire cable corridor area during construction or operation. It is more likely that effects would be restricted to an area around the working sites. Therefore, there is no AEOI of the Winterton-Horsey Dunes SAC in relation to the conservation objectives for grey seal.</p> <p>f) There are currently no known or anticipated further activities, other than current baseline levels of vessel activity in the offshore cable corridor area, therefore there are no further in-combination effects for grey seal in this area. Therefore, it is concluded that there would be no AEOI of the Winterton-Horsey Dunes SAC in relation to the conservation objectives for grey seal.</p>																		