From:	Taylor, Jessica
To:	Norfolk Vanguard
Subject:	RE: EN010079 Norfolk Vanguard Natural England Deadline 4 Submission (Ref: 273178)
Date:	13 March 2019 19:12:15
Attachments:	EN010079 273178 Norfolk Vanguard Natural England responses to second round of ExA Qus.pdf EN010079 273178 Norfolk Vanguard Natural England comments on The Wildlife Trust Deadline 3 submission_Final.pdf EN010079 273178 Norfolk Vanguard Natural England comms on Migrant non-seabird CRM_Final.pdf EN010079 273178 Norfolk Vanguard Natural England comments on Applicant response to WRs provided at Deadline 2_Final.pdf EN010079 273178 Norfolk Vanguard Natural England Comments on Applicant"s response to our response to ExA Q_Final.pdf EN010079 273178 Norfolk Vanguard Natural England comments Applicant"s response to Annex C Benthic of WRs.pdf EN010079 273178 Norfolk Vanguard Natural England comments on other outstanding documents_Final.pdf EN010079 273178 Norfolk Vanguard Natural England"s Generic Cable Protection Advice Note.pdf EN010079 273178 Norfolk Vanguard Natural England"s Generic Sabellaria Spinulosa Advice Note.pdf EN010079 273178 Norfolk Vanguard Natural England"s Generic small scale loss Advice Note - Copy.pdf

Dear Sirs,

Please find attached Natural England's submissions at Deadline 4 in relation to the Norfolk Vanguard Offshore windfarm Application, including:

- Natural England's response to the second set of Examiners questions;
- Comments on The Wildlife Trust's Deadline 3 submission [REP3-063];
- Comments on the Applicant's Migrant non-seabird Collision Risk Modelling [REP3-038];
- Comments on the Applicant's comments on Written Representations [REP2-003];
- Comments on the Applicant's responses to the ExA's Written Questions [REP-004];
- Comments on the Applicant's comments on Natural England's Written Representation – Annex C [REP2-031].
- Comments on all other outstanding documents that have been submitted by the Applicant up to Deadline 3 and are relevant to Natural England including:
    - REP2-016, REP2-026, REP2-027, REP2-028, REP3-010, REP3-011 to REP3-022, REP3-032, REP3-033 & REP3-034, REP3-036, REP3-037, REP3-038.

Natural England can now confirm that they are up-to-date with review of all documents submitted as part of this application up to Deadline 3.

In addition, Natural England have also submitted three advice notes regarding:

- Generic position on Cable protection;
- Statutory Nature Conservation Bodies (SNCB's) generic advice in relation to colonisation of Sabellaria spinulosa reef on artificial substrate being considered as Annex I reef and contributing to the favourable condition status as reef; and
- Advice note regarding consideration of small scale habitat loss within Special Areas of Conservation (SACs) in relation to cable protection.

Please also accept this email as notification that Natural England **will** be making oral representations at the up and coming Issue Specific Hearings on 27th and 28th March. However, Natural England would request that a clear agenda and list of questions is provided ahead of these hearings to allow all interested parties sufficient time to prepare and to ensure that best use is made of the limited time.

Best wishes,
Jessica

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We are here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

In an effort to reduce Natural England's carbon footprint, I will, wherever possible, avoid travelling to meetings and attend via audio, video or web conferencing.

THE PLANNING ACT 2008

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NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Schedule of Natural England‘s responses to Examining Authority‘s second round of written questions.

13 March 2019

The table below presents Natural England's responses to the second round of the Examining Authority's Written Questions. We have omitted the questions that were not directed at Natural England from this document.

Question Number	Question to	Question	Natural England Comments
1.	**General**		
1.7	NE, RSPB, MMO, TWT, WDC	Are you satisfied that long-term ecological monitoring during the operational phase of the project is adequately secured in the dDCO?	There is an In Principle Monitoring Plan that includes monitoring post construction. This is secured in the DCO/DML and in line with all other OWF NSIPs
3.	**Ecology offshore - ornithology**		
4.9	Applicant, NE, MMO, TWT, WDC	At the offshore environmental matters Issue Specific Hearing 2 (ISH2) [EV-009 and EV-010] the Applicant stated that other offshore construction techniques, such as vibration or downward impulses, were being considered. At present Condition 14(f) of Schedules 9 and 10 and Condition 9(f) of Schedules 11 and 12 of the dDCO only requires the submission of a Marine Mammal Mitigation Protocol (MMMP) in the event that driven or part-driven piles are proposed to be used. Furthermore, Conditions 14(m) of Schedules 9 and 10 and 9(l) of Schedules 11 and 12 contain similar wording in relation to the submission of a Site Integrity Plan (SIP). In the event that the Applicant proposed to utilise any other construction techniques, instead of driven or part-driven piling, do you consider that a MMMP and SIP should still be submitted? Please justify your answer.	Natural England consider a MMMP and SIP should still be submitted in order to mitigate the injurious impacts of any additional noise introduced into the marine environment from construction and to ensure there is no adverse effect on integrity on the SNS SCI. We would welcome the opportunity to work with the Applicant to ensure the mitigation secured in the MMMP is appropriate for the construction method being used.
4.11	Applicant, MMO, NE, WDC, TWT	A maximum hammer energy of 5,000kJ has now been specified in condition 14(1)(n) of Schedules 9 and 10 of the dDCO [REP2-017]. However, please comment on whether or not there would be any benefits in having a range of maximum hammer energies being specified in the dDCO, for example the 2,700kJ figure that relates to the worst-case scenario for a 9MW pin pile structure?	Natural England is satisfied with the inclusion of 5,000kJ as the maximum hammer energy.

Question Number	Question to	Question	Natural England Comments
5.	**Ecology offshore – other**		
5.24	NE	Further to the Applicant's response to ExQ1 5.12 [REP1-007] and your Statement of Common Ground [REP1-049] please justify why you consider that cable repairs should not be allowed for in the dDCO providing that such repairs would fall within the maximum parameters that have been assessed in the ES.	Natural England would welcome the inclusion of cable repairs within the DCO/DML. However, the parameters and impacts of such repairs need to be fully assessed and appropriately secured. Natural England's main concerns relate to impacts to Haisborough Hammond and Winterton (HHW) SAC and not the inter array cables.
5.26	Applicant, NE	In Annex C of its WR [REP1-088] Natural England advises that a preconstruction sandwave levelling report and assessment is required. Do you consider that this is adequately secured in the dDCO, for example in the wording of Condition 13 of Schedules 11 and 12? If not, then suggest additional wording that you consider should be included.	For clarification, the requested report and assessment should be informed by pre construction survey data, but the report should set out the exact/finalised methodologies along the section of the Export cable route within HHW SAC and review the potential impacts to the features to ensure they are within the parameters of those assessed by the SoS Appropriate Assessment (AA). If not then a further AA by the MMO will be required.
16.	**Geology, ground conditions, drainage, pollution and flood risk**		
16.31	Applicant	In the event that cables were to become exposed due to coastal erosion what mitigation or remediation measures may be required? How would this be monitored?	Natural England would welcome a condition that secures the provision of a

Question Number	Question to	Question	Natural England Comments
		Paragraph 5.510 of (EN-1) seeks to ensure that proposed developments will be resilient to coastal erosion and deposition, taking account of climate change, during the project's operational life and any decommissioning period. How has the resilience to costal erosion during the decommissioning period been addressed?	report to LPA, EA, and MMO plus their advisers CEFAS and the relevant SNCB.
16.34	Applicant, EA	Please provide an update on your discussions regarding the storage of spoil within the floodplain	The clarification note regarding sediment management received on 27 February 2019 includes confirmation that topsoil and turf will be stored outside the flood plain.
20.	**Content of the draft DCO (dDCO)**		
20.147	NE	Please supply wording as to the requested changes to Schedule 1, Part 1	Natural England will work with the MMO to consider this further. One example would be the MMO's condition applied to aggregates industry which specifies that the removed sediment particle size needs to be >95% similar to the disposal location. The scale of impacts to HHW SAC including volume, lengths and areas need to be more explicit in the DCO/DML
23.	**Habitats Regulations Assessment**		
23.66	NE and RSPB	Can you confirm whether the use of mean density values is advocated in any particular guidance?	A worked example for the Band (2012) model is available online[1]. In this the example uses boat-based survey data

[1]Using a collision risk model to assess bird collision risks for offshore wind farms – with extended method: Worked example. Available from: https://www.bto.org/sites/default/files/u28/downloads/Projects/Final_Report_SOSS02_Band4WorkedExample.pdf

Question Number	Question to	Question	Natural England Comments
			for an offshore wind farm (OWF), where two years of surveys were undertaken with two survey per month. The example shows that for each month a mean and standard deviation are calculated from all surveys undertaken within that month (and across both years of survey). The collision risk model evaluates risk on a month by month basis across the year in order to reflect changing bird abundance within and utilisation of the area. Therefore, it has become standard practice to use the mean monthly densities of birds in flight with the Band/deterministic collision risk model – e.g. mean bird densities were used in the CRM assessments for East Anglia 3 and mean densities were also used by the Vanguard Applicant in their PEIR. With regard to the MSS stochastic model, the user guide[2] for this states there are

[2] Stochastic collision risk model – User Guide. Available from: https://www2.gov.scot/Topics/marine/marineenergy/mre/current/StochasticCRM/userguide

Question Number	Question to	Question	Natural England Comments
			3 options are provided for the bird densities through time (monthly): 1. The first, referred to the "truncated Normal" mirrors that of Masden's original code, but with the upper bound of the truncated Normal distribution removed (previously it was upper-bounded at 2). Data is entered as monthly means and standard deviations. A recommendation from the review in Trinder (2017) was this be removed. Simple means and standard deviations are required for each month. 2. The second option is by providing reference points (max, min and selected percentiles) for the user's distribution of mean density. A template can be downloaded with this option that provides a CSV file to be filled. The file is then uploaded for analysis. The third option is by providing 1000 samples from the user's distribution of mean density. A template can be downloaded

Question Number	Question to	Question	Natural England Comments
			with this option that provides a CSV file to be filled. The file is then uploaded for analysis. Undertaking Collision Risk Modelling using standard approaches and parameters has the significant benefit of allowing cumulative impact assessments (including within Appropriate Assessments) to be carried out by decision-makers in a way that robustly quantifies the relative contributions of different projects to the overall impact. Presenting outputs from alternative methodologies does not allow this to be done, hence Natural England's emphasis on ensuring standard methodologies are used wherever appropriate.
23.67	NE and RSPB	Can you comment on whether AEOI could be ruled out for collision risk for any features of the European sites currently under discussion, should the ExA be minded to agree to the use of median values?	Please see Natural England's comments in REP3-051 regarding our advice on the use of median densities and the use of the Applicant's stochastic model in the CRM. Natural England's position regarding the use of the median densities will not change and we advise that the mean densities and the

Question Number	Question to	Question	Natural England Comments
			deterministic/Band model is the appropriate approach. With regard to designated sites, we have not received anything further from the Applicant and therefore apart from the issues with the CRM figures, issues still remain regarding apportionment rates, offshore wind farm figures that have not been included for relevant other offshore wind farms (e.g. Kincardine, Hywind and Moray West). However, we are aware that the Applicant is proposing to provide updated information around these issues and revised CRM figures for the designated sites and so Natural England will respond accordingly once this information has been received and reviewed.
23.68	NE	In relation to the Hornsea Project Three data, the Applicant can only base its in-combination assessment on the information available to it. Therefore, please can you comment on the in-combination assessments on this basis. Are you able to provide any indication of how the relevant figures for Hornsea Project Three could change and affect the incombination assessment?	At this time Natural England is still working with the Hornsea Project Three Applicant to understand the assessments and consider the impacts from that project alone and cumulatively/in-combination and therefore, at this stage we cannot verify what figures should or should not be used

Question Number	Question to	Question	Natural England Comments
			for this project in cumulative or in-combination assessments. However, it should be noted that Natural England has fundamental concerns with the baseline data for Hornsea Project Three and therefore, there will be significant challenges associated with taking forward cumulative and in-combination assessments. In a call between Natural England and the Vanguard Applicant on 8 March 2019, it was agreed that the Vanguard Applicant would review Natural England's advice on Hornsea Project Three that is to be submitted on the 14th March 2019.
23.69	NE	Further to the ExQ1 3.16, please assess and comment on any areas of disagreement regarding the Applicant's Deadline 3 submission 'Migrant non-seabird Collision Risk Modelling' [REP3-038].	Please see our full response on Migrant Non-seabird Collision Risk Modelling, also provided at Deadline 4, for our response to REP3-038
23.73	NE	Do you have any further comments regarding collision risk mortality to herring gull from the Alde-Ore Estuary SPA?	Herring gull is not a qualifying feature of the Alde-Ore Estuary SPA, therefore we do not have any further comments regarding collision risk mortality of this species at this site.

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23.77	NE	Please confirm whether your concerns regarding operational displacement of auks at FFC SPA are in respect of the project alone or in-combination with other plans or projects.	Our concerns regarding operational displacement of auks at the FFC SPA are with respect to in-combination.
23.79	NE	Can you please explain whether, using the figures you have calculated with apportionment rates of 4.8% for autumn and 6.5% for spring, you consider there to be an AEOI to gannets of the FFC SPA during the nonbreeding season? Please provide further justification for the use of these apportionment rates.	As highlighted in our Relevant Representations (RR-106), for the apportionment of impacts of species to relevant SPA colonies during the non-breeding seasons, Natural England recommend that the data presented in the tables in Appendix A of Furness (2015) for the relevant species Biologically Defined Minimum Population Scales (BDMPSs) for each season (e.g. migration, winter etc.) are used. We would advise that the proportion the relevant colony figure represents of the total number of birds of all ages in the relevant BDMPS in the season in question is used as the apportionment figure. We do not recommend that the colony figures presented in the tables in Appendix A for the SPA colony in question are updated with more recent figures, unless there is evidence to suggest that the colony in question has increased or

Question Number	Question to	Question	Natural England Comments
			decreased relative to other colonies. Whether the colony figure in the BDMPS tables used is the adult figure or that for all ages depends on any Population Viability Analysis (PVA) model and outputs to be used. Given that the outputs of the existing PVAs tend to be on an adult currency, Natural England advises that calculations of baseline mortality used in the HRA are undertaken on an adult currency, therefore using the adult colony figure and the adult mortality rate rather than on all ages. As outlined in our response to the Applicant's response to the first ExA Question 23.44 [REP2-036], following this recommended approach, we have calculated apportionment rates of 4.8% for autumn and 6.5% for spring. These have been calculated via the following approach: • Autumn migration: number of FFC SPA adult gannets in North Sea and Channel BDMPS = 22,122 and the total number of birds of all

Question Number	Question to	Question	Natural England Comments
			ages in the BDMPS = 456,299. So the proportion of FFC SPA adult birds = (22,122/456,299) x 100 = 4.8%. • Spring migration: number of FFC SPA adult gannets in North Sea and Channel BDMPS = 15,485 and the total number of birds of all ages in the BDMPS = 248,385. So the proportion of FFC SPA adult birds = (15,485/248,385) x 100 = 6.2%. These figures are consistent with our advice on this matter for Hornsea Project Three. Following a call between Natural England and the Vanguard Applicant on the 8 March 2019 we understand that the differences arise due to the Applicant using the apportionment approach undertaken at East Anglia Three and the Dogger Bank projects, which makes considerations of proportions of birds migrating north and south from colonies including Flamborough. Whilst this approach was accepted at the

Question Number	Question to	Question	Natural England Comments
			previous cases, this was not used in the Furness (2015) report that is publically available and we continue to advise that the approach we have set out above is used. This is consistent with advice at Hornsea 3 and will ensure consistency in the approaches used for non-breeding season apportionment across projects going forwards. We understand from discussions with the Applicant on 8th March that this approach, along with the Applicant's preferred approach, will be provided; which is welcomed. With regard to in-combination CRM, there remain other relevant offshore wind farms for which figures are currently not included in Vanguard's in-combination CRM assessment (e.g. Kincardine, Hywind and Moray West). Therefore, at present we cannot reach any agreements on AEOI from Vanguard alone or in-combination. As noted in our response to question 23.67 above, we are aware that the Applicant is

Question Number	Question to	Question	Natural England Comments
			proposing to provide updated information around these issues and revised CRM figures for the designated sites and so Natural England will respond accordingly once this information has been received and reviewed.
23.83	NE and RSPB	Having regard to the Applicant's response at D1, please can you expand on your concerns regarding nocturnal activity rates?	Our advice regarding nocturnal activity has been set out in detail in our Relevant Representations (RR-106), Written Representations (REP1-088), our response to first ExA question 3.3 part g) in Annex A of our Written Representations (REP1-088), our response to the Applicant's Section 51 response (REP2-038), and our response to the Applicant's response to question 3.3 part g) of the first round of ExA questions, provided at Deadline 4 as Comments on Applicants Response to Natural England's Response to First Round of Written Questions [REP2-004]. Our position on this remains unchanged.
23.91	NE	In its response to ExQ1 the Applicant states that it cannot agree to no cable protection being installed. Consequently, are there any measures that the Applicant could implement that would satisfy you and lead you to	Natural England had a call with the applicant on 8 March 2019 and during that discussion the

Question Number	Question to	Question	Natural England Comments
		be able to conclude that there would be no AEOI resulting from the installation of cable protection within the Haisborough, Hammond and Winterton SAC (HHW SAC)?	Applicant stated that they were undertaking further assessment of their survey data to inform an interim cable burial study. Once that is submitted Natural England will provide further advice. Please see our generic cable protection advice note provided at Deadline 4 in the interim.
23.92	NE	You raised comments in your RR [RR-106] on the Applicant's Outline Scour Protection and Cable Plan, and the Applicant has responded that the Plan would be updated as the final design develops. Do you have any further comment to make, and does the relevant Condition in the DMLs provide you with sufficient comfort that there would be no AEOI to the HHW SAC for scour protection and cable protection?	The condition as it stands doesn't provide the necessary comfort to rule out an AEoI at the time. However, again during the call on 8 March 2019 the Applicant has proposed to provide a Site Integrity Plan for HHW SAC which they intend to provide some comfort to Natural England. Once this is submitted we will provide further advice
23.93	NE	Do you have any further comments to make following the Applicant's confirmation that the proposed cable protection would remain in place upon decommissioning?	Natural England advises that cable protection would result in a change of habitat within the SAC. Please note that once the interim cable burial study is provided Natural England will provide further advice on the permanency of the impact. IN the interim, please see our generic cable protection advice note provided at Deadline 4.

Question Number	Question to	Question	Natural England Comments
23.94	Applicant and NE	Do you have any further comments to make regarding the issue of micrositing within the HHW SAC?	As set out in our response to the Applicant's response to our answer to the first set of Examiners question 5.6 1) Natural England agrees that there is an element of patchiness to *Sabellaria spinulosa* reef (Gubbay 2007). However, the point here is that when undertaking Annex I reef surveys an area with the same side scan sonar 'reef' return is identified and the extent of that habitat is mapped. That potential reef area is then ground truthed using grab samples and drop down video to determine the reefiness qualities i.e. elevation, abundance and patchiness. The micro siting condition is to avoid areas of reef no matter what the quality. Therefore the suggestion to go through areas of reef that has less coverage is outside the proposed mitigation. For this to be feasible there would need to be a 15-20m wide corridor (similar to a dual

Question Number	Question to	Question	Natural England Comments
			carriageway travelling in both directions) with no *Sabellaria spinulosa* in it, and recognising that similar to a road the bend radius of a cable is about 5m making the ability to weave around features challenging if not impossible. Hence the requirement to avoid areas completely. 2) The fisheries byelaw areas have been identified to manage DEFRA's 'Red' risks from ongoing fisheries and enable recovery of the Annex I reef features. Any anthropogenic impacts should not hinder the management of these areas. In allowing cable installation through these areas it would almost certainly slow the trajectory of recovery and temporarily reverse any recovery that management measure had achieved. Whilst it is acknowledged that these management areas will include areas where reef may be absent at any given moment

Question Number	Question to	Question	Natural England Comments
			in time, the sediment included is considered by Natural England to have the potential for reef to develop. Hence the management for recovery. Previously it has been agreed that if the Annex I preconstruction surveys show that reef is absent at the time of construction then cable installation could happen within the byelaw areas of the Wash. However, as demonstrated by the Race Bank OWF located in the Wash and North Norfolk Coast SAC the cable installation is no longer considered a one off activity especially where reburial and/cable repairs are required over the life time of the project. Which would further hinder the management measures. 3) In addition to this if cable protection is installed then there will be a permanent change to the habitat and therefore we believe that there will be a loss of feature extent and the management

Question Number	Question to	Question	Natural England Comments
			measures for the site would be hindered. Therefore we advise that if cable installation with the byelaw area is permitted by the Secretary of State then there would need to be a restriction of no cable protection in that area. But given this is likely to be an area of mixed sediment rather than sand it is likely to be the most challenging habitat for installing cable within the site. Accordingly consideration of the most appropriate installation technique would be required
23.96	NE	Please explain why sandwave levelling, seabed preparation and disposal warrant a separate plan and why this cannot be secured as part of the detailed cable specification, installation and monitoring plan that is secured through Condition 9(1)(g) of Schedules 11 and 12 of the DMLs?	Natural England has no issue with the plans being combined into one document. However, we wish to ensure that such a document includes a thorough sandwave levelling, site preparation and disposal methodology and assessment. Therefore we request that reference is made to these specific elements in the DCO/DML to ensure that they are provided.
23.98	NE	Are you content that a detailed cable laying plan would be secured through condition 9(1)(g) of Schedules 11 and 12 of the DMLs? Would you still also require the submission of a burial risk assessment?	During our call with the Applicant on 8 March 2019 the Applicant committed to undertaking a burial risk

Question Number	Question to	Question	Natural England Comments
			assessment document, which we anticipate being a live document that would be updated as more survey data becomes available.
23.100	NE	In relation to the Southern North Sea cSAC (SNS cSAC) please indicate whether you still have concerns that the Applicant should demonstrate that the fish assemblages (for example sandeels and herring) that are key prey species for harbour porpoise would not be adversely affected by the proposed project.	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 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 Conservation) /SCI. However Natural England would defer to Cefas on this issue.
23.102	Applicant, NE, MMO, TWT and WDC	A conclusion of no AEOI on the SNS cSAC relies on appropriate mitigation measures being secured in the final Site Integrity Plan and Marine Mammal Mitigation Protocol. However, these mitigation measures are not yet specified and there remains some doubt over how effective certain measures, such as soft start piling, actually are. Please comment further on this matter.	Following further internal discussion, Natural England is satisfied that the soft-start protocol is fit for purpose. We are therefore content that both the MMMP and the SIP will contain appropriate mitigation measures once they are

Question Number	Question to	Question	Natural England Comments
			agreed and finalised to address an AEoI alone.
23.105	NE and Applicant	The conclusions of no AEOI for all onshore sites presented in the Information to Support HRA report (document 5.3) are not agreed by NE. NE's position is summarised in the SoCG with NE [REP1-049]. Please provide an update as to the position on this matter.	Natural England and the Applicant are in discussion in this regard. The applicant has provided an updated Clarification Note on 27 February 2019 and Natural England will respond by deadline 5 and feed into the updated SoCG as agreed in our joint position statement.
23.106	NE and Applicant	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 not agreed by NE. NE's position is summarised in the SoCG with NE [REP1-049]. Please provide an update as to the position. In particular: • Can the Applicant provide a comparison of the impact of trenched and trenchless crossing techniques on the flow of water to Botton Common SSSI and Norfolk Valley Fens SAC, as requested by NE? • What is the Applicant's response to NE's comments regarding the need for sensitive restoration within the River Wensum floodplain north of Penny Spot Beck? • Can the Applicant provide an update on the assessment of impacts to River Wensum SAC, Norfolk Valley Fens SAC and The Broads SAC when considered in-combination with the Hornsea 3 cable route?	An assessment of potential impacts of alternatives of trenched and trenchless crossing techniques have not been provided. The clarification note does not currently contain an in combination assessment with Hornsea 3 cable route.
23.107	NE	A Clarification Note: Bat Impact Assessment – Paston Great Barn Special Area of Conservation (SAC) is provided by the Applicant as an appendix to your SoCG with the Applicant [REP1-049]. Please identify specifically which parts of the assessment if any with which you disagree and why.	Natural England are currently reviewing the updated Bat Clarification Note and will respond for Deadline 6 in line

Question Number	Question to	Question	Natural England Comments
			with our joint position statement.
23.109	NE	Please detail your remaining concerns as to the potential impact on Paston Great Barn SAC and detail the further information you have sought from the Applicant.	Natural England are currently reviewing the updated Bat Clarification Note and will respond as per the joint position statement for Deadline 6.
24.	**Onshore Ecology**		
24.20	NE, Applicant	NPS EN-1 Sections 5.3.16 – 5.3.17 requires the ExA to have regard to the protection of legally protected species and habitats and species of principal importance for nature conservation and to refuse consent where harm to the habitats or species and their habitats would result, unless the benefits (including need) of the development outweigh that harm, and to give substantial weight to any such harm to the detriment of biodiversity features of national or regional importance which it considers may result from a proposed development. Please provide an update as to the final position set out in Table 12, Statement of Common Ground - Onshore ecology and ornithology [REP1049], specifically commenting on legally protected species and habitats and species of principal importance for nature conservation.	Updated clarification notes were provided by the Applicant on 27 February 2019. Discussions are ongoing as to these Clarification Notes and Natural England will feed into the updated SoCG for deadline 5 as per the joint position statement.
24.21	NE	As to the impacts on groundwater supply and surface water quality for Dereham Rush Meadow SSSI, Holly Farm Meadow, Wendling SSSI, Whitwell Common SSSI and Booton Common SSSI, what further information if any is now available to aid appraisal of these effects?	Updated clarification notes were provided by the Applicant on 27 February 2019 Discussions are ongoing as to these Clarification Notes and Natural England will feed into the updated SoCG for deadline 5.

Question Number	Question to	Question	Natural England Comments
24.22	NE	Appendix 2 of [REP1-049] provides an assessment of effects on certain water dependent designated sites according to their proximity to the proposed location of onshore buried cables. What specific further information do you require 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 and why does the information in Appendix 2 not reasonably demonstrate that there would be no direct pathway between the construction works and the underlying chalk aquifer for these sites which are further away from the construction footprint?	Updated clarification Notes were provided by the Applicant on 27 February 2019. Discussions are ongoing as to these Clarification Notes and Natural England will feed into the updated SoCG for deadline 5.
24.26	NE	The Applicant states in its comments at DL2 on NE's response to FWQ 24.15 that whilst its Phase 1 habitat surveys were undertaken outside of the optimum survey window, they are deemed sufficient. Please comment.	Any future surveys should aim for better coverage and be completed within the optimum survey season, as agreed in SoCG.
24.27	NE	How do you propose that it be secured within the DCO that future ecological assessments undertaken will cover a greater area and are conducted within the optimum survey window?	It should be secured as a DCO condition Licence as part of the terrestrial In Principle Monitoring Plan that all ecological assessments are conducted within the optimum survey window and cover the redline boundary and buffer, with ecological assessment methodology statements and Protected Species License requests submitted to Natural England.
24.29	Applicant and NE	Please provide an update on the position regarding mitigation of impacts outlined in WQ24.28 above including what further changes if any are	Natural England have not been consulted on any further

Question Number	Question to	Question	Natural England Comments
		proposed to the CoCP or OLEMS to deal with the risk of damaging or destroying ground nesting birds (i.e. skylarks) during construction.	changes incorporated into CoCP or OLEMS, as yet.

THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Natural England's comments on The Wildlife Trust's Post Hearing Submission provided at Deadline 3 [REP3-063]

13 March 2019

1. Introduction

1.1. Natural England has reviewed the post hearing submission provided by The Wildlife Trust at Deadline 3 [REP3-063].

1.2. On Page 1 of this response The Wildlife Trust notes that they do not agree with the proposed Statutory Nature Conservation Body (SNCB) advice on underwater noise management as they do not feel that the proposed thresholds set by the SNCBs are underpinned by science and we do not know what the carrying capacity is within the Southern North Sea Site of Community Importance (SCI).

1.3. This management approach has been agreed by the SNCBs and been used by the Regulator in Habitats Regulations Assessments and within the current Review of Consents. Natural England has no further comment at this time, other than we are happy with its use in this assessment.

1.4. The SNCB's are open to investigating alternative management approaches, but to date none have been provided. The SNCB's also acknowledge further scientific evidence may become available in the future, which may warrant the thresholds being reviewed and amended as appropriate. But this is unlikely to happen in the near future and definitely not within the timeframes of this examination.

THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Natural England's comments on Migrant Non-seabird Collision Risk Modelling [REP3-038].

13 March 2019

1. Introduction

1.1. Natural England welcomes the work undertaken by the Applicant on migrant non-seabird collision risk modelling (CRM) in REP3-038.

1.2. With regard to this document we note the following comments and requests for clarification.

1.3. Please also note Natural England are aware from a call with the Applicant on 8th March 2019, that they will be altering the worst case scenario in terms of the number of turbines. As a result of this the Applicant will need to re-run all collision risk modelling using the revised array.

2. Species covered

2.1. The assessment in REP3-038 has covered the non-seabird migrant species requested by Natural England (i.e. those covered by the East Anglia Three Offshore Wind Farm (EA3 OWF), with the addition of Bewick's swan and avocet). Therefore no further non-seabird migrant species require a CRM.

3. Migration periods/routes

3.1. The Applicant has assumed in paragraph 4 on Page 8 of REP3-038 that there were two migration periods per year (e.g. spring and autumn), which is reasonable. However, in order to assess risks annually, the Applicant has therefore doubled the 'at risk' numbers. We note that it appears that the Vanguard Applicant has not given any consideration to estimates for each migration season may differ for some species (e.g. for dark-bellied brent goose, DBBG) due to the species using staging posts on route to or from Great Britain and Ireland, as was done at EA3 OWF. We recommend that the approach taken at EA3 OWF regarding this matter is also followed at Norfolk Vanguard.

4. Relevant total and SPA population sizes (Table 3)

4.1. Clarification is required as to whether the total migrant population sizes presented in Table 3 on Page 9 of REP3-038 as from Wright et al. (2012) are those for the GB population or the GB and Ireland population figures. As for some species these appear to be the GB figure plus the Ireland figure, e.g. Bewick's swan, the GB figure of 7,000 plus the Ireland figure of 380; and dunlin the GB figure of 350,000 plus the Ireland figure of 88,480. However, for other species they appear to be just the GB figure, e.g. curlew, the GB figure of 140,000 is included, but the Ireland figure of 54,650 has not been included.

4.2. Clarification is also required as to the source of the SPA population sizes presented in Table 3 on Page 9 of REP3-038. It appears that these figures are drawn from the SPA citations, but this is unclear. Natural England considers that the most appropriate figures to use for the assessment are the most recent 5-year mean peak counts, which can be obtained from Wetland Bird Survey (WeBS) data. In the case of the North Norfolk Coast, we suggest that the Applicant requests the data for this SPA from BTO

rather than using the counts available from the WeBS online database/report[1], as the boundaries of the site presented on line may not exactly match with the SPA boundary.

5. CRM input parameters (Table 4)

5.1. Clarification is required as to the source of the proportion at potential collision height (%PCH) values presented for each species in Table 4 on Page 10 of REP3-038. Natural England advises the Applicant uses the recommended central %PCH values for each species group or species and the ranges recommended in Table 3 of Wright et al. (2012). Whilst it appears that most of the %PCH values used by the Applicant and presented in Table 3 appear to use the central recommended value from Wright et al. (2012), we note that this is not the case for all species, for example:

- Common scoter: Table 3 of Wright et al. (2012) advises 1% PCH (range <0.1-17%), but we note that the Applicant has used 30%;
- Curlew: Table 3 of Wright et al. (2012) advises 25% PCH for waders (range 5-75%), but we note that the Applicant has used 1%.

5.2. Clarification is also required as to the nocturnal activity factors used by the Applicant in the CRM, as these are not presented anywhere in REP3-038.

5.3. The Applicant states that the bird biometrics data presented in Table 4 on Page 10 of REP3-038 are those used at the EA3 OWF assessment and hence presented in APEM (2014). We note that the figures presented in the Applicant's Table 4 for DBBG and pintail are different from those used for these species in the East Anglia Three assessment (APEM 2014). Clarification is required as to why these are different and of the sources of the figures used by the Vanguard Applicant.

5.4. We would recommend that example species Band (2012) model input and output data sheets are also provided.

6. Avoidance rates

6.1. We welcome that the Applicant has undertaken and presented CRM results for a range of avoidance rates from 98% to 99.8% for each species in Table 5 on Page 11 of REP3-038. However, we note that Natural England does not agree that 99.5% avoidance for Bewick's swan and 99.8% for DBBG are appropriately precautionary rates for these species to base assessment conclusions on. This is because:

- We note that the SNH recommended avoidance rate of 99.5% for swans in SNH (2017) is based on use for onshore wind farms and not offshore wind farms such as Norfolk Vanguard, where bird behaviour may well be different. We also note that the recommendation of 99.5% is based on evidence presented in Whitfield & Urquhart (2015). Whitfield & Urquhart (2015) presents empirical evidence from one study at a Dutch polder (by Fijn et al. 2012). Whilst the study does present some other evidence from studies that appear to suggest that swan avoidance rates are likely to be high, there are some issues associated with these: inability to calculate avoidance rates from them; and most are from sites where swan densities are low anyway, meaning there would be a low likelihood of detecting collisions. Given this and that the recommended figure is based on one onshore study from the Netherlands, and

[1] WeBS data available from: https://app.bto.org/webs-reporting/

that we do not know whether the species behaves in the same way at an offshore wind farm in the southern North Sea, Natural England currently does not consider that 99.5% is an appropriately precautionary avoidance rate to use in CRM for offshore wind farms for Bewick's swan. We advise that a 98.9% avoidance rate is considered the appropriate precautionary rate for Bewick's swan for CRM assessments at OWFs.

- We note that WWT Consulting, under contract to Natural England, have reviewed much the same material regarding goose avoidance rates of wind farms as SNH have done in their 2010 and 2013 (SNH 2010; 2013) reviews (WWT Consulting 2014). From this WWT Consulting concluded that although the average avoidance rate for geese is likely to be high, they considered that there seems to be little new evidence since the Fernley et al. (2006) and Pendlebury (2006) reviews (on which the SNH 99% AR recommendation was based) on which to base an informed revision. Therefore, due to the uncertainties Natural England recommends that an avoidance rate of 99% is used for CRM assessments for geese, including DBBG, but that a broader range of avoidance rates (e.g. 95-99.8%) is also presented.

7. CRM estimates, Vanguard East and Vanguard West

7.1. We note that if a 98% avoidance rate is used in the assessment for Bewick's swan, 1.5 annual collisions are predicted, rather than less than 1 as stated by the Applicant in paragraph 10 of REP3-038.

7.2. We note that if a 99% avoidance rate is used in the assessment for DBBG, 5.1 annual collisions are predicted, rather than less than 1 as stated by the Applicant in paragraph 10 of REP3-038.

7.3. However, we note that these increases would not alter the Applicant's conclusions for the assessment of impact from Vanguard alone.

7.4. We note in our comments raised above regarding the recommendation to use the most recent 5-year mean peak counts for each SPA in the assessment. Therefore, we advise that the assessment is revisited following use of these figures.

8. Cumulative assessments

8.1. We welcome that the Applicant has undertaken a cumulative and in-combination assessment for Vanguard plus EA3 OWF. We note the issues raised above regarding the Vanguard alone assessment and recommend that the cumulative/in-combination assessment is revisited following consideration of these comments.

9. References

APEM (2014) East Anglia THREE Windfarm Migropath and Collision Risk Modelling Report for Non-seabirds. APEM Scientific Report 512608-Mig-3.A. APEM Ltd., Stockport.

Band, W. (2012). Using a collision risk model to assess bird collision risks for offshore wind farms. The Crown Estate Strategic Ornithological Support Services (SOSS) report SOSS-02.

Fernley, J. Lowther, S. & Whitfield, P. (2006) A review of goose collisions at operating wind farms and estimation of the goose avoidance rate. Natural Research Ltd, West Coast Energy and Hyder Consulting report. West Coast Energy, Mold, UK.

Fijn, R.C., Krijgsveld, K., Tijsen, W., Prinsen, H.A.M., & Dirksen, S. (2012) Habitat use, disturbance and collision risks for Bewick's Swans *Cygnus columbianus bewickii* wintering near a wind farm in the Netherlands. Wildfowl, 62: 97–116.

Pendlebury, C. (2006) Review of 'Review of goose collisions at operating wind farms and estimation of the goose avoidance rate'. BTO report to SNH.

SNH (2010) Use of avoidance rates in the SNH wind farm collision risk model. SNH Guidance Note.

SNH (2013) Avoidance rates for wintering species of geese in Scotland at onshore wind farms.

SNH (2017) Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model.

Whitfield, D.P & Urquhart, B. (2015) Deriving an avoidance rate for swans suitable for onshore wind farm collision risk modelling. Natural Research Information Note 6. Natural Research Ltd, Banchory, UK.

Wright, L.J., Ross-Smith, V.H., Massimino, D., Dadam, D., Cook, A.S.C.P. & Burton, N.H.K. (2012). Assessing the risk of offshore windfarm development to migratory birds designated as features of UK Special Protection Areas (and other Annex I species). Strategic Ornithological Support Services. Project SOSS-05. BTO Research Report No. 592.

WWT Consulting (2014) Pink-footed Goose anthropogenic mortality review: Avoidance rate review. Natural England Commissioned Report, NECR196.

THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Natural England's Comments on Applicants Response to Natural England's Written Representations [REP2-003]

13 March 2019

Norfolk Vanguard Offshore Wind Farm – Comments on Applicants Response to Natural England's Written Representations [REP2-003] provided by the Applicant at Deadline 2

Following submission of REP2-003 by the Applicant at Deadline 2 regarding the construction and operation of Norfolk Vanguard Offshore Wind Farm, Natural England has reviewed this document, and provided comment within the remit of Natural England. These comments are colour coded as:

Green Comments – Comments support/agree with Natural England position or does not impact on Natural England concerns or Natural England has no further comments in this regard

Amber Comments – Natural England comments may be in contradiction further advice needed, or potential new issue not included in NE comments

Red Comments – Comments in direct contradiction/argument with Natural England position or represents a significant issue not mentioned in NE relevant reps

Table 1: Natural England Comments on Applicants Response to Natural England's Written Representations [REP2-003] provided by the Applicant at Deadline 2

Summary of Written Representation	Applicant's Response	Natural England Comments
Evidence Natural England has some concerns with the standard of evidence provided in support of the application, primarily in relation to birds and Annex I Sandbank and/or Reef features. Consequently Natural England is unable to reach conclusions beyond reasonable scientific doubt in a number of areas.	The Applicant's response to Natural England's comments on offshore ornithology is provided below. Natural England provides detailed comments on Sandbanks and Reef in Annex C of their Deadline 1 submission which the Applicant has responded to in Appendix 1 (document reference ExA;WQRApp1;10.D2.3).	No further comments.
Habitats Regulation Assessment/ Report to Inform Appropriate Assessment NE is unable to agree with the conclusions set out in the HRA/RIAA due to the reasons set out within the Written Representations.	Discussions with Natural England regarding the potential for AEoI are ongoing and the position at Deadline 1 is documented in the SoCG with Natural England (document Rep1-SOCG-13.1). The SoCG will be updated and submitted at Deadline 4.	Please see joint position statement submitted by the Applicant at deadline 4

Summary of Written Representation	Applicant's Response	Natural England Comments
DCO and DML As stated in our Relevant Representation Natural England has fundamental concerns with several areas of the Development Consent Order (DCO) requirements and the Deemed Marine Licence (DML) licences, and require further suggested conditions based on the conditions set out in the Environmental Statement and the Habitats Regulations Assessment. These concerns were set out in detail in Appendix 5 of the Relevant Representation There has been no further engagement with the Applicant in relation to DCO or DML and therefore our concerns remain the same.	The Applicant has reviewed Natural England's Relevant Representation and where the Applicant is in agreement with Natural England, the DCO has been updated and is provided with the Deadline 2 submission. Discussions with Natural England are ongoing and the SoCG will be updated where applicable.	Natural England provided full comments in this regard in our Deadline 2 response, please see REP3-051.
Offshore Ornithology		
Natural England was unable to advise beyond all reasonable scientific doubt that the project both alone and in-combination would not have an adverse effect on site integrity for the relevant SPAs.	Evidence in support of the Applicant's conclusions was presented in the ES and Information to support the Habitats Regulations Assessment (HRA). Further evidence on these matters was subsequently submitted (following NE's Written Representation) in support of the Applicant's position on these matters, and this includes the responses to the ExA's First Written Questions (document reference ExA; WQ; 10.D1.3) and supporting notes submitted for Deadline 1. (The Applicant acknowledges that this represents further information not previously seen by Natural England when this Written Representation was submitted). On this basis, the Applicant considers that adverse effects can be ruled out both for the project alone and in-combination.	The Applicant's supporting notes submitted at deadline 1 (namely: Appendix 3.1 on red-throated diver (RTD) displacement, Appendix 3.2 on CRM and Appendix 3.3 on auk and gannet displacement) do not cover HRA aspects and focus on EIA issues for impacts from Vanguard alone and cumulatively. Whilst the Applicant has provided some additional information regarding HRA related issues (such as further information in support of their breeding season apportionment to LBBG from the Alde-Ore Estuary SPA

Summary of Written Representation	Applicant's Response	Natural England Comments
		and non-breeding season apportionment of gannet from the Flamborough and Filey Coast (FFC) SPA), the issues raised by Natural England in our Relevant Representations (RR-106) and Written Representations (REP1-088) regarding HRA matters largely remain unresolved. However, we again note that at East Anglia Three OWF, Natural England could not rule out beyond reasonable scientific doubt AEOI for kittiwake at FFC SPA due to in-combination collision risk impacts. The Norfolk Vanguard proposal will be adding collisions potentially apportioned to FFC SPA to that total, and it is therefore considered unlikely that this conclusion will be any different now. Full details can be found in our deadline 3 response [REP3-051].
Natural England was unable to advise with certainty that the project will not have a significant impact on a number of seabird species in an EIA context, namely red-throated diver, gannet, kittiwake, guillemot, razorbill, puffin, herring gull, lesser black-backed gull, and greater black-backed gull.	Evidence in support of the Applicant's conclusions was presented in the ES. Following receipt of Natural England's Written Representation further evidence has been provided in support of the Applicant's position, which includes the responses to the ExA's First Written Questions (ExA; WQ; 10.D1.3) and supporting notes submitted for Deadline 1. (The Applicant acknowledges that this represents further information not previously seen by Natural England when this Written Representation was submitted). On this basis, the Applicant considers that the project will not have a	From the Applicant's supporting documents submitted at Deadline 1 (Appendix 3.1, 3.2 and 3.3 [REP1-008]). Natural England can now advise the following conclusions for impacts from the Vanguard development alone for EIA: Disturbance/displacement:

Summary of Written Representation	Applicant's Response	Natural England Comments
	significant effect on these species either alone or cumulatively.	•Construction/decommissioning: no significant impacts (no greater than minor adverse) for any relevant species for Vanguard alone. •Operational: no significant impacts (no greater than minor adverse) for auks and gannet and RTD (for Vanguard East only) from Vanguard alone. For Vanguard West and both Vanguard East and West combined for RTD for operational disturbance/displacement from Vanguard alone, at the Natural England preferred worst case scenario of 100% displacement and 10% mortality, our conclusion is a moderate adverse impact. For full details of our reasoning for this, see REP1-008 in REP3-051. Collision risk: Based on the figures presented by the Applicant in their CRM clarification and update note (Appendix 3.2) for the deterministic/Band model Option 2 using the mean bird densities (plus upper and lower 95% CIs around these) along with the mean/central recommended values for avoidance rates, flight height distribution and nocturnal activity), we can conclude no significant impact (no

Summary of Written Representation	Applicant's Response	Natural England Comments
		greater than minor adverse) from Vanguard alone for all relevant species (i.e. gannet, kittiwake and the large gulls), although we have low confidence in this conclusion for GBBG at Vanguard East. For full details of our reasoning for this, see REP1-008 in REP3-051. We note that conclusions as to the levels of cumulative impacts from both displacement and collision risk remain yet to be agreed. However, we again note that at East Anglia Three OWF, Natural England could not rule out significant adverse impacts at the EIA scale for great black-backed gull (GBBG) due to cumulative collision risk impacts. The Norfolk Vanguard proposal will be adding collisions to that total, and it is considered unlikely that this conclusion will be any different now. Full details can be found in our deadline 3 response [REP3-051].
Natural England identified a number of methodological issues in relation to the offshore ornithological assessment, particularly the type of modelling used in displacement estimates. The key issues are:	The Applicant has either addressed Natural England's points in documents submitted at Deadline 1 or will be providing further supporting documentation for future deadlines as follows:	Please see our joint position statement submitted by the Applicant at Deadline 4.

Summary of Written Representation	Applicant's Response	Natural England Comments
a. Seasonal definitions for lesser black-backed gull (LBBG) and gannet;	a) Assessment for lesser black-backed gull in the Information to support the HRA considered both the migration free and extended breeding season, while the Applicant's response to WQ 23.36 considers the impact on gannet if the extended breeding season is used for assessment. Therefore, the Applicant considers both these aspects have now been addressed.	As noted in our Written Representations [REP1-088], in instances where the full breeding season is used to define the breeding season, as is recommended for both LBBG and gannet for Vanguard, there will then be overlap of months considered in both the full breeding season and the non-breeding seasons (e.g. with autumn and spring migration seasons). In cases where this occurs we advise that the non-breeding periods are adjusted accordingly to exclude these months. We acknowledge that in the Information to support the HRA the Applicant has considered both the migration free and extended breeding season for LBBG from the Alde-Ore Estuary SPA. However, it is unclear from this document whether the Applicant has taken the approach of adjusting the non-breeding (i.e. spring and autumn migration) periods where there are overlapping months when the full breeding season is used. Clarification is still required from the Applicant as to whether this approach has been applied or not.

Summary of Written Representation	Applicant's Response	Natural England Comments
		With regard to gannet at FFC SPA, we welcome the Applicant's assessment using the full breeding season presented in response to ExA Q23.36. However, we note that the figures presented are based on the outputs from the Applicant's own stochastic collision risk model (which we do not consider to be appropriate to use for assessments, see REP1-008 in REP3-051) and using the median bird densities rather than the mean densities, (which we again do not consider to be appropriate, see REP1-008 in REP3-051). There are also outstanding queries regarding the non-breeding season apportionment figures (see response to point b below), which need to be resolved/clarified. These issues need to be considered before Natural England can agree with the CRM figures for gannet from the FFC SPA from Vanguard alone.
b. Seasonal apportionment of impacts for HRA in non-breeding seasons to the relevant SPA colonies and in the breeding season for LBBG at the Alde-Ore Estuary SPA and kittiwake at the Flamborough and Filey Coast (FFC) SPA;	b) Apportioning among Special Protection Area (SPA)'s during the breeding and nonbreeding seasons has been conducted using available evidence and follows the approaches used for previous offshore wind farm applications (e.g. East Anglia THREE). In some cases the population estimates in Furness (2015) have been superseded with more recent counts and, where these are considered reliable, these have been used in preference to the older estimates. Further work is underway to review	Non-breeding season apportioning: As noted in our Written Representations [REP1-088], the Applicant's apportioning of kittiwake to the FFC SPA in the non-breeding season follows Natural England standard advice and therefore we agree with the apportionment figures

Summary of Written Representation	Applicant's Response	Natural England Comments
	kittiwake tracking data from the Flamborough and Filey Coast SPA, recently supplied by the RSPB, and this will be reported on and the assessment updated (if necessary) for future deadlines.	of 5.4% for autumn and 7.2% for spring used by the Applicant. As noted in our response to ExA Q23.34, we concluded that the Applicant's apportioning for the non-breeding season periods (i.e. migration and winter) was reasonable/precautionary. With regard to apportionment of gannet to FFC SPA in the non-breeding seasons (autumn and spring), the Applicant has clarified in its response to ExA Q23.44 that they have used the figures presented in Furness (2015) for the UK North Sea and Channel BDMPSs to reach their apportionment figures of 4.2% in autumn and 5.6% in spring. However, as noted in our response to the Applicant's response to ExA Q23.44 (REP2-036), we calculate the gannet apportionment figures for the FFC SPA to be 4.8% for autumn and 6.2% for spring, which are slightly higher than those used by the Applicant. If the Applicant wishes to use their preferred values, Natural England seeks further clarification regarding how these figures have been calculated.

Summary of Written Representation	Applicant's Response	Natural England Comments
		Breeding season apportioning: We agree with the Applicant's approach to apportioning of impacts to gannet from FFC SPA in the breeding season. With regard to breeding season apportionment of LBBG to the Alde-Ore Estuary SPA, we note that the Applicant has provided further information to justify the figure of 25% in their response to ExA Q23.35. We welcome this additional information, but as noted in our response to the Applicant's information in response to ExA Q23.35 (REP2-036), we have previously noted that whilst tracking data are useful and demonstrate connectivity of the Vanguard site with breeding birds from the Alde-Ore Estuary, it can only ever tell part of the story as there will be both individual and between year differences. Whilst the Applicant has attempted to address some of the issues Natural England / RSPB raised regarding additional town colonies that hadn't previously been included, the foraging behaviour of town colonies compared to more traditional colonies and control of town colony populations, this doesn't really address the issue of segregation

Summary of Written Representation	Applicant's Response	Natural England Comments
		and therefore this issue still requires consideration. We welcome that the Applicant is in the process of reviewing kittiwake tracking data from the FFC SPA and look forward to the results of this work/amended assessments.
c. Assessment of displacement impacts regarding consideration of uncertainty and variability and red-throated diver assessments;	c) An updated red-throated diver displacement assessment has been submitted as an appendix to the Applicant's responses to the ExA's written questions (Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Red-throated diver displacement Appendix 3.1, document reference ExA; WQApp3.1; 10.D1.3) which the Applicant considers will address Natural England's outstanding concerns on this matter.	We welcome the updated RTD displacement assessments in Appendix 3.1. Following this, we agree with the Applicant's conclusions for the Natural England preferred worst case scenario of 100% displacement and 10% mortality for both construction and operation of Vanguard alone for EIA, namely: Annual predicted impacts of: •Minor adverse significance for displacement from installation of the Vanguard export cable. •Minor adverse significance for construction displacement in Vanguard East, construction in Vanguard West and for construction in Vanguard East + West combined.

Summary of Written Representation	Applicant's Response	Natural England Comments
		•Minor adverse significance for operational displacement for 100% capacity in Vanguard East. •Moderate adverse significance for operational displacement for 100% capacity in Vanguard West and for Vanguard East + Vanguard West combined. Further details regarding this can be found in REP1-008 in REP3-051. However, we note that there are still outstanding issues regarding cumulative operational RTD displacement (for details see REP1-008 in REP3-051 and at present NE is not in a position to reach any conclusion regarding the level of cumulative impact on RTD from the operational phase. We also note that the updated assessment in Appendix 3.1 does not consider the issues raised by Natural England regarding the 5% mortality rate used in the Applicant's assessment of potential impact from disturbance/displacement of RTD from the Greater Wash SPA due to construction of the offshore export cable. Nor does it deal with the issue of in-combination RTD displacement from the Greater Wash SPA. Therefore,

Summary of Written Representation	Applicant's Response	Natural England Comments
		these issues currently remain unresolved.
d. Collision risk modelling (CRM);	d) Additional seabird collision risk modelling assessment has been provided as an appendix to the Applicant's responses to the ExA's written questions (Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Collision Risk Modelling: update and clarification Appendix 3.2, document reference ExA; WQApp3.2; 10.D1.3) which the Applicant considers will address Natural England's outstanding concerns on this matter. This includes collision predictions using evidence based and Natural England advised rates of nocturnal activity. With respect to non-seabird collision risk, this will be addressed in additional assessment updates to be submitted for future deadlines.	As noted in our response to the Applicant's CRM update and clarification, Appendix 3.2 (REP1-008 in REP3-051), we consider that the mean bird densities are the appropriate figures to use in collision risk modelling. Additionally, we do not recommend that the outputs from the Applicant's stochastic model are relied upon for drawing conclusions regarding the levels of impact of CRM from Vanguard alone. Nor should these figures be included in cumulative/in-combination assessments. However, the Applicant has presented in Appendix 3.2 a range of deterministic/Band Option outputs for various scenarios. As it appears that the greatest uncertainty in the predictions from the variations of Band model outputs presented occurs due to the variability/uncertainty in the bird density, in the absence of the full requested deterministic/Band model outputs using mean density and varying avoidance rates, flight distributions and nocturnal activity in turn and presentation of stochastic outputs from the MSS model, we recommend that conclusions are based on the deterministic/Band (2012)

Summary of Written Representation	Applicant's Response	Natural England Comments
		model outputs using the mean bird densities, recommended avoidance rates of 98.9% for gannet and kittiwake and 99.5% for large gulls, mean flight height distributions and nocturnal activity factors of 2 (or 25%) for gannet and 3 (or 50%) for kittiwake and large gulls. We also recommend that the uncertainty around the densities is considered by considering the deterministic/Band outputs using the lower and upper 95% confidence intervals of the density data together with the same central avoidance rates, flight distribution and nocturnal activity factor as recommended for the mean densities. Based on these figures presented by the Applicant in Appendix 3.2, we note that all the central CRM predictions equate to less than 1% baseline mortality of largest BDMPS for all species. This is also the case for the upper 95% confidence intervals of the bird density for all species except great black-backed gull (GBBG), where the predicted CRM figures of 410 equates to 2.43% of baseline mortality of the largest BDMPS for all turbines in Vanguard East and 0.94% of baseline mortality of the biogeographic population. Therefore, based on these figures we conclude that the collision

Summary of Written Representation	Applicant's Response	Natural England Comments
		risk from Vanguard alone would have no significant impact at the EIA scale for all species, although this conclusion can only be made with low confidence regarding impacts on GBBG at Vanguard East.
e. Cumulative and in-combination assessments (displacement and CRM); and	e) The Applicant has updated the assessments of displacement in the following submissions for Deadline 1 (Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Red-throated diver displacement Appendix 3.1, document reference ExA; WQApp3.1; 10.D1.3 and Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Operational Auk and Gannet Displacement: update and clarification Appendix 3.3, document reference ExA; WQApp3.3; 10.D1.3). The Applicant considers these will address Natural England's outstanding concerns on these matters in relation to the auk displacement due to the project alone and cumulatively. The Applicant intends to provide additional project alone and cumulative/in-combination displacement assessment updates for other species for future deadlines. Updated cumulative collision risk tables were included in the Applicant's Section 51 response (Norfolk Vanguard Offshore Wind Farm The Applicant's Response to Section 51 Advice from the Planning Inspectorate, Document reference PB4476-008-001). The Applicant provided additional collision risk estimates in response to Natural England's comments in their relevant representation (Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Collision Risk Modelling: update and clarification Appendix 3.2, document reference ExA;	Displacement A number of issues have been noted with the updated RTD cumulative displacement assessment presented by the Applicant in their RTD displacement Appendix 3.1. These include: a lack of data for a number of the relevant OWFs, suggestions for alternative approaches and issues with the data included for Thanet Extension – full details of these issues are presented in REP1-008 in REP3-051. A number of issues have been noted with the updated auk cumulative displacement assessments presented by the Applicant in their auk and gannet clarification, Appendix 3.3. These include: lack of inclusion of Moray West OWF, issues with the figures presented for Hornsea 3 and Thanet Extension sites, queries regarding the BDMPS populations used for the assessments, the need to consider a range of potential impact scenarios rather than just

Summary of Written Representation	Applicant's Response	Natural England Comments
	WQApp3.2; 10.D1.3). This update and clarification note provided alternative model outputs (as requested by Natural England), however, since the Applicant considers the mortality predictions presented in the original assessment (ES) remain appropriate, the cumulative tables provided in the Applicant's response to section 51 advice (cited above) remain valid (although the estimates for other wind farms currently in planning may change).	focussing on the Applicant's preferred scenario and lack of a full assessment of gannet cumulative displacement – full details of these issues are presented in REP1-008 in REP3-051. As a result of the above, Natural England's position remains that at present we are not in a position to reach any firm conclusions regarding the level of cumulative impact on RTDs or auks from the operational phase. We note that the Applicant's updated assessments in Appendix 3.1 and 3.3 do not cover any updates to in-combination displacement assessments for RTD displacement at the Greater Wash SPA, or auks and gannet from the FFC SPA. Therefore, as a result of the above Natural England's position remains that we are not currently able to reach any firm conclusions regarding the level of cumulative displacement impact on RTD, gannet and auks from the operational phase, or in-combination displacement impacts on RTD from the Greater Wash SPA and auks and gannet from the FFC SPA. Collision risk As noted in our response to the Applicant's Section 51 response (REP2-

Summary of Written Representation	Applicant's Response	Natural England Comments
		038), a number of issues remain with the cumulative collision risk tables presented by the Applicant; including: some relevant North Sea OWFs have not been included in the cumulative tables (e.g. Moray West, Hywind and Kincardine), issues regarding the figures presented for the other sites currently in examination (Hornsea 3 and Thanet Extension). Additionally, the figures presented for Vanguard and included in the cumulative CRM tables are those from the Applicant's stochastic collision model, which also uses the median bird densities and the Applicant's nocturnal activity rates derived from tracking data for gannet and kittiwake. As noted in our response to the Applicant's CRM update and clarification, Appendix 3.2 (REP1-008 in REP3-051), we consider the mean bird densities to be the appropriate data to use in CRM and we do not recommend that the outputs from the Applicant's stochastic model are relied upon for drawing conclusions regarding the levels of impact of CRM from Vanguard alone. Nor should these figures be included in cumulative/in-combination assessments.

Summary of Written Representation	Applicant's Response	Natural England Comments
		Therefore, Natural England's position remains that at present we are not in a position to provide formal advice on the accuracy of the predicted impacts at either the biogeographic/BDMPS or SPA scale for cumulative/in-combination collision risk assessments.
f. Population modelling approaches (Environmental Impact Assessment, EIA and Habitats Regulations Assessment, HRA).	f) The Applicant acknowledges the aspects of population modelling which Natural England has raised, and has provided responses on this matter for WQ 23.26.	We note the Applicant's responses to ExAQ 23.26 in REP1-007. With regard to the Applicant's comments in REP1-007 that the results obtained from matched-pairs and non-matched simulations are the same in terms of the average predictions obtained (for density independent simulations), Natural England considers this to be unexpected as other work (e.g. Cook & Robinson 2017)[1] suggests that there should be a difference. We also note that in the updated FFC SPA PVA models recently completed for the Hornsea Project 3 examination[2],[3], the Hornsea Three Applicant has now

[1] Cook, A.S.C.P. & Robinson, R.A. (2017). Towards a framework for quantifying the population-level consequences of anthropogenic pressures on the environment: The case of seabirds and windfarms. Journal of Environmental Management, 190: 113-121.
[2] Initial updated FFC SPA PVAs submitted at Deadline 1 of Hornsea Project Three examination, available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-001142-DI_HOW03_Appendix%209.pdf
[3] Appendix 73 to Deadline 4 Submission – Applicant responses to the ExA Q2.2.30 and Q2.2.39: PVA information submitted for Hornsea Project Three examination, available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-001565-Orsted%20Hornsea%20Project%20Three%20(UK)%20Ltd%20-%20Appendix%2073%20-%20Detailed%20response%20to%20the%20Examining%20Authority's%20Q2.2.30%20and%20Q2.2.39.pdf

Summary of Written Representation	Applicant's Response	Natural England Comments
		presented the counterfactual metrics and associated confidence intervals for matched and unmatched runs for the density independent models and these do show differing results. As far as Natural England can tell this analysis is satisfactory for the density independent models (see Natural England 2019[4]) Therefore, Natural England does not agree with the Vanguard Applicant's statement in REP1-007 that the published work that shows a difference between matched pairs and unmatched pairs is flawed. We would also query whether the Vanguard Applicant's statement in REP1-007 of >=1,000 simulations as being sufficient iterations is robust. We note that previous PVAs (e.g. MacArthur Green 2015[5]) have used 5,000 simulations for the stochastic models, whereas the updated PVAs undertaken for Hornsea 3 have used 1,000. We note that at Hornsea 3 we have advised that a larger number of simulations would

[4] Natural England (2019) Hornsea Project Three Offshore Windfarm Natural England Written Submission for Deadline 6: Written Submission of Natural England's Representation at Issue Specific Hearing 5 – Offshore Ecology. Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-001688-Natural%20England%20-%20Written%20Submission%20of%20Natural%20England%E2%80%99s%20Representations%20at%20Issue%20Specific%20Hearing%205%20-%20Offshore%20Ecology.pdf

[5] MacArthur Green (2015b) Flamborough and Filey Coast pSPA Seabird PVA Report.

Summary of Written Representation	Applicant's Response	Natural England Comments
		potentially be needed to generate reliable results (Natural England 20194). In addition, we query the Vanguard Applicant's statement in REP1-007 that density dependent simulations cannot be run as strictly matched-pairs, when other publications (e.g. Cook & Robinson 2017; Jitlal et al. 2017[6]) have presented matched pairs for density dependent models. Therefore we consider that the Applicant's statement is not strictly true. With regard to the revised advice the Applicant refers to regarding how the results are presented, we note that Natural England has recommended since the Hornsea Project 2 and East Anglia 3 examinations that assessments focus on impacts on the counterfactual of growth rate and the counterfactual of final population size, as the two metrics that are, in Natural England's opinion, least sensitive to mis-specification of the population trend and demographic rates used in the PVA model (Natural England 2015[7]).

[6] Jitlal, M., Burthe, S., Freeman, S. and Daunt, F. (2017). Testing and Validating Metrics of Change Produced by Population Viability Analysis (PVA). Scottish Marine and Freshwater Science Vol 8 No 23. Marine Scotland Science.

[7] Natural England (2015) Hornsea Offshore Windfarm Project Two: Written Submission for Deadline 7. Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010053/EN010053-001242-EN010053%20-%20Natural%20England's%20Deadline%207%20response.pdf

Summary of Written Representation	Applicant's Response	Natural England Comments
		In addition to these issues, it should be again noted that: •The PVAs currently used by the Applicant are run over 25 years rather than 30 years (which is the lifespan of Norfolk Vanguard) meaning that potential impacts occurring in the last five years of operation are not being accounted for in the models. •Not all of the PVAs used by the Applicant present outputs as the required counterfactuals (e.g. that undertaken for Galloper OWF for LBBG at the Alde-Ore). Therefore based on the above, Natural England does not agree that the Applicant has any basis for the statement that PVA results referred to in the Norfolk Vanguard assessment remain reliable despite having been produced before Natural England adopted the matched-pair advice.
Benthic ecology and protected sites		
Natural England is unable to agree with the conclusions within the Habitats Regulation Assessment that there will be no adverse effect on the integrity of Haisborough Hammond and Winterton	Natural England provided detailed comments on Sandbanks and Reef in Annex C of their Deadline 1 submission which the Applicant has responded to in Appendix 1 (document reference ExA;WQRApp1;10.D2.3).	Natural England confirms that the inclusion of the comments were pre-emptive. However, we note that in The Applicants Response to our response to

Summary of Written Representation	Applicant's Response	Natural England Comments
SAC Annex I sandbanks and reef features both alone and in-combination. These concerns primarily relate to: • Impacts from sandwave levelling; • Scour prevention and cable protection; • Impacts on Sabellaria spinulosa reef; and • Boulder clearance.	The sections below are included in Natural England's Written Representation but are not raised in Annex C. It should be noted that Natural England's Annex C and the Written Representation make mention of 'sensitive' cable protection, beneficial effects of cable protection, routing through 'low' reef, and removal of cable protection at decommissioning – these concepts are not included in the Applicant's documentation; the Applicant believes these provide a pre-emptive position from Natural England based on the Hornsea Project Three Application. Natural England advised in a conference call with the Applicant on 22 January 2019 that these comments were provided to be pre-emptive in nature.	the first set of Examiners question the Applicant has referred to micro siting through patchy areas of Annex I reef. Please see our Deadline 4 response as Natural England has concerns in relation to this. In our discussions with the Applicant on 22 January 2019 and 8 March 2019 we have highlighted our concerns in relation to the use of cable protection within the SAC. Please see our Generic Cable Protection Advice Note also provided at Deadline 4 for further details.
Sandwave levelling Comments discussed in detailed response to Annex C apart from: • It is also unclear how single build vs. phased build both alone and / or in - combination with Norfolk Boreas has been assessed against the conservation objectives for the site. • Therefore, due to the limited amount of supporting evidence and uncertainty in the cumulative/in-combination assessment Natural England is still unable to advise beyond reasonable scientific doubt that there will be no adverse effect on site integrity of Haisborough Hammond and Winterton Annex I sandbanks.	Regardless of whether the project is installed in a single or two-phased scenario, the export cable installation will be undertaken for one cable pair at a time and therefore the main difference between the scenarios would be the duration between the installation of one HVDC cable pair and the next. The export cable corridor is in a dynamic environment. 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 and therefore there would be no adverse effect on integrity (AEoI).	Natural England agrees with the applicant that the sandbank system is dynamic within HHW SAC. However, there is also Annex I reef features that remain a concern as well as any non-recoverable impacts within either feature.

Summary of Written Representation	Applicant's Response	Natural England Comments
Boulder clearance (not included in Annex C) • The figure presented in table 10.12 only includes impacts on Haisborough Hammond and Winterton SAC from removal of boulder. This figure should also include the disturbance likely to occur in the location they are moved to	As noted in the Applicant's response to First Written Questions (Q5.22), given the low proportion of boulders in the area, it is likely that micrositing around boulders would be possible. However, as requested by Natural England and the MMO in their respective PEIR responses, the impact assessment includes the potential for boulder clearance in order to be conservative. A conservative allowance for clearing up to 75 boulders (53 in the offshore wind farm sites and 22 in the offshore cable corridor) of up to 5m in diameter has been included in the assessment. The area of temporary disturbance as a result of boulder clearance in the offshore wind farm sites assessed in the ES based on these assumptions is 0.001km2, which the Applicant deems to be conservative. The area vacated by the boulder is highly likely to become consistent with the wider area and that lost by the new boulder location and therefore there is no net change in habitat availability, resulting in a temporary effect. However, if this were to be 0.002km2 as suggested by Natural England, to reflect the area vacated plus the area on which each boulder is placed, the total overall temporary disturbance footprint would be 16.120km2 rather than 16.119km2 (either way, rounded to 16.1km2 as per ES Chapter 10 Benthic Ecology, Table 10.12 Impact 1A). Likewise, the area of boulder clearance in the offshore cable corridor assessed in the ES is 0.0004km2. However, if this were to be 0.0008km2 as suggested by Natural	No further comments.

Summary of Written Representation	Applicant's Response	Natural England Comments
	England, the total overall footprint in the offshore cable corridor would be 6.0729km2 rather than 6.0724km2 (either way, rounded to 6.1km2 as per ES Chapter 10 Benthic Ecology, Table 10.12 Impact 1B). There would therefore be no change to the conclusions of the assessment as the temporary effect associated with boulders is negligible. Pre-construction surveys required under dDCO Schedules 9 and 10 Part 4 Condition 20(2)(b) and Schedules 11 and 12 Part 4 Condition 13(2)(b) would identify any requirement for boulder clearance within the offshore project area.	
Physical Processes		
Benthic and Physical processes Comments discussed in detailed response to Annex C apart from: • Natural England disagrees with some of the Sensitivity data presented in table 10.7.2, for example, coarse sediment has high sensitivity to habitat change as does subtidal sand.	The Applicant believes Natural England is referring to Table 10.17 of ES Chapter 10 Benthic Ecology. The Applicant would welcome confirmation of the information source/reference Natural England is referring to in its assertion that all coarse sediment and subtidal sand should be classified as having high sensitivity. Tillin & Tyler-Walters1 (2013) provides a review of the sensitivities of UK subtidal sedimentary habitats to pressures associated with human activities on behalf of the JNCC. The review focusses on the sensitivity of the ecological groups of species associated with a habitat.	Whilst we do not dispute the JNCC report it does only relate to biological communities. We advise that the Conservation advice package for HHW SAC including Conservation Objectives and Advise on Operations detailed on the Natural England website is considered for these sub features.

Summary of Written Representation	Applicant's Response	Natural England Comments
	Example conclusions for the impact of habitat change on ecological groups that are of relevance to Norfolk Vanguard include: • Mobile epifauna, mobile predators and scavengers o "it is noted that Asterias rubens and Pagurus bernhardus are found on hard substratum including bedrock and boulders and would not be excluded by an increase artificial substratum" o The group is assessed as 'Not Sensitive' • Small- medium suspension and/or deposit feeding polychaetes: o This ecological group would be highly sensitive to a change to hard substratum as this would result in the loss of suitable habitat for this ecological group • Small epifaunal species with robust, hard or protected bodies: o "it is noted that this ecological group is able to colonise artificial substratum" o The group is considered 'Not Sensitive'. The Applicant therefore maintains that coarse sediment (including the biotopes SS.SCS.CCS, SS.SCS.CCS.MedLumVen and SS.SCS.CCS.Pkef which were recorded in the Norfolk Vanguard offshore project	

Summary of Written Representation	Applicant's Response	Natural England Comments
	area) are categorised as low to high sensitivity as shown in Table 10.17.	
Coastal processes • At the Relevant Representation stage Natural England raised concerns regarding erosion rates at Happisburgh landfall site (paragraph 5.4.1 – 5.4.6). The Applicant provided a clarification note on 30 November 2018 (Appendix 1 – Coastal erosion Clarification). • Natural England has reviewed this document and is satisfied that the specific issues raised in previous correspondence relating to the assessment of coastal Erosion at Happisburgh have been resolved.	The Applicant welcomes Natural England's revised position.	No further comments
Marine Mammals		
At the Relevant Representations stage Natural England raised a number of issues regarding potential impacts to marine mammals. We have since had discussions with the Applicant regarding some of those points. Areas of agreement between Natural England and the Applicant are included in the draft SoCG provided by the Applicant. For any points not agreed in the SoCG, the submissions made in the Relevant Representations	• The dDCO (Schedules 9 and 10 Part 4 Condition 14(m) and Schedules 11 and 12 Part 4 Condition 9(l)) states: "In the event that driven or part-driven pile foundations are proposed to be used, the licenced activities, or any phase of those activities must not commence until a site integrity plan which accords with the principles set out in the in principle Norfolk Vanguard Southern North Sea candidate Special Area of Conservation Site Integrity Plan has been	No further comments

Summary of Written Representation	Applicant's Response	Natural England Comments
are still valid and should be considered as outstanding points of concern. These relate to: • The management of cumulative noise impacts on the Southern North Sea SCI from both piling and UXO activities; • Southern North Sea SCI HRA assessment in-combination with other plans or projects; • Effectiveness of UXO mitigation; particularly in relation to the largest UXOs.	submitted to the MMO and the MMO is satisfied that the plan, provides such mitigation as is necessary to avoid adversely affecting the integrity (within the meaning of the 2017 Regulations) of a relevant site, to the extent that harbour porpoise are a protected feature of that site." This provides the commitment that construction cannot commence until the MMO agrees there would be no AEoI on the Southern North Sea Site of Community Importance (SCI), and therefore allows the Information to Support HRA report to conclude that there would be no AEoI. • The Norfolk Vanguard in-combination assessment provided in the Information to Support HRA report includes the projects considered in the Review of Consents (RoC) and takes a more conservative approach to the in-combination scenarios. • Unexploded ordnance (UXO) clearance is not included within the DCO application. A Marine Licence application will be completed pre-construction following the UXO surveys and once the nature and extent of UXO clearance is known. A Marine Mammal Mitigation Protocol for the UXO clearance works will be submitted with the Marine Licence application.	
Fish and Shellfish Ecology		
Natural England noted concerns in its Relevant Representation (paragraph 5.3.1) that no further monitoring or independent surveys are proposed	The Applicant proposes that given the minor impacts of the project on fish and shellfish ecology, no monitoring would be undertaken.	No further comments

Summary of Written Representation	Applicant's Response	Natural England Comments
regarding fish and shellfish ecology within the In Principle Monitoring Plan. These concerns primarily relate to fish assemblages which form a functional role in the food web for harbour porpoise within Southern North Sea SCI. Natural England's position remains the same as that presented in our Relevant Representation. However, we acknowledge that the Applicant will seek to address these concerns post consent.	It is agreed with Natural England in the SoCG (document Rep1-SOCG-13.1) that the In Principle Monitoring Plan provides an appropriate framework to agree monitoring post consent.	
Decommissioning		
Comments discussed in detailed response to Annex C apart from: NE acknowledges that a decommissioning programme will be required post consent and that this will be agreed at the relevant time under the provisions of the Energy Act 2004. The decommissioning plan should include an assessment on whether in-combination decommissioning impacts have been assessed fully and, if not, request additional information on the impact assessment. NE would welcome a discussion with the Applicant on the potential for in-combination impacts at that time.	In accordance with DCO Schedule 1 Part 3 Requirement 14 "No offshore works may commence until a written decommissioning programme in compliance with any notice served upon the undertaker by the Secretary of State pursuant to section 105(2) of the 2004 Act has been submitted to the Secretary of State for approval." It is standard practice for the decommissioning programme and associated impact assessments to be reviewed (and updated if necessary) prior to decommissioning occurring.	No further comments
Contract for Difference (CfD)		
In relation to discussions about Contract for Difference (CfD) potentially influencing how much of the	The DCO (Schedules 9 and 10 Part 4 Condition 14(1)(b) and Schedules 11 and 12 Part 4 Condition 9(1)(b)) requires	Natural England believes there may have been a misunderstanding, we

Summary of Written Representation	Applicant's Response	Natural England Comments
consented project is built out and therefore influencing the electrical system used for the whole project or as two separate phases; Natural England requests that there is a requirement for all Applicants to formally and legally notify the regulators, and the SNCB, that all construction works have completed and no further phases of construction will commence. This is to ensure that monitoring plans and ongoing requirements for the development take proper account of future works and to ensure clarity on when operations and maintenance phase has begun to allow related conditions to be enforced. However, this will also have an additional benefit to the wider industry in that it will release any remaining Mega Watt capacity in order for the Habitats Regulations Assessments to be revised/use best available information allowing possible further headroom for other projects.	a construction programme and monitoring plan to be submitted to and approved in writing by the MMO prior to construction. This must include an indicative written construction programme for (where relevant under the respective DML) all wind turbine generators, accommodation platforms, meteorological masts, measurement buoys, cables, offshore electrical platforms and cables. As part of the construction programme and monitoring plan the Applicant must include "… (cc) at least four months prior to commissioning, detail of post-construction (and operational) monitoring." In addition, Condition 8 of the Generation DML (Schedules 9 and 10) and Condition 3 of the Transmission DML requires that the undertaker must give notice to the MMO whether the authorised scheme will be constructed in a single phase or in two phases. As part of the notification, details must be provided in relation to the total number of wind turbine generators, accommodation platforms, meteorological masts, Light Detection and Ranging (LiDAR) measurement buoys and wave measurement buoys to be constructed in that phase. The Applicant therefore considers that the DMLs, as currently drafted, provide certainty over the construction and operational periods of the development and an amendment to the conditions of the DML is not necessary in this instance.	would like notification of the completion of various stages. Not just an upfront timeline as it is recognised by all parties that things can slip and/or be completed early. As the applications are based on WCS not the as built project, the completion notification we are seeking would be legal confirmation that no further development will occur as part of this project such that subsequent projects in-combination assessment can be altered accordingly and available 'head room' is released.

Summary of Written Representation	Applicant's Response	Natural England Comments
Onshore Ecology and Ornithology		
At the Relevant Representations stage Natural England raised a number of issues regarding potential impacts to onshore ecology and ornithology. We have since had discussions with the Applicant regarding some of those points. Areas of agreement between Natural England and the Applicant are included in the draft SoCG provided by the Applicant. For any points not agreed in the SoCG, the submissions made in the Relevant Representations are still valid and should be considered as outstanding points of concern.	The current position is set out within the SoCG with Natural England submitted at Deadline 1 (Rep1 - SOCG - 13.1). The Applicant held a meeting with NE on 22nd January 2019 to discuss matters that are currently not agreed. The Applicant is currently considering the advice provided by Natural England and will continue to engage to progress these matters.	No further comments.
In-combination Natural England recommends that an in-combination assessment should be undertaken for Norfolk Valley Fens SAC with Hornsea Three OWF as this cable route passes about 360 m to east of Booton Common and construction periods may overlap.	The Applicant has received advice from Natural England in their review of Appendix 2 Clarification Note: Norfolk Vanguard Water Dependent Designated Sites (Appendix 2 to Statement of Common Ground: Rep1 - SOCG - 13.1). The Applicant and Natural England have also discussed aspects of this during a meeting on 22nd January 2019. The Applicant will provide Natural England with further clarification on the water supply mechanisms of Norfolk Valley Fens SAC.	No further comments.
Assessment of Adverse Effect on Integrity Natural England is not able to agree with the conclusion that there is no potential adverse effect on the integrity of the River Wensum SAC, Paston Great Barn SAC and Norfolk Valley Fens SAC in relation to	Issues related to the River Wensum SAC remain under discussion. The current position is set out within the Statement of Common Ground submitted at Deadline 1 (Rep1 - SOCG - 13.1).	No further comments.

Summary of Written Representation	Applicant's Response	Natural England Comments
the conservation objectives for the sites due to insufficient evidence.	The Applicant has received advice from Natural England in their review of Appendix 3 Clarification Note: Norfolk Vanguard Bat Impact Assessment – Paston Great Barn Special Area of Conservation (SAC) (Appendix 3 to Statement of Common Ground: Rep1 - SOCG - 13.1). The Applicant and Natural England have also discussed aspects of this during a meeting on 22nd January 2019. The Applicant will provide Natural England with further clarification on this issue. As noted above, the Applicant will provide Natural England with further clarification on the water supply mechanisms of Norfolk Valley Fens SAC.	
Outline Code of Construction Practice (CoCP) and Outline Landscape and Environmental Management Strategy (OLEMS) There is insufficient detail in the CoCP measures to safeguard River Wensum SAC, Norfolk Valley Fens SAC and The Broads SAC and SSSI in relation to sediment control and reinstatement of all work areas.	Issues related to sediment control remain under discussion. The current position is set out within the Statement of Common Ground submitted at Deadline 1 (Rep1 - SOCG - 13.1). The Applicant and Natural England have also discussed aspects of this during a meeting on 22nd January 2019.	No further comments.
Wintering and Breeding Birds in Wider Countryside There appears to be no detailed noise assessment for disturbance to birds during construction. Sand martin are known to nest in Happisburgh Cliffs which may be affected by noise, vibration and 24hr working (i.e. works involving lighting). The stated distance between nest sites and landfall (130m), Chapter 25 Onshore Noise and Vibration Table 25.17	Issues related to the noise and vibration effects remain under discussion. The current position is set out within the Statement of Common Ground submitted at Deadline 1 (Rep1 - SOCG - 13.1). Table 25.17 of Chapter 25 Onshore Noise and Vibration lists vibration inducing relevant activities which may lead to vibration and the corresponding distances at which vibration levels may be experienced. The only activity identified within Table 25.17 that is relevant to the works in proximity to Happisburgh Cliffs is vibratory compaction required for	No further comments.

Summary of Written Representation	Applicant's Response	Natural England Comments
Predicted distances at which vibration levels may occur shows that some vibration may be felt at this distance. Therefore an assessment of potential vibration effects and the significance of this for birds should be evaluated. Natural England suggests that designated sites within 500 m of works are screened in for assessment of noise disturbance on birds, i.e. River Wensum SSSI, Dereham Rush Meadows SSSI and Dillington Carr, Gressenhall SSSI. Currently it would appear a distance of 300m has been selected as distance criteria for scoping out, but it is unclear where this distance has come from.	the introduction of the haul road for accessing the landfall. Whilst the landfall compound extends to within approximately 130m from the cliffs, the haul road accessing the landfall compound would be set much further back from the cliffs; approximately 300m+. Vibration effects associated with steady state vibratory compaction would not be experienced beyond 102m based on the information set out in table 25.15 of ES Chapter 25 Noise and Vibration. Vibration effects when a vibratory compactor starts up would be briefly experienced up to 166m away. These effects would be experienced for a few seconds and would not be perceptible at distances beyond 166m. 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.	
Water Supply Mechanism Natural England note that there is no information provided on the water supply mechanism for The Broads and Norfolk Valley Fens SACs and how this may be affected by the installation of the cable route. There is also insufficient evidence to assess any impacts which may arise from changes in groundwater flow to component SSSIs of Norfolk Valley Fens SAC.	Issues related to water supply mechanisms remain under discussion. The current position is set out within the Statement of Common Ground submitted at Deadline 1 (Rep1 - SOCG - 13.1). The Applicant and Natural England have discussed aspects of this during a meeting on 22nd January 2019. The Applicant will provide Natural England with further clarification on the water supply mechanisms.	No further comments.

Summary of Written Representation	Applicant's Response	Natural England Comments
The Applicant supplied a clarification note (Appendix 2 – Water Dependent Designates Sites) on 30 November 2018. Natural England has reviewed this document as part of our submission in this Written Representations, however, the information provided within this clarification note does not contain sufficient information or detail to ascertain potential effects on water dependant designated sites, and does not reference WETMECS as identified by the EA. Therefore Natural England's position remains the same as that presented in our Relevant Representation. Natural England also advises that further information is obtained from Environment Agency and used in a detailed appraisal of groundwater effects.		
Barbastelle Bats 6.8.15. Natural England considers that there is likely to be an impact on the Paston Great Barn SAC due to loss and severance of foraging and commuting habitat over at least 7 years. 6.8.16. To fully assess the impact Natural England would like more information about the 82 m of hedgerow to be removed within 5 km of Paston Great Barn, along with an accurate estimation of the timescale for recovery to previous (or better) condition following installation of the cable trench. The	Issues related to barbastelle bats remain under discussion. The current position is set out within the Statement of Common Ground submitted at Deadline 1 (Rep1 - SOCG - 13.1). The Applicant and Natural England have discussed this during a meeting on 22nd January 2019. The Applicant will provide Natural England with further clarification.	No further comments.

Summary of Written Representation	Applicant's Response	Natural England Comments
assessment should provide an indication of hedgerow quality for bats, as well as the potential long-term effects on quality with estimated timescales. 6.8.17. Natural England would also like to see an estimation of the importance to bats from Paston Great Barn SAC of the 11 ha of woodland that will be fragmented by the hedgerow removal. The Applicant supplied a clarification note (Appendix 3 – Bat Impact Assessment) on 30 November 2018. Natural England has been unable to review this as part of our submission in this Written Representation due to time constraints and therefore at this time our position remains the same as our Relevant Representation. However, Natural England will review this document for Deadline 2 and if its conclusion/s alter our position will provide an update.		
Use of Topsoil Natural England suggests that it isn't appropriate to treat topsoil from agricultural land as a single resource for stockpiling and reuse isn't appropriate as there are significant differences between topsoil in arable and grassland, valley bottom and valley sides and natural, semi natural and managed land. Therefore topsoil should be reinstated where it originated.	Issues related to topsoil reinstatement remain under discussion. The current position is set out within the Statement of Common Ground submitted at Deadline 1 (Rep1 - SOCG - 13.1). Topsoil would be 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.	No further comments.

THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Natural England's Comments on Applicants Response to Natural England's Response to First Round of Written Questions [REP2-004]

13 March 2019

Norfolk Vanguard Offshore Wind Farm – Comments on Applicants Response to Natural England's Response to First Round of Written Questions [REP2-004] provided by the Applicant at Deadline 2

Following submission of REP2-004 by the Applicant at Deadline 2 regarding the construction and operation of Norfolk Vanguard Offshore Wind Farm, Natural England has reviewed this document, and provided comment within the remit of Natural England. These comments are colour coded as:

Green Comments – Comments support/agree with Natural England position or does not impact on Natural England concerns or Natural England has no further comments in this regard

Amber Comments – Natural England comments may be in contradiction further advice needed, or potential new issue not included in Natural England comments

Red Comments – Comments in direct contradiction/argument with Natural England position or represents a significant issue not mentioned in Natural England comments

Table 1: Natural England Comments on Applicants Response to Natural England's Response to First Round of Written Questions [REP2-004] provided by the Applicant at Deadline 2

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
1.2	Please provide comments on any relevant information contained in the Change Report [AS-009] and Errata document [AS-010], and whether you agree with the conclusions reached by the Applicant. In the event that the amendments are accepted please	Natural England is supportive of the general approach set out in the change report, and broadly agrees with the conclusions presented. However, we have the following additional comments: a) In-combination – The change report does not fully detail how these changes may impact any in-combination assessment. Whilst it is the view of Natural England that this increase is unlikely to alter the conclusions laid out in the original application you should undertake this assessment and present the results; b) Temporal WCS - The	a) The Change report demonstrates that there is no change to the impact conclusions of the ES, with the exception of the potential maximum seasonal average1 in the Southern North Sea candidate Special Area of Conservation (cSAC)/Site of Community Importance (SCI) which has increased by 0.03% for the winter area in relation to piling in Norfolk Vanguard East. This level of change does not affect the conclusions of the in-combination assessment in the Information to Support HRA report (document 5.3) which refers to the commitment to mitigate cumulative impacts through the Site Integrity	No further comments.

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	indicate any consequential amendments which you require to the dDCO.	Applicant states in paragraph 36 of the change report 'In addition to the spatial extent of underwater noise impacts, consideration was also given to the temporal worst case scenario (wcs). The Environmental Statement (ES) assessed a total duration of 1,260 hours of piling activity (equivalent of 52.5 days), for all project infrastructure which could be piled over a 4 year construction duration.' However, table 2.8 details a WCS of 59 days. This discrepancy should be clarified; and c) There are no units against 'average piling time per foundation' in table 2.2. Whilst it has been assumed that this is in hours this should be confirmed. A full copy of our response to the Applicant in this regard can be found in Annex D. With reference to document AS-010 - Both the availability of the documents and significance of them has been missed by Natural England until review of the ExA questions that refer to Section 51 Advice document amendments. Unfortunately as they are rather large documents Natural England has not had the chance to review and consider potential implications for advice in time for deadline one especially as one of them is 342 pages long. Therefore, Natural England will review these documents and provide Written Representation at Deadline 2.	Plan (SIP) (as required under dDCO Schedules 9 and 10 Part 4 Condition 14(m) and Schedules 11 and 12 Part 4 Condition 9(l) in accordance with the In Principle SIP (document reference 8.17). b) The marine mammal assessment (including Table 2.8) includes 10 minutes of Acoustic Deterrent Device (ADD) deployment per pile as well as pile driving activity. For the original number of piles assessed in the ES, this represented: • 139 hours (equivalent of 6 days) of potential disturbance to marine mammals as a result of ADD; plus • 1,260 hours of piling activity (equivalent of 52.5 days) i.e. 1,399 hours of potential marine mammal disturbance in total (equivalent of 58 days) Table 2.8 specifically focusses on the seasonal piling duration and its impacts on harbour porpoise which is inclusive of 10 minutes of ADD deployment per pile as specified in Section 2.1.3.5 Marine mammals. ADDs are not expected to affect fish significantly and so have not been included in the assessment of fish and shellfish ecology (section 2.1.3.4 of the Change Report, which includes paragraph 36) hence the discrepancy between the fish and marine mammal temporal worst case scenarios. It should be noted that, for the revised number of piles assessed in the Change Report, the total durations are as follows and as discussed in the Change Report this minor increase does not affect the	

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
			conclusion of the ES: • 146 hours (equivalent of 6 days) of potential disturbance to marine mammals as a result of ADD; plus • 1,296 hours of piling activity (equivalent of 54 days) i.e. 1,442 hours of potential marine mammal disturbance in total (equivalent of 60 days). c) The Applicant confirms that the unit is hours.	
3.1	Can you confirm that you are content that the baseline environment for ornithology along the offshore cable corridor has been sufficiently well informed and has been characterised correctly?	Natural England assumes that the data utilised by the Applicant for the offshore cable corridor assessments are that presented in the Greater Wash Special Protection Area (SPA) Department Brief (i.e. Natural England & JNCC 2016) and that the Applicant has not requested the raw data from JNCC. Although, we have not received anything from the Applicant to clarify our assumption. As noted in our RRs, the Applicant has not presented any evidence to back up its statements that the offshore cable corridor does not overlap spatially with the distributions of common scoter and tern features of the Greater Wash SPA. With regard to the red-throated diver (RTD) density data utilised by the Applicant, we assume that the Applicant has used Figure 2 of the mean density surface maps for RTD presented in the Greater Wash Departmental Brief to obtain the figure of 1.36–3.38 birds/km2 for the peak density of birds in the	The Applicant can confirm that the red-throated diver density estimates used in the assessment were those presented in the Greater Wash Special Protection Area (SPA) Department Brief (Natural England and Joint Nature Conservation Committee (JNCC) 2016). The Applicant has produced the figure requested by Natural England which shows that the offshore cable route does not overlap with any concentrations of common scoter, using the data presented in Natural England and JNCC (2016). This figure is presented in Appendix 23.1 The above aspects notwithstanding, the Applicant welcomes Natural England's conclusion that the best available evidence has been used in this assessment.	Natural England is content that the baseline environment has been characterised correctly. However, we have reservations regarding the Applicant's assessment of impacts. As noted in our response to the Applicant's updated Greater Wash SPA citation and assessment in their response to the Section 51 advice [REP2-038], the upper density figure of 3.38 birds/km2 would result in the displacement of 85 red-throated divers (RTDs), assuming 100% displacement around a maximum of two cable laying vessels. Using the preferred Natural England worst case scenario of 10% mortality a predicted 8.5 birds would be expected to die. Using the corrected SPA RTD population size of 1,407 and the corrected natural mortality of the SPA population

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		SPA crossed by the cable route. These values are presented in both the ES and the Report to Inform the HRA. Use of the upper figure of 3.38 birds/km2 is unlikely to be precautionary, bearing in mind recent surveys of Outer Thames Estuary SPA have identified higher RTD densities when digital aerial surveys have been undertaken compared with earlier visual aerial surveys, data from the latter having been used for the classification of the Greater Wash SPA. However, a more robust approach would be for the underlying density estimate data for all 1x1km squares that cover the offshore export cable route and buffer from the individual surveys are utilised to calculate a mean peak density for the cable route for use in the assessments. Nevertheless, for the area covered by the Vanguard offshore export cable, in the absence of site-specific surveys of the cable corridor area (which is typical for offshore wind farm assessments), we would consider the data utilised in the Greater Wash SPA Departmental Brief (i.e. Natural England & JNCC 2016 and that in Lawson et al. 2016) to be the best available evidence currently available to characterise that section of the cable route through this area of the Greater Wash SPA. Provided that the upper density		figure of 281, the addition of 8.5 birds equates to 2.65% of baseline mortality, which is not insignificant and requires further consideration by the Applicant regarding whether mitigation measures are needed, including assessing the potential merits of seasonal restrictions that ensure cable laying within the SPA take place outside the peak period for RTD.

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		figure of 3.38 birds/km2 is used for the assessments we feel the best available evidence has been utilised.		
3.2	Based on the 'Rochdale envelope' parameters for the project that the Applicant has stated, can you confirm whether in your view the methodology used in the modelling assesses the worst case collision risk?	The Applicant's worst case scenario for the Collision Risk Modelling (CRM) assessment is based on 200 x 9MW turbines, which is the smallest turbine option, but represents the largest number of turbines. Notwithstanding our concerns regarding the approach the Applicant has taken to the broader methodological issues of CRM, based on the information provided by the Applicant in the CRM annexes of the offshore ornithology technical appendix (annexes 3, 4 and 5 of Appendix 13.1), this option produced the highest collision predictions (higher than the 90 x 20MW turbine option). The assessments are then based on whichever of the build out options of either all the turbines in Vanguard East or all of the turbines in Vanguard West is the highest CRM prediction for the 200 x9MW turbine option, as this is considered the worst case. We would agree that this approach is the worst case option, as from our calculations any split in the turbines across Vanguard East and West does not result in a higher collision prediction than the highest prediction from either all turbines in West or East.	No further response required.	No further comments.

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
3.3	Can an update be provided on the progress that has been made since NE's RR [RR-106] and RSPB's RR [RR-197] in resolving the outstanding areas of disagreement regarding the following offshore ornithology matters for Norfolk Vanguard alone and in-combination, and in particular in regard to the following matters:	Natural England has not received any further discussions/clarifications from the Applicant regarding resolving any of the outstanding areas of disagreement regarding offshore ornithology matters. However, we have been able to utilise information provided by the Applicant in their original submission documents, and can provide more detail and some updates on the following issues raised by the ExA.	The Applicant has provided a range of updates and clarifications in its responses to the ExA's first written questions (as listed below) and these have been provided to Natural England and the RSPB. The Applicant also welcomes further dialogue with the RSPB to resolve outstanding areas of disagreement. Norfolk Vanguard Offshore Wind Farm Applicant Responses to the ExA's First Written Questions document reference: ExA; WQ; 10.D1.3 • Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Red-throated diver displacement (Appendix 3.1, document reference ExA; WQApp3.1; 10.D1.3) • Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Collision Risk Modelling: update and clarification (Appendix 3.2, document reference ExA; WQApp3.2; 10.D1.3) • Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Operational Auk Displacement: update and clarification (Appendix 3.3, document reference ExA; WQApp3.3; 10.D1.3)	Natural England has been satisfied regarding the impacts of Norfolk Vanguard alone at the EIA scale for Collision Risk Modelling, but has outstanding concerns regarding the assessment the cumulative collision impacts of Norfolk Vanguard together with other offshore windfarms at the EIA scale. Furthermore, Natural England has a number of outstanding concerns regarding impacts on several Special Protection Areas, both from Norfolk Vanguard alone and also in-combination with other offshore windfarms. Natural England's responses to the documents listed by the Applicant can be found in REP2-036 and REP1-008 in REP3-051. Natural England has continued engagement with the Applicant regarding outstanding areas of concern and looks forward to

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			The Applicant will be providing further assessment updates through the examination process to address remaining areas raised by Natural England and the RSPB.	further discussions to address these issues.
3.3	a) The use of potential biological removal (PBR) versus population viability analysis (PVA) modelling;	Natural England's Response: a) Our position regarding the use of Potential Biological Removal (PBR) vs Population Viability Analysis (PVA) remains the same as highlighted in our Relevant Representations (RRs) – NE does not advocate the use of PBR modelling when PVA modelling is available. Therefore our consideration will focus only on the PVA outputs. Although NE has previously considered PBR outputs for assessing population impacts in cases where up to date PVA models have not been available at an appropriate population scale. However, the use of PBR on its own, as the means of assessing population impacts on seabird populations presents a number of issues. Therefore, NE advises that wherever possible the population level impacts of predicted mortality from developments should be assessed using PVA models as these allow the effects of factors such as density dependence, population trends and varying demographic parameters to be explicitly investigated in terms of their effect on the population trajectory. PVA models also allow relative comparisons of population level	Potential Biological Removal (PBR) has been referred to in the assessments as an additional source of predictions about population consequences from additional mortality. These outputs are not relied upon in order to support the Applicant's assessment, but they do provide useful background information on the relative size of impacts and it is for that reason they have been included in the assessment. The Applicant agrees that population modelling (in the form of PVA) has additional benefits for understanding population consequences, and for these reasons the assessments also include references to Population Viability Analysis (PVA) where appropriate. At this stage, the Applicant does not consider there to be sufficient justification for updated PVA to be conducted, since the existing models (to which reference is made) remain valid.	Natural England re-iterates its position that we do not advocate the use of PBR modelling when PVA modelling is available. Therefore, we advise that no weight is placed on the PBR outputs.

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		effects with and without the additional mortality to be considered in a way that is not possible with PBR.		
3.3	b) The mean peak seasonal abundances for red-throated diver that have been used in the operational displacement assessments and matrices in Tables 13.27 to 13.29 of ES Chapter 13 [APP-337];	No further clarification/information has been received from the Applicant regarding the mean peak seasonal abundances for RTD used in the operation displacement matrices for Vanguard West (Tables 13.27-13.29 of the ES). Therefore, our position remains that we do not agree with the figures used in the assessment, as these appear to be based on data for just birds on the water and hence the figures used are too low. This approach is not consistent with the advice in the joint Statutory Nature Conservation Body (SNCB) interim displacement advice note (MIG-Birds, 2017), which advises that displacement assessments should use bird data for birds sitting on the water and birds in flight. This is also inconsistent with the approach the Applicant has taken for the assessments of operation displacement for Vanguard East for RTD and also for all of the auk and gannet assessments, as these have used the recommended approach of using abundances of birds on the water plus birds in flight. We therefore recommend that the Applicant revisits its operational displacement assessment for RTD at Vanguard West, and hence also the assessment of the operational	The Applicant notes that this was an error in the submitted assessment. This has been rectified in Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Red-throated diver displacement (Appendix 3.1, document reference ExA; WQApp3.1; 10.D1.3) submitted at Deadline 1.	The correct mean peak seasonal abundances for RTD in Vanguard West (i.e. birds on the water plus birds in flight) have now been used by the Applicant in their Appendix 3.1: RTD displacement – see REP1-008 in REP3-051.

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		displacement for RTD from Vanguard East and West combined.		
3.3	c) The displacement and mortality rate levels that have been used for red-throated diver;	No further clarification/information has been received from the Applicant regarding the displacement rate of 80% and mortality rate of 5% used in their assessments of RTD displacement (at Environmental Impact Assessment (EIA)) for operational displacement and for construction/cable laying of the offshore export cable for both EIA and HRA for the Greater Wash SPA). Our position remains that we do not consider the 80% displacement and 5% mortality rate used by the Applicant to be appropriate for assessing disturbance and displacement impacts to RTD from offshore wind farms and that this does not follow SNCB guidance (MIG-Birds, 2017). As highlighted in our RRs, based on the available evidence, we consider that there is no clear justification to change our current advice of a 4km buffer and 100% displacement across this (as advised in the joint SNCB displacement interim advice note, MIG-Birds, 2017) at this stage for the purpose of impact assessment. It would seem that while 4km may be an underestimate of the true extent of the displacement, assuming a magnitude of 100% out to 4km is likely to be an over-	The Applicant has submitted a review of evidence for red-throated diver displacement and this is included in Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Red-throated diver displacement (Appendix 3.1, document reference ExA; WQApp3.1; 10.D1.3) submitted at Deadline 1. This review considers that displacement from within the wind farm itself should be 90% and that the rate beyond the wind farm boundary declines rapidly and is close to zero by 2km. The review also presents evidence that the displacement-induced mortality should be no more than 1%, rather than the highly precautionary 10% advised by Natural England. On this basis, the Applicant disagrees with the figures produced by Natural England and the conclusion that the annual total displacement mortality is 'not insignificant'. The above notwithstanding, the updated assessment also presents displacement tables which include Natural England's preferred rates. The updated assessment also corrects the Norfolk Vanguard West assessment for the noted error and reports that the impacts for this site are also not significant.	As noted in our response to the Applicant's Appendix 3.1 on RTD displacement [REP1-008 in REP3-051], we continue to advise that assessments of operational disturbance and displacement for RTD for offshore wind farm assessments are based on a constant displacement rate across the offshore wind farm site and a 4km buffer and suggest that a range of displacement rates up to 100% and a mortality rate of up to 10% are considered. However, we also note that in Appendix 3.1, the Applicant has now produced impact figures for a range of rates of 90-100% displacement and 1-10% mortality, which covers the range requested by Natural England. We note that at the Natural England preferred range of up to 100% displacement and 10% mortality that if all capacity is built in Vanguard West, then the annual predicted impact due to displacement of RTD during the operational phase is of moderate adverse significance, which is not

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		estimate. Therefore, the use of the two components of our current advice (a conservative estimate of extent and a precautionary estimate of magnitude within that extent) in combination, is likely to result in an appropriate estimate, based on our current understanding of the evidence base. Indeed the recent evidence (described in our RRs) suggests that this approach (100%, 4km) might be closer to the truth, and hence less precautionary than has been previously suggested. As a result we continue to advise that assessments of operational disturbance and displacement for RTD for offshore wind farm assessments are based on a constant displacement rate across the offshore wind farm site and a 4km buffer and suggest that a range of displacement rates up to 100% and a mortality rate of up to 10% are considered. As the full EIA operational displacement matrices of up to 100% displacement and 100% mortality have been presented by the Applicant in their original submission document, NE has been able to calculate the figures we believe are the appropriate impact predictions based on our preferred worst case scenario of 100% displacement and 10% mortality rates for Vanguard East: • Autumn migration period: if 100% of the turbines are constructed in Vanguard East, a		insignificant in EIA terms (as is also the case for the unrealistic assessment of Vanguard East and West combined) (see paragraphs 38 and 44 of the Applicant's RTD displacement Appendix 3.1).

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
		maximum of 5 RTDs are predicted to die, which equates to 0.17% of baseline mortality for the spring Biologically Defined Minimum Population Scales (BDMPS) population (from Furness 2015), which would not alter the conclusion of a minor adverse impact made by the Applicant in their submitted ES Offshore Ornithology Chapter. • Winter period: if 100% of the turbines are constructed in Vanguard East, a maximum of 3 RTDs are predicted to die, which equates to 0.13% of baseline mortality for the winter BDMPS population (from Furness 2015), which would not alter the conclusion of a minor adverse impact made by the Applicant in their submitted ES Offshore Ornithology Chapter. • Spring migration period: if 100% of the turbines are constructed in Vanguard East, a maximum of 12 RTDs are predicted to die, which equates to 0.40% of baseline mortality for the spring BDMPS population (from Furness 2015), which would not alter the conclusion of a minor adverse impact made by the Applicant in their submitted ES Offshore Ornithology Chapter. • Annual impact: if 100% of the turbines are constructed in Vanguard East, the summed annual mortality for EIA operational		

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		displacement equals a maximum of 20 RTDs (5+3+12) predicted to die (range from CLs of abundance data: 0-57 birds), which when assessed against the largest BDMPS population (from Furness 2015) equates to 0.66% of baseline mortality (range from CLs: 0.00-1.88%), or when assessed against the biogeographic population (from Furness 2015) equates to 0.32% of baseline mortality (range from CLs: 0.00-0.93%). Using the mean peak abundance data, the predicted level of impact would not the conclusion of a minor adverse impact made by the Applicant in their submitted ES Offshore Ornithology Chapter. However, using the upper CLs of the abundance data, the predicted levels of impact are not insignificant and require further consideration by the Applicant. It has not been possible for us to complete such an assessment for Vanguard West (or for Vanguard East and West combined) due to the errors identified in the seasonal abundance estimates used in the displacement matrices for this site.		
3.3	d) The use of the Applicant's own stochastic collision modelling (CRM) rather than that advocated by the	The Applicant has not provided any further information on their stochastic CRM model. Our position remains that as we are uncertain of the R code the Applicant has used in their stochastic CRM model, we do not know whether this is the same as the MSS model	The Applicant has provided an update and clarification note at Deadline 1 (Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Collision Risk Modelling: update and clarification (Appendix 3.2, document reference ExA; WQApp3.2; 10.D1.3)) which	As noted in our response to the Applicant's Appendix 3.2 on CRM updates and clarifications [REP1-008 in REP3-051], whilst the Applicant has compared their stochastic model with the MSS

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	RSPB and NE (ie the Marine Scotland Science Model, MacGregor et al 2018);	(McGregor et al. 2018) and this means that potentially we would not end up with the same set of results from Vanguard as with the MSS work. The MSS stochastic CRM (McGregor et al. 2018) is now available and the general view of NE is that the stochastic CRM can be used for assessments, but that assessments should also provide the outputs from the standard Band model spreadsheets as well. We recommend the Applicant gives consideration to this.	addresses the concerns raised by Natural England and the RSPB.	stochastic model in terms of running both models effectively as deterministic models, we still do not have any information or R code for the Applicant's model and therefore we are unable to substantiate the applicants figures. , But it is our view that there are clear differences between it and the MSS model. Critically, the Applicant's stochastic model has not been subject to any QA or testing by independent authorities, is not publically available and as such cannot be considered to be transparent. In contrast, the MSS stochastic model has been subject to a project steering group (which included representation from Natural England) and the model documents (Shiny App, user guide and full report) are available in the public domain and project outputs can therefore be replicated or checked. As a result, we do not recommend that the outputs from the Applicant's stochastic model are relied upon for drawing conclusions regarding the levels of impact of CRM from Vanguard alone. Nor should these figures be included in

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				cumulative/in-combination assessments.
3.3	e) As requested by NE, please can the Applicant please provide the CRM input data that it has used in its own stochastic CRM, including the R code;	Question for Applicant.	The Collision Risk Modelling: update and clarification (Appendix 3.2) submitted at Deadline 1 provides the complete input data as requested by NE in their RR to allow them to calculate deterministic collision mortalities. Data files containing input data to allow NE to use the Marine Scotland Science (MSS) model can also be supplied on request, however the Applicant's R code was not written to be accessible for others to use and is embedded within a much larger piece of code which runs the complete analysis of the data. It would take considerable effort to modify the code and input data to make it a standalone piece of analysis code and this would simply replicate the MSS model. Therefore, the Applicant considers that this is not an efficient or appropriate use of time or resources. The above considerations notwithstanding, the Applicant can submit the R code to NE in confidence and subject to an agreement that it would only be used to confirm the modelling methods and would not be shared with third parties.	As noted in our response to the Applicant's Appendix 3.2 on CRM updates and clarifications [REP1-008 in REP3-051], the Applicant has now provided all the required input data to calculate deterministic/Band (2012) model outputs. Please see our response to question 3.3, part d above and REP 1-008 in REP3-051 with regard to the Applicant's stochastic collision risk model and its lack of transparency.
3.3	f) The use of median bird densities within the CRM, and the	No further information has been provided regarding the issues raised in NE's RRs regarding the use of median densities of	The Applicant has provided an update and clarification note at Deadline 1 (Norfolk Vanguard Offshore Wind Farm Offshore	As noted in our response to the Applicant's Appendix 3.2 on CRM updates and clarifications [REP1-

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	overall derivation of bird densities used in the CRM;	birds in flight rather than mean densities. Therefore, our concerns regarding this raised in our RRs remain, namely: • We are uncertain as to why in the stochastic CRMs the Applicant has not used the monthly density estimate +/- 95% confidence limits to give a range of predicted collisions. • We consider the use of a bootstrapped median to estimate density in the non-stochastic CRM to be questionable, when a mean density already exists. We note that the point of bootstrapping is to estimate variance – the Applicant claim's that it has to be this way to enable comparison with stochastic CRM outputs, but we aren't looking to compare the two. Additionally, Appendix 13.1 (Offshore Ornithology Technical Appendix) defends this approach by saying that "all collision predictions accurately reflected the observed densities", but we are not certain that this is true. The observed densities are those derived from the images (average of birds per image), whilst the bootstrapped data is a theoretical distribution of densities, from which the median gives an estimate of central tendency – therefore not a probability of being the 'true' density.	Ornithology: Collision Risk Modelling: update and clarification (Appendix 3.2, document reference ExA; WQApp3.2; 10.D1.3)) which addresses the concerns raised by Natural England.	008 in REP3-051], we continue to advise that the mean density of birds in flight is the most appropriate to use for the deterministic/Band model, which has been the standard approach for previous offshore windfarm assessments and enables comparisons between projects and in-combination assessment to be undertaken. The mean densities should also be used for the Marine Science Scotland stochastic Collision Risk Model.

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		We note that using the mean densities rather than the median densities, will result in increased CRM predictions.		
3.3	g) The Nocturnal Activity Factor that has been used in the CRM;	With regard to nocturnal activity factors for gannet, we are aware that the paper reviewing gannet nocturnal activity has been accepted and published in the Journal of Applied Ecology (Furness et al. 2018). Furness et al. (2018) has calculated average activity rates for gannet from several studies and recommended use of a "precautionary" nocturnal activity of 8% of daytime activity in the breeding season and 3% in the non-breeding season applied to the period sunset to sunrise. However, in the Norfolk Vanguard submission documents, the Applicant refers to a gannet review paper by Furness et al. (in subm.), which recommends use of 4.3% nocturnal activity in the breeding season and 2.3% in the non-breeding season for gannet, and these are the figures the Applicant has used in their stochastic CRM for assessment of impacts from Vanguard alone both for EIA and HRA. There is clearly a difference between the published figures in Furness et al. (2018) and the figures used by the Applicant in its submission assessment. Additionally, the analyses by Furness et al. (2018) and also used in the Applicant's submission documents are both different	The Applicant has provided additional collision risk modelling results in Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Collision Risk Modelling: update and clarification (Appendix 3.2, document reference ExA; WQApp3.2; 10.D1.3). While Natural England are correct to point out discrepancies in the values used for gannet between those in Furness et al. (2018) and an early version of the manuscript, it is important to note that the dataset and analysis was the same in both cases, however the final version took a slightly more precautionary approach. Nonetheless, all the data collected to date supports the fact that the standard nocturnal activity rates previously advised by Natural England are too high. With respect to questions about the timing of sunrise and sunset and ensuring compatibility of the analysis and the CRM, this aspect was given careful consideration in order that the results obtained would be appropriate for use in the CRM, since this was a primary aim of that work. The Applicant acknowledges that the time of day when surveys are conducted and how these relate to the diurnal patterns of flight activity	Natural England's position remains that previously outlined in our Relevant Reps (RR-106), namely: We currently do not have any agreed 'empirically derived' nocturnal activity factors that can be used with the Band model. We recognise from recent evidence presented e.g. by MacArthur Green (2015a) that nocturnal activity levels for some species may be lower than the levels that equate to the nocturnal activity factors currently used in CRM. However, we also note that there is uncertainty about the empirical activity levels and uncertainty about how these might translate into nocturnal factors applicable to the Band model. We advise that CRM outputs covering a range of nocturnal activity factors are considered to account for the uncertainty/variability (in the same way as has been recommended for bird densities, avoidance rates and

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		from those recommended in the first review undertaken as part of the East Anglia 3 assessment, which recommended use of 0% nocturnal activity during the breeding season and 2% nocturnal activity for gannet in the non-breeding season (see MacArthur Green 2015). Likewise, for kittiwake, the review undertaken as part of the East Anglia 3 assessment recommended use of 0% nocturnal activity during the breeding season and 12% nocturnal activity for kittiwake in the non-breeding season (see MacArthur Green 2015).The Norfolk Vanguard Applicant has used evidence reported in Furness et al. (in prep.) to suggest use of a nocturnal activity rate of 20% of daytime activity in the breeding season and 17% in the non-breeding season, with variability around these mean levels for kittiwake. Apparently, the emerging evidence on nocturnal activity levels from analysis of tagging work has itself generated conflicting recommendations. The activity levels of birds in the Norfolk Vanguard areas are defined as the percentage of birds in flight from the site-specific digital aerial surveys, which are effectively 'snapshot' surveys of the birds and their activities present at the site at the time of the survey. These surveys take place more	in seabirds is important to consider. However, in the case of Norfolk Vanguard and gannet records (in particular, although this also applies to most species) the peaks of activity were during the autumn, winter and spring. At these times of year there are less pronounced variations in flight activity over the course of the day and this, combined with the shorter day length during which surveys can be conducted, means that the results are little affected by questions of representativeness.	flight heights) and the suggested range of nocturnal flight activities to be considered within the Band model CRM are: 1-2 (equating to 0-25% nocturnal activity) for gannet and 2-3 (equating to 25-50% of nocturnal activity) for kittiwake (and the large gulls, which has been used by the Applicant). The rationale for this position is that there is inconsistency in the numbers that are being calculated and presented from the various tagging studies; and in relation to the question about the diurnal variation in activity levels, then this issue is still unresolved. We understand that the Applicant acknowledges that there is variation in activity levels across the day and that at sea surveys may not be reflecting this. The Applicant appear to be arguing that this effect is less of an issue for Vanguard, because the collisions are in the autumn/winter/spring and therefore (it is asserted) that days are shorter and activity levels will vary less. However, Natural England does not

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		in core daylight hours, i.e. well away from sunrise and sunset. However, the nocturnal activity factors/rates that are calculated from the reviews of the tagging studies (e.g. MacArthur Green 2015; Furness et al. 2018) calculate nocturnal:diurnal ratios over all hours of the day. Therefore, the daytime flight activity recorded in the Norfolk Vanguard digital aerial surveys may not match the levels of daytime flight activity that are the basis of the calculations in the empirical tagging studies. Thus, is not clear whether it is appropriate to apply the nocturnal activity factors/rates derived from tracking data to the site-specific survey data.		feel there is clear evidence to support this. So it remains unclear whether it is valid to compare activity levels derived from a snapshot, middle of the day at sea survey to % relative activity levels derived from tagging studies where activity has been calculated for the whole day relative to the whole night.
3.3	h) Can the Applicant explain its reasoning for using displacement assessments for Norfolk Vanguard East using birds in flight and birds on the water, but only birds on the water for Norfolk Vanguard West, and clarify whether any corrections if made would be likely to	For Applicant to answer.	This was an error in the original assessment and a correction has been provided in Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Red-throated diver displacement (Appendix 3.1, document reference ExA; WQApp3.1; 10.D1.3),	The correct mean peak seasonal abundances for RTD in Vanguard West (i.e. birds on the water plus birds in flight) have now been used by the Applicant in their Appendix 3.1: RTD displacement – see REP1-008 in REP3-051.

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	alter the conclusions reached;			
3.3	i) The differences between the deterministic model and the Applicant's model in terms of collision mortality;	Given our outstanding concerns regarding the CRM methods, NE is not in a position to comment without further clarification being provided by the Applicant.	The Applicant has provided additional collision risk modelling results in Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Collision Risk Modelling: update and clarification (Appendix 3.2, document reference ExA; WQApp3.2; 10.D1.3) which addresses the points made by the RSPB.	Please see our response to the Applicant's Appendix 3.2 on CRM updates and clarifications [REP1-008 in REP3-051].
3.3	j) The apportioning of mortality to SPAs;	Non-breeding season apportionment As noted in our RRs, we recommend that for the apportionment of impacts of species to relevant SPA colonies during the non-breeding seasons, the data presented in the tables in Appendix A of Furness (2015) for the relevant species Biologically Defined Minimum Population Scales (BDMPSs) for each season (e.g. migration, winter etc.) are used. Whether the colony figure in the BDMPS tables used is the adult figure or that for all ages depends on any Population Viability Analysis (PVA) model and outputs to be used. Lesser black-backed gull (LBBG), Alde-Ore Estuary SPA: The approach taken by the Applicant for apportioning impacts in the non-breeding season for LBBG for the Alde-Ore	The Applicant will be reviewing impacts on Special Protection Area (SPA) populations and will provide an update for a later deadline as necessary.	We welcome the Applicant's commitment to review this issue and await receipt of any updates.

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		Estuary SPA colony departs from the standard practice set out above. However, in this instance the Applicant's approach does not appear to make a significant difference to the apportionment figures in the non-breeding season that result from taking the NE recommended approach (for more detail see comment to question 23.34 below). Gannet, FFC SPA: As noted in our RRs, for gannets from the Flamborough and Filey Coast (FFC) SPA in the non-breeding season it is unclear from the Vanguard assessment documents what BDMPS figure has been used in the apportionment. In addition, further information was required as to the FFC SPA colony population used in these calculations, and confirmation was required that the BDMPS population estimates used are those presented in Furness (2015) for the North Sea and Channel BDMPSs. No further information has been received from the Applicant on this issue. Kittiwake, FFC SPA: We note that the approach taken by the Applicant for apportioning impacts for kittiwake from the FFC SPA in the non-breeding season is consistent with our standard advice outlined above. We advise that the same approach is taken for gannet for FFC SPA.		

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		Breeding season apportionment LBBG, Alde-Ore Estuary SPA: No further information has been received from the Applicant regarding the concerns we raised in our RRs regarding the apportioning of LBBGs to the Alde-Ore Estuary SPA in the breeding season. Therefore, we again recommend that the Applicant considers these concerns and revisits its apportioning for the site and species in the breeding season in light of this. Further information on this issue can be found in the comments to question 23.34 below. Gannet, FFC SPA: As noted in our RRs, we agree with the approach used to apportion 100% of predicted impacts in the breeding season to birds from the FFC SPA. Kittiwake, FFC SPA: No further information has been received from the Applicant regarding our recommendation to consider the more recent tracking data for kittiwakes from the FFC SPA in its apportionment calculations for this species from this site in the breeding season. Therefore, we again recommend that the Applicant requests this data from RSPB and then revisits the kittiwake breeding season apportioning following consideration of this data.		

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3.3	k) Having regard to the evidence from Cleasby et al (2015) that the RSPB has cited, the appropriateness of the gannet avoidance rate in regard to the breeding season;	NE's position remains that the most appropriate avoidance rates to use in CRM for gannet are those recommended in the joint SNCB response to the MSS avoidance rate review (JNCC et al, 2014). In the case of gannet for the 'basic' Band model (i.e. options 1 or 2), this is 98.9% ±2SD, which is the rate and ranges used by the Applicant in their assessment.	The Applicant and Natural England are in agreement over gannet avoidance rates. The Applicant acknowledges the RSPB's position on gannet avoidance rates, but points out that the Statutory Nature Conservation Bodies (SNCBs) do not share this position and that recent work has provided evidence that the gannet avoidance rate of 98.9% remains precautionary and that a higher rate of 99.5% is appropriate (Bowgen and Cook 2018).	The SNCB's are currently reviewing the evidence on avoidance rates presented in the recently published Bowgen & Cook (2019) and its applicability to SNCB advice on CRM. This work is ongoing and will not be completed before the end of this examination. Therefore Natural England's position remains that the appropriate avoidance rates to use with Band (2012) model are those set out in the SNCB guidance note JNCC et al (2014), i.e. 98.9% for gannet with the 'Basic' Band model (i.e. Options 1 and 2).
3.3	l) The kittiwake tracking data, including the availability of the RSPB data;	As noted in our response to point j above, we continue to recommend that the Applicant requests the more recent (2017) kittiwake tracking data from the FFC SPA from RSPB and then revisits the kittiwake breeding season apportioning following consideration of this data.	The RSPB has supplied the kittiwake tracking data to the Applicant and preliminary analysis has been undertaken. However, further work is required and this will be discussed with the RSPB and NE. Following this the results will be presented and used as appropriate.	We welcome the Applicant's commitment to undertake further work regarding this issue and await further discussions with the Applicant on this.
3.3	m) The effectiveness of predator management at the Alde-Ore Estuary SPA as a mitigation measure in regard to	Predation levels at the Alde-Ore Estuary SPA LBBG colony form part of the environmental baseline (and associated condition status) and therefore the Appropriate Assessment will need to consider the impacts of Norfolk Vanguard as potentially exerting a potential	The Applicant acknowledges Natural England and the RSPB's responses on this matter, but it is also important to note that, irrespective of the proposed Natural England led management action, the impact on the SPA population due to the Norfolk Vanguard	We are not currently in a position to agree with the Applicant's assessment of impacts on the integrity of the Alde-Ore SPA due to the following reasons set out in our Relevant and Written

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	lesser black-backed gull.	additional pressure on a struggling colony, rather than comparing the relative importance of different negative impacts. We are aware that during the examination of Galloper Offshore Windfarm (OWF) this potential mitigation measure was brought forward and funds put aside. However to date predator control has not been possible at the SPA due to a wide range of reasons. The fact that these funds have not been used to date indicates that predator control may not be a practicable mitigation measure at the SPA.	wind farm is predicted to be negligible and therefore not significant (see Applicant's response to Q23.35 for further supporting discussion on this impact) and consequently there is no requirement for project level mitigation.	Representations [RR-106 and REP1-088], our response to the Applicant's Section 51 advice [REP2-038] and our response on the Applicant's CRM update Appendix 3.2 REP1-008 in REP3-051] around breeding season apportionment, CRM for Vanguard alone, in-combination CRM assessment figures and PVAs. Please note that Natural England has a coordination role with regards to predator management, however the Section 106 agreement and the implementation thereof are outwith Natural England's control.
3.13	In reference to the errors that you have noted in your RR [RR-106] in regard to Tables 13.69 and 13.71 of the ES [APP-337], please confirm that these have now been corrected in the revised assessment that has been	With reference to document AS-010 - Both the availability of the documents and significance of them has been missed by NE until review of the ExA questions that refer to Section 51 Advice document amendments. Unfortunately as they are rather large documents Natural England has not had the chance to review and consider the implications for our advice in time for deadline one especially as one of them is 342 pages long.	No further response required.	Please see our response to the Section 51 Advice document amendments [REP2-038].

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	submitted by the Applicant.	Therefore, Natural England will review these documents and provide Written Representation at Deadline 2.		
3.16	Can you confirm for which species of non-seabird migrants you consider cumulative CRM is required?	As advised in our RRs, we recommend that for the Norfolk Vanguard project alone, CRM is conducted using the Vanguard turbine specifications and site locational information for the non-seabird migrant modelled at East Anglia Three – namely dark bellied-brent goose, wigeon, gadwall, teal, pintail, shoveler, pochard, tufted duck, common scoter, golden eye, marsh harrier, oystercatcher, ringed plover, golden plover, grey plover, lapwing, knot, sanderling, dunlin, bar-tailed godwit, curlew, redshank and turnstone. In addition to this, we would also recommend that migration modelling and CRM is undertaken for the following additional species: Bewick's swan and avocet. Until the outputs of these assessments are available it is not clear whether the impacts of Norfolk Vanguard would be of sufficient significance to occasion a cumulative CRM.	No further response required.	We note that the non-seabird migrant CRM assessment undertaken by the Applicant in REP3-038 has covered the species requested by Natural England. Please see our comments on non-seabird collision risk modelling provided at Deadline 4.
3.18	Please provide the following papers that have been referred	Requested references are referred to in the NE RR:	These references were supplied by the Applicant at Deadline 1.	No further comments.

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	to in either the ES, NE's RR [RR-106] or RSPB's RR [RR-197]: Cleasby et al (2015), Furness (2015), Furness et al (2013), Furness et al (2018), Garthe et al (2004), Green et al (2016), MacGregor et al (2018), O'Brien et al (2017), Wade et al (2016).	Furness (2015). This can be downloaded from: http://publications.naturalengland.org.uk/publication/6427568802627584. This document has also been provided at Deadline 1.		
5.6	Chapter 10 of the ES [APP-334] states that cable would be micro-sited through areas of Sabellaria spinulosa reef, where possible. Please comment on the effectiveness of this micro-siting technique as a mitigation measure.	Natural England supports the mitigation measure to avoid impacts to Sabellaria spinulosa reef through micro siting/routing cables. However, our concern relates to the phrase 'where possible'. Natural England is aware of a large area of Annex I reef straddling the export cable corridor. Therefore the 'wiggle' room available to avoid reef within the Development Consent Order (DCO) boundary of the cable is limited. NE welcomes the reduced number of export cables from 12 to 4 with the High Voltage Direct Current (HVDC) electrical system proposed for Norfolk Vanguard and Boreas which helps to free up more space within the cable corridor. However, we continue to advise that all reef is avoided within	As stated in the Applicant's response to the ExA's Written Questions (Q5.19), it should be noted that Sabellaria reef is rarely continuous and is characteristically patchy; low reefiness is characterised by only 10-20% coverage (Gubbay, 2007) and therefore increases the potential for micrositing. Medium reefiness also has high potential for micrositing, being classified by 20-30% coverage. Only low and medium reefiness were recorded within the Norfolk Vanguard offshore cable corridor during the site specific survey in 2016 (ES Appendix 10.1). The Applicant notes that NE expects Sabellaria reef to recover following circa. 100 years of extensive and repeated commercial fisheries dredging, should the area become	Natural England agrees that there is an element of patchiness to *Sabellaria spinulosa* reef (Gubbay 2007). However, the point here is that when undertaking Annex I reef surveys an area with the same side scan sonar 'reef' return is identified and the extent of that habitat is mapped. That potential reef area is then ground truthed using grab samples and drop down video to determine the reefiness qualities i.e. elevation, abundance and patchiness. The micro siting condition is to avoid ***areas*** of reef no matter what the quality. Therefore the

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		Haisborough Hammond and Winterton (HHW) Special Area of Conservation (SAC). That recoverability of reef is not guaranteed as evidence is presented for individual Sabellaria tubes and not reef or recovery from unrelated activities to that of cable installation. It should also be noted that Natural England is currently advising Eastern Inshore Fisheries Conservation Agency on a fisheries byelaw closure area to protect the area of Sabellaria reef within the Vanguard cable corridor from repeated damage from fishing gear. It is anticipated that the closure will not only maintain the areas of known reef, but in the absence of fishing pressures restore Sabellaria spinulosa reef across any closure area. Therefore it is highly likely that the presence of Annex I Sabellaria spinulosa reef will have significantly changed prior to any OWF construction activities. Therefore, whilst we continue to advocate that the standard mitigation measure/marine licence conditioned to avoid reef features is included in the Projects DML it may not be feasible to do so. To address this the Applicant has included the caveat 'where possible', but Natural England have concerns about the increased level of risk to the integrity of the site such a caveat would endorse as there	closed to fishing via a fisheries byelaw closure area. It is therefore highly likely that the same logic would apply to short term and localised cable installation activities for Norfolk Vanguard. The following references, considered in the Information to Support HRA report, refer to *Sabellaria* reef rather than (or as well as) individuals: • Tillin, H.M. & Marshall, C.M. (2015) Sabellaria spinulosa on stable circalittoral mixed sediment. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [online]. Plymouth: Marine Biological Association of the United Kingdom. Available from: http://www.marlin.ac.uk/habitats/detail/377 • Holt, T.J., Rees, E.I., Hawkins, S.J., & Reed, R. (1998) Biogenic reefs: An overview of dynamic and sensitivity characteristics for conservation management of marine SACs. Scottish Association of Marine Sciences (UK Marine SACs Project), Oban. The Applicant has taken account of the potential for a greater extent/coverage of reef to be present by the time of construction within paragraphs 411-428 of the Information to Support HRA report which concludes that	suggestion to go through areas of reef that has less coverage is outside the proposed mitigation. For this to be feasible there would need to be a 15-20m wide corridor (similar to a dual carriageway travelling in both directions) with no *Sabellaria spinulosa* in it. And recognising that similar to a road the bend radius of a cable is about 5m making the ability to weave around features challenging if not impossible. Hence the requirement to avoid areas. The fisheries byelaw areas have been identified to manage DEFRA's 'Red' risks from ongoing fisheries and enable recovery of the Annex I reef features. Any anthropogenic impacts should not hinder the management of these areas. In allowing cable installation through these areas it would almost certainly slow the trajectory of recovery and temporarily reverse any recovery that management measure had achieved. Whilst it is acknowledged that these management areas will include

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		are no parameters to assess and agree what is "possible".	given the very small proportion of temporary disturbance and the high recoverability of Sabellaria reef, the conservation objective of maintaining or restoring extent would be sustained and there would be no adverse effect on the integrity of the Haisborough, Hammond and Winterton Special Area of Conservation (SAC).	areas where reef may be absent at any given moment in time, the sediment included is considered by Natural England to have the potential for reef to develop. Hence the management for recovery. Previously it has been agreed that if the Annex I preconstruction surveys show that reef is absent at the time of construction then cable installation could happen within the byelaw areas of the Wash. However, as demonstrated by the Race Bank OWF located in the Wash and North Norfolk Coast SAC the cable installation is no longer considered a one off activity, especially where reburial and/cable repairs are required over the life time of the project. Which would further hinder the management measures. In addition to this if cable protection is installed then there will be a permanent change to the habitat and therefore we believe that there will be a loss of feature extent and the management measures for the site would be hindered. Therefore

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				we advise that if cable installation with the byelaw area is permitted by the Secretary of State then there would need to be a restriction of no cable protection in that area. But given this is likely to be an area of mixed sediment rather than sand it is likely to be the most challenging habitat for installing cable within the site. Accordingly consideration of the most appropriate installation techniques would be required.
6.12	Do you agree with the contingency estimate of 10% of the total cabling for unburied cables that the Applicant has applied?	Based on evidence presented for Hornsea Project 3 examination [REP-138] in relation to the amount of rock armouring used by Orsted on their installed cables around the UK, Natural England agrees that 10% is conservative, however that doesn't make it acceptable in terms of impact to nature conservation and Marine Protected Areas MPAs). Natural England notes that the 10% presented for Norfolk Vanguard is as a contingency, but currently there is no certainty that the sandwave levelling and other installation techniques will be successful such that cable protection will not still be required as well.	The Scour Protection and Cable Protection Plan required under dDCO Schedules 11 and 12 Part 4 Condition 9I, in accordance with the Outline Scour Protection and Cable Protection Plan (document reference 8.16), provides the mechanism to agree cable protection requirements prior to construction. This document will be updated as the final design of the project develops and will include justification of the location, type, volume and area of cable protection, based on crossing agreements and pre-construction survey data to ensure only essential cable protection can be installed in the Haisborough Hammond and Winterton (HHW) SAC and to confirm there will be no Adverse Effect on Integrity (AeoI).	Please see generic cable protection advice note provided with this deadline response that considers the use of the 10% cable length requiring cable protection. As set out above some habitats will be more challenging than others and therefore we advise that we continue to have significant uncertainties, and that an AeoI can't be ruled out at this time. We also disagree that it is appropriate to assess the impacts against the entirety of a site and not the conservation objectives and extent of individual interest features.

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			The worst case scenario assessed in the ES and the Information to Support HRA report includes the contingency value and the Applicant concludes that this would have no adverse effect on the site, primarily due to: • The small scale of the cable protection in the context of the SAC, representing 0.003% of the SAC area. • This small scale of protection would not affect the marine physical processes of the SAC • The communities of the Annex 1 Sandbank are primarily: o low diversity; o hardy species accustomed to natural disturbance associated with the mobile sandbanks; and/or o species associated with hard substrata and therefore likely to colonise cable protection, including Sabellaria spinulosa reef. These community characteristics are acknowledged in Natural England's Conservation Objectives referred to in para 2.1.4 of Annex C of Natural England's Deadline 1 submission.	Please see *Sabellaria spinulosa* advice note also provided at Deadline 4 where we clarify that colonisation of scour protection doesn't contribute to the favourable condition of the site, However, in discussions with the Applicant on 8 March 2019 the Applicant has confirmed that they are undertaking a cable burial risk assessment to narrow down the likely requirement for cable protection. This is welcomed by Natural England and we will provide further advice once this is received.

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20.4	Unexploded Ordnance (UXO) detonation is detailed within the ES (cf Appendix 5.2 – Norfolk Vanguard Detonation Effects of UXO and Appendix 5.4 – Underwater noise from UXO) but not referenced in the dDCO/DMLs. Explain in detail why you consider that a separate Marine Licence will need to be sought prior to construction, and why it is likely that a European Protected Species (EPS) licence will need to be applied for prior to any UXO detonation works.	A separate licence is required for removal of unexploded ordnance as it is considered a separate activity to the construction of the windfarm and involves the removal of items from the seabed. An European Protected Species (EPS) licence is required for any activity that is likely to disturb protected species. Although a MMMP should form part of the application for an EPS licence, this only provides mitigation for injury effects, not disturbance, so a licence is still required.	The Applicant agrees with Natural England's response.	No further comments.
20.75	Please comment on the suggestion that you be included in the notification	Natural England would welcome inclusion in this notification as the decision on how to build out the projects will inform our advice more widely on marine sustainable	The Applicant notes Natural England's response. However, the Applicant considers that the MMO will be the relevant authority to discharge the conditions in the DMLs. Certain DML conditions provide for consultation with	No further comments.

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	referred to in the preceding question.	development projects within the southern North Sea.	specified bodies on the discharge of that condition, such as Trinity House, the MCA, and the relevant statutory body. It is considered that the MMO would consult relevant statutory nature conservation bodies where appropriate.	
20.87	Explain, in your relevant representations [RR-106] "also allow amendments to the plan to be reviewed in context with the existing volumes and the success to the cable protection and scour protection deployed" and clarify whether the dDCO needs to be amended in this regard and if so how.	The phrase 'also allow amendments to the plan to be reviewed in context with the existing volumes and the success to the cable protection and scour protection deployed' refers to a need to allow flexibility in the cable installation plans as the knowledge develops on the success of cable protection and scour protection deployed to date. The plans should also be flexible to be reviewed as knowledge of volume of sandwaves to be levelled and therefore subsequent volume of disposal material is known. The dDCO should be amended to reflect the need for this flexibility.	The plans pursuant to the DMLs will not be finalised until prior to construction of the licensed activities. This, amongst other things, will allow the Applicant time to finalise the plans in accordance with best practice guidance and the most up to date data and procedures (for example, concerning the current volume of sandwaves to be levelled). This is secured through the Cable Specification, Installation, and Monitoring Plan (to be agreed pursuant to Condition 9(1)(g) of the Transmission DMLs (Schedules 11-12)) which must include: " (i) technical specification of offshore cables (including fibre optic cable) below MHWS, including a desk-based assessment of attenuation of electro-magnetic field strengths, shielding and cable burial depth in accordance with industry good practice; (ii) a detailed cable (including fibre optic cable) laying plan for the Order limits, incorporating a burial risk assessment to ascertain suitable burial depths and cable	Please see generic cable protection advice note also provided at Deadline 4 in relation to cable protection. Natural England remains concerned about how the impacts to designated sites will be assessed and then measured against during construction. However, during discussions with the Applicant on 8 March 2019 it has been agreed that they would provide a HHW SAC Site Integrity Plan, which would be a halfway house between a cable installation plan and the final document provided prior to construction. This will hopefully address some of the uncertainties and make sure the appropriate mechanisms are in place to manage the HRA risks.

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			laying techniques, including cable landfall and cable protection measures and, in particular, proposals for the Haisborough, Hammond and Winterton Special Area of Conservation; (iii) proposals for monitoring offshore cables including cable (including fibre optic cable) protection during the operational lifetime of the authorised scheme which includes a risk based approach to the management of unburied or shallow buried cables; and (iv) appropriate methods such as a trawl or drift net to be deployed along Work No. 4A and 4B (export cables and fibre optic cables), following the survey referred to in condition 15(2)(b) to assess any seabed obstructions resulting from burial of the export cables and fibre optic cables. " The Applicant therefore considers that, as currently drafted, the wording of the plans allows for sufficient flexibility. Comments regarding sandbanks are also dealt with in the SoCG with Natural England (document reference: Rep1 – SOCG – 11.1) and the MMO (document reference: Rep1 – SOCG – 13.1).	
20.88	Justify the proposed amendment to	To date developers have never had to confirm to the MMO or NE as standard what	Condition 14(1)(e) of Schedule 9 and 10 and condition 9(1)(e) of Schedule 11 and 12	Natural England still disagrees with the Applicant on this point. It is not

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	Condition 14 (e) (scour protection and cable protection plan) to require an as-built report to be submitted after completion of cable installation works, to confirm the locations and volumes deployed and thus confirm adherence to the approved plan.	they have actually installed on the ground and the location in relation to the parameters of their 'Rochdale envelope'. This is something that we are wanting to address across the industry as knowledge of this should benefit the developer by informing amendments to post construction monitoring proposals. For Natural England this amendment enables us to better advise on wider management of designated sites in relation to conservation objectives and potentially enable wider sustainable development within the marine environment.	require that prior to commencement of licensed activities "…details of the need, type, sources, quantity and installation methods for scour protection and cable (including fibre optic cable) protection…" must be approved by the MMO. The condition also requires the plan to be updated and resubmitted for approval if changes to it are proposed following cable laying operations. Therefore, to the extent that there are any changes to the details of the as built cable protection and scour protection, this will be provided in the updated plan. Therefore the amendment sought by NE is not considered necessary.	about if plans are amended. We would like confirmation of locations, extent and volumes that have actually been installed as it is recognised that the Applicant will always have a degree of contingency in their documents and we are wanting to make sure that where possible there is sufficient headroom for future sustainable development, rather than using WCSs presented prior to installation. It will also inform/focus the decommissioning phase by knowing what went in and where.
20.11.7	In the relevant DML Conditions in Schedules 10 and 11of the made DCO for East Anglia THREE and Requirement 2(2), there was a specified minimum draught height of 22m above MHWS, but there was also the stipulation of a maximum number of	Natural England Response: Natural England accepts the principle that raising the draft height will result in a reduction in collision risk. We have previously advised the Applicant (in our Section 42 response) to give consideration to proposals of best practice mitigations that seeks to reduce the cumulative/in-combination collision totals, for example by raising the height of the lower rotor tip of the turbines. We advise that the Applicant gives consideration to mitigation measures which seek to reduce the cumulative/in-combination total impacts.	The Applicant acknowledges that predicted collision risks can be reduced through increases in the lower rotor tip height, however since the predicted collision risks are small, and have been assessed as giving rise to non significant effects, this mitigation is not required for Norfolk Vanguard.	Whilst following the CRM Appendix 3.2, we may now be in a position to agree no significant effect from Vanguard alone for CRM at EIA (based on the deterministic model outputs using the mean bird densities and upper and lower 95% CIs, along with mean/central values for avoidance rate, flight height distribution and nocturnal activity rate), we still have not agreed on CRM alone for HRA or cumulative/in-combination CRM.

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
	wind turbine generators (WTGs) with a draught height of less than 24m from MHWS. Are you satisfied that this has not been included in the dDCO for Norfolk Vanguard?	Therefore, we would welcome discussions with the Applicant regarding this issue.		We note that at East Anglia 3 Natural England concluded that AEOI could not be ruled out for HRA for kittiwake at the FFC SPA due to in-combination collision mortality and that a significant effect at the EIA scale could not be ruled out for great black-backed gull (GBBG) for cumulative collision mortality. As there have been no changes in CRM methodology since East Anglia 3 in terms of avoidance rates etc., and that more collisions are being added to these totals from the additional projects currently under examination (Hornsea 3, Norfolk Vanguard and Thanet Extension) it is considered unlikely these positions will change. Therefore, we would advise that this mitigation is considered by the Applicant.
23.3	Please comment on whether the corrections made to the Greater Wash SPA citation would have any bearing on	The corrections made to the Greater Wash SPA citation have resulted in a reconfiguration of the site boundary (exclusion of an area around the outer perimeters of Lincs, Lynn and Inner Dowsing and LID6 offshore wind farms) and changes to the site area and changes to the estimated	The Applicant's response to Section 51 advice (Norfolk Vanguard Offshore Wind Farm The Applicant's Response to Section 51 Advice from The Planning Inspectorate Document Reference: PB4476-008-001) included updated assessments for the red-throated diver and little gull features of the	RTD: As we have noted previously use of the upper density figure of 3.38 birds/km2 with an assumption of 100% displacement around the cable laying vessels and the Natural England preferred worst case scenario of 10% mortality

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
	the Applicant's assessment.	sizes of the populations of three of the qualifying features (common scoter, red-throated diver and little gull) from the Applicant's assessment. The aspects of the development relevant to these features are the construction of the offshore export cable for common scoter and RTD and collision risk from the operating wind farm to little gull. The Norfolk Vanguard offshore cable route does not pass through the footprints of the three offshore wind farms in the area that is now excluded from the SPA boundary, so these changes would not affect the Applicant's assessment for these species. Common scoter: We understand that the Vanguard cable route does not pass through the areas of the SPA used by common scoter and if this can be backed up by the Applicant (e.g. though the provision of figures), then the changes to the common scoter population will also not affect the Applicant's assessment for the feature. Red-throated diver: The RTD density data for the Greater Wash SPA has not been altered by the corrections, meaning that the density figures for the offshore cable corridor used by the Applicant of 1.36-3.38 birds/km2 has not altered and hence the numbers of birds at risk of 100% displacement around a 2km buffer from two cable laying vessels remains at between 34 and 85 RTDs. The Applicant	Greater Wash SPA using the final population estimates as identified here. The population changes in the final SPA citation do not alter the original conclusions of the assessment, namely that there would be no adverse effect on the integrity of the Greater Wash SPA due to Norfolk Vanguard alone or in-combination with other projects. Updated assessment for the Greater Wash SPA including consideration of the cable laying for the Hornsea Three Project has not yet been undertaken. This will be provided for a future deadline. Common scoter: The Applicant has produced the figure requested by Natural England which shows that the offshore cable route does not overlap with any concentrations of common scoter, using the data presented in Natural England and JNCC (2016). This figure is presented in Appendix 23.1. Little gull: The Applicant has provided additional assessment of relevance to this species in the responses to the examiners first written questions (Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Collision Risk Modelling: update and clarification Appendix 3.2, document reference ExA; WQApp3.2; 10.D1.3). The Applicant considers that this will enable Natural England to conclude there is no risk of an adverse effect on integrity for the Greater Wash SPA due to collision risk for this species. 1. Natural England and JNCC	results in a level of predicted additional mortality for Vanguard alone when expressed as a % of the baseline mortality level that is not insignificant and requires further consideration by the Applicant regarding whether mitigation measures are needed, including seasonal restrictions that ensure cable laying within the SPA take place outside the peak period for RTD. Common scoter: We welcome that the Applicant has provided in Appendix 23.1 the required figure of common scoter distribution and the offshore cable corridor. However, as noted in our response to ExA question 23.41 (see Annex A of REP1-088) and in our response to the Applicant's Section 51 advice [REP2-038], we consider that the LSE screening should be a coarse filter and as the offshore cable route passes through the Greater Wash SPA, this would indicate a potential impact pathway for species sensitive to disturbance/displacement from the

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		has used a 5% mortality rate in their assessment, which has calculated that the numbers of birds at risk of dying is between 2 and 4. The corrected RTD estimated population size for the SPA is 1,407 (rather than 1,511 as used by the Applicant), which means that the natural mortality of the SPA population (based on the 0.228 average mortality rate across all ages used by the Applicant) would be 281 rather than the approx. 300 used by the Applicant, which would result in a slight increase to proportion of baseline mortality figures that the predictions equate to from those calculated in the Applicant's assessment for Vanguard alone. However, it should be noted that NE does not agree with the Applicant's use of a 5% mortality rate, and advises a worst case scenario of 10% mortality. Using the corrected SPA RTD population size of 1,407 and the corrected natural mortality of the SPA population figure of 281 (rather than the approx. 300), the addition of between 3 and 8.5 birds equates to 0.94-2.65% of baseline mortality (our previous calculation based on the original RTD population of 1,511 was 0.87-2.46% of baseline mortality). These new % figures are therefore slightly increased in comparison to those based on the original higher SPA population. However, the change has not materially altered the conclusion that we reached before i.e. that these levels of	(2016). Departmental Brief: Greater Wash potential Special Protection Area. Version 8, Final, March 2016	presence of vessels and hence an LSE concluded for the common scoter and RTD features of this site. The analysis of whether the cable corridor overlaps spatially with the distributions of these species should then be considered within the Appropriate Assessment. However, based on the figure presented by the Applicant in Appendix 23.1, we conclude no AEOI on the common scoter feature of the greater Wash SPA from offshore export cable laying for Vanguard alone. Little gull: We note that following the information provided by the Applicant in their CRM update and clarification (Appendix 3.2), Natural England's position remains that the mean bird densities are the most appropriate to use in the CRM [see REP1-008 in REP3-051]. We also do not recommend that the outputs from the Applicant's stochastic model are relied upon for drawing conclusions regarding the levels of impact of CRM from Vanguard alone and these figures should not

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		predicted additional mortality for Vanguard alone when expressed as a % of the baseline mortality level are not insignificant and require further consideration by the Applicant. As noted in our RRs, the in-combination assessment for RTD at the Greater Wash SPA should also consider the potential for displacement from cable laying for Hornsea 3 OWF and that consideration should also be given to the in-combination disturbance/displacement effect on RTD of cable laying with the currently constructed or consented wind farms within the Greater Wash SPA, not just those consented after Triton Knoll OWF. No further information has been received from the Applicant on this aspect, so this issue still remains and therefore we cannot reach a conclusion regarding the level of impact from in-combination displacement at this stage. Little gull: The corrected little gull estimated population size for the SPA is 1,255 individuals (rather than 1,303 as used by the Applicant). This change would not significantly alter the Applicant's apportionment percentages calculated for apportioning impacts of CRM of little gull to the Greater Wash SPA. However, we note that the issues regarding the CRM remain and therefore we cannot reach a conclusion regarding the level of impact from Vanguard alone at this stage. Therefore, we also		be included in cumulative/in-combination assessments [see: REP1-008 in REP3-051]. Therefore, the assessment/apportioning of CRM impacts to little gull from the Greater Wash SPA should be based on the deterministic/Band model Option 2 CRM outputs for little gull using the mean bird in flight densities (with consideration of the upper and lower 95% CIs around this), along with an avoidance rate of 99.2%, nocturnal activity factor of 2 (or 25%) and the maximum likelihood generic flight height distributions data – this should be presented by the Applicant before any conclusions can be made regarding the level of impact from CRM for this feature of the Greater Wash SPA from Vanguard alone.

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		recommend that the in-combination collision risk to little gulls from the Greater Wash SPA is revisited once these issues/uncertainties are resolved. No changes have been made to the tern qualifying features, as these were based on colony counts rather than at sea counts.		
23.7	Please set out the CRM methodology and data that you consider the Applicant should provide and use in order for you to be able to fully determine whether or not there would be no AEOI for the Greater Wash SPA.	For determining whether or not there would be no Adverse Effect On Integrity (AEOI) for collision risk from Vanguard alone for the little gull qualifying feature of the Greater Wash SPA, we require the deterministic CRM/Band model to be undertaken using the mean densities of birds in flight rather than the median densities as currently used by the Applicant, together with use of an avoidance rate of 99.2%, the maximum likelihood flight height data from Johnston et al. (2014), a nocturnal activity factor of 2 (Garthe & Hüppop 2004). If the Applicant is to use its R coding for the deterministic model rather than the Band (2012) spreadsheet, then it should provide the full input data required to run the Band model and also the R code that has been used. The uncertainty/variability in the densities of birds in flight, avoidance rates, flight heights and nocturnal activity should also be considered. This should be done either by presenting multiple deterministic/Band model	The Applicant has provided additional collision risk modelling results in Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Collision Risk Modelling: update and clarification (Appendix 3.2, document reference ExA; WQApp3.2; 10.D1.3) which provides further outputs for little gull collision risk and addresses these comments.	The information provided by the Applicant in Appendix 3.2 does not provide any HRA CRM assessment update. However, as noted in response to question 23.3 above, following the information provided by the Applicant in their CRM update and clarification (Appendix 3.2), Natural England's position remains that the mean bird densities are the most appropriate to use in the CRM (see REP1-008 in REP3-051). We also do not recommend that the outputs from the Applicant's stochastic model are relied upon for drawing conclusions regarding the levels of impact of CRM from Vanguard alone and these figures should not be included in cumulative/in-combination assessments [see: REP1-008 in REP3-051]. Therefore, whilst we have

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		outputs for the different ranges of input parameters, or by using the MSS stochastic CRM (rather than the Applicant's version of a stochastic CRM) and also presenting the deterministic/Band model outputs for using the mean bird density, the maximum likelihood flight height data, a nocturnal activity factor of 2 and an avoidance rate of 99.2%, to see whether the stochastic model predictions are similar to these for the central values.		previously agreed with the Applicant's approach to apportioning little gull CRM impacts to the Greater Wash SPA, this apportioning should be based on the deterministic/Band model Option 2 CRM outputs for little gull using the mean bird in flight densities (with consideration of the upper and lower 95% CIs around this), along with an avoidance rate of 99.2%, nocturnal activity factor of 2 (or 25%) and the maximum likelihood generic flight height distributions data – this should be presented by the Applicant before any conclusions can be made regarding the level of impact from CRM for this feature of the Greater Wash SPA from Vanguard alone. As noted in our response to the Applicant's Section 51 Advice [REP2-038], we advise that whilst the predicted Vanguard CRM impact to little gulls from the Greater Wash SPA is likely to equate to less than 1% baseline mortality and could be considered non-significant and therefore would not be an AEOI. However, while 1% baseline mortality can be

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				considered to be insignificant in the context of the population, this does not mean that this level of additional mortality should not be added to an assessment of in-combination impacts. Therefore, we advise that the in-combination CRM figures for other relevant North Sea offshore wind farms (OWFs) for little gull from the Greater Wash SPA are presented (where figures are available) and that the overall in-combination CRM figure is presented.
23.10	In your RR [RR-106] you have advised that you cannot complete any in-combination assessment relating to marine mammal disturbance until the Review of Consents is completed. The Examining Authority (ExA) understands that the Department for Business, Energy and Industrial Strategy has published a draft	The Department for Business, Energy and Industrial Strategy (BEIS) published a draft Habitats Regulations Assessment (HRA) of their review of consents (RoC) in autumn 2018 and Natural England submitted a response to this on 13 December. In our response we advised that the draft assessment had not covered sufficient scenarios so we are of the view that the in combination assessment is not yet sufficiently comprehensive. However, despite this, some of the in combination scenarios presented indicate that seasonal noise thresholds for the Site of Community Importance (SCI) as advised by the Statutory Nature Conservation Bodies (SNCBs) could be exceeded by windfarm projects	The Norfolk Vanguard in-combination assessment provided in the Information to Support HRA report (document reference 5.3) includes the projects considered in the RoC and takes a more conservative approach to the in-combination scenarios. It has been agreed in the SoCG with NE (document reference Rep1 -SOCG -13.1) that the Site Integrity Plan, in accordance with the In Principle Site Integrity Plan (document 8.17) provides an appropriate framework to agree mitigation measures for effects on the Southern North Sea cSAC/SCI with the MMO in consultation with the relevant SNCBs prior to construction.	Natural England is in agreement that the Site Integrity Plan (SIP) will secure any further mitigation that is required for the impacts of the project alone prior to construction commencing at Vanguard. However, there remains uncertainty in relation to the mechanism to manage in-combination impacts.

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	HRA for consultation. Taking this into account, are you now able to provide further comment on potential impacts to marine mammals of the Southern North Sea cSAC?	constructing at the same time (and also in conjunction with other noisy activities from other marine sectors). The RoC refers to Vanguard as a Tier 4 project in the in combination assessment, which means there is a low level of confidence in the final design envelope and construction schedule. Despite this, it does show (Fig 52 of the draft HRA) that possible construction of the Vanguard project in 2024-26 overlaps with a number of other offshore wind projects which could also be in construction. This therefore confirms that developers including for the Vanguard project (as well as other industries with noisy activities) may need to include mitigation to reduce the spatio-temporal disturbance footprint (e.g. through the use of noise mitigation systems or alternative foundations, by ensuring the location of simultaneous piling reduces the spatial extent within the SCI, or by looking at concurrent piling in close proximity so the deterrence footprints overlap).		
23.13	Can you confirm whether or not you agree with the European sites and features screened in by the Applicant, ie	Natural England generally agrees with the European sites and features screened in by the Applicant, i.e. for which a Likely Significant Effect (LSE) has been identified. However, we disagree with the exclusion of Outer Thames Estuary SPA as it is the view	During consultation with Natural England, the Outer Thames Estuary SPA was identified for consideration due to the potential for disturbance to red-throated divers resulting from movements of operations and maintenance vessels through part of that	As noted in our response to ExA question 23.41 [REP1-088], we consider that the LSE screening should be a coarse filter and as the offshore cable route passes through the Greater Wash SPA,

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	for which a LSE has been identified.	of Natural England that until the operations and maintenance port has been confirmed this site must be screened in.	SPA to and from Great Yarmouth (which may be used as a port for Norfolk Vanguard). However, Great Yarmouth is located very near to the northern edge of the Outer Thames Estuary SPA and is outside the main concentrations of divers (as reported in the SPA evidence, e.g. Webb et al. 2009, O'Brien et al. 2012). Consequently the magnitude of impact due to the additional operations and maintenance vessels through this small section of the SPA, which has low densities of red-throated diver (<=1.5 birds per km2), was considered to be very small. In addition, given the extent of existing vessel movements in the region, the additional movements resulting from the construction of Norfolk Vanguard will represent a very small change from the baseline. Therefore, the potential for a Likely Significant Effect (LSE) was considered to be negligible and the SPA was scoped out.	this would indicate a potential impact pathway for species sensitive to disturbance / displacement from the presence of vessels and hence an LSE concluded for the common scoter and RTD features of this site. The analysis of whether the cable corridor overlaps spatially with the distributions of these species should then be considered within the Appropriate Assessment. The Applicant should screen in/consider SPAs where there is an impact pathway in the non-breeding season (even if there is no impact pathway in the breeding season). Given the potential for all three auks to winter in the North Sea, this would therefore include consideration of the Farne Islands SPA (guillemot and the seabird assemblage feature, which includes razorbill and puffin) and Coquet Island SPA (seabird assemblage feature, which includes puffin).
23.14	Can you provide further details of your concerns with regard to the identification of	The concerns relating to LSE for RTD at the Outer Thames Estuary SPA relate to the possibility of disturbance/displacement of RTDs due to movements of operations and	As noted above, the magnitude of potential impact is very small and therefore the risk of an LSE was ruled out and the Outer Thames	See section 5 of our Deadline 2 response to the Applicant's Appendix 3.1 on RTD displacement

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	a LSE for red-throated divers of the Outer Thames Estuary SPA, and please detail how you consider your concerns could be resolved by the Applicant.	maintenance vessels through the SPA, depending on the operations and maintenance (O&M) port, for which the location is still to be agreed. In the instance that the O&M port location once decided means that vessels will pass through the Outer Thames Estuary SPA, if mitigation measures regarding RTD displacement such as that agreed at East Anglia Three can be agreed with the Vanguard Applicant, then this will remove the likelihood of AEOI for this feature of the SPA.	Estuary SPA was scoped out of the assessment.	[REP1-008 in REP3-051] for further information regarding this issue.
23.15	Please provide comment on whether you consider that trenchless crossing (Appendix 5.2, paragraph 86) [APP-047], limited construction hours (Information for the HRA report, paragraph 102) [APP-045], mitigation for noise effects from piling and UXO clearance (Table 8.4) [APP-045] and micrositing to avoid permanent habitat loss (Information for	Natural England can confirm that we would consider these activities as mitigation.	Noted.	No further comments.

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	the HRA report, paragraph 67) [APP-045] should be considered mitigation in light of the judgement in the People over Wind, Peter Sweetman v Coillte Teoranta case C-323/17.			
23.22	The Applicant has proposed a number of mitigation measures within the draft Marine Mammal Mitigation Protocol [APP-037], and the Draft SNS cSAC Site Integrity Plan [APP-041], and it has also proposed that a Marine Pollution Contingency Plan be produced post-consent. The successful delivery of these plans is relied upon for concluding no AEOI, and yet there remains some doubt about the	The proposed measures set out within the draft SIP include alternate foundation methodologies, noise mitigation systems, scheduling of pile driving and other relevant technologies or methodologies that may emerge in the future. These are all the sorts of measures that we refer to in our advice above (23.10) in relation to ensuring in combination adverse effects are avoided to the SCI. Therefore we are content that the scope of the measures in the draft SIP is appropriate. There has not yet been a need to adopt these measures in windfarm construction to date therefore they have not been proven to be deliverable. The Applicant will need a clear requirement to agree and secure the necessary measures in the period between consent and the commencement of piling, following an updated assessment of the potential impacts from pile driving and an assessment of their efficacy. Potential	The Applicant acknowledges Natural England's contentment that the scope of mitigation measures in the In Principle Site Integrity Plan (document 8.17) are appropriate. The Site Integrity Plan is secured under dDCO Schedules 9 and 10 Part 4 Condition 14(m) and Schedules 11 and 12 Part 4 Condition 9(l).	No further comments.

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	nature and efficacy of some of the proposed measures. Therefore can you please confirm to what extent you are satisfied that the measures referred to in these plans are sufficiently well-defined and deliverable?	strategic management measures such as scheduling of pile driving (section 6.1.3) would need to be carefully managed by the Regulators to achieve a coordinated approach with other developers.		
23.24	In regard to the Applicant's proposed MMMP for UXO clearance, please indicate the degree of confidence you have in the efficacy of mitigation measures that are yet to be defined.	There is currently little empirical evidence on the range of noise generated by Unexploded Ordnance (UXO) clearance and therefore the potential significance of effect on marine mammals. There is similarly little or no information available to date on the efficacy of mitigation measures, such as use of bubble curtains. Given the potential significance of the impacts, there is a need to gather more evidence and Natural England, the Crown Estate, BEIS and windfarm developers recognise this and are in discussion over ways to do this. If successful, some information should be available before the construction of the Vanguard project and would be included in any updated assessment of the potential effects of UXO	UXO clearance is not included within the DCO application. A Marine Licence application will be completed pre-construction following the UXO surveys and once the nature and extent of UXO clearance is known. A Marine Mammal Mitigation Protocol for the UXO clearance works will be submitted with the Marine Licence application. The Applicant welcomes the potential that additional information may be available prior to construction.	No further comments.

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		clearance and mitigation considered necessary.		
23.25	Do you agree that an AEOI can be ruled out for any of the features of any of the European sites for which a LSE has been identified?	No, based on current evidence proposed it is the view of Natural England that adverse effect on integrity cannot be ruled out for any of the features of any of the European sites for which a LSE has been identified.	Discussions with Natural England regarding the potential for adverse effect on integrity are ongoing and the position at Deadline 1 is documented in the SoCG with Natural England (document Rep1-SOCG-13.1). The SoCG will be updated and submitted at Deadline 4.	No further comments.
23.29	As your RR [RR-106] did not make any mention of the Humber Estuary SAC, The Wash and North Norfolk Coast SAC or Winterton-Horsey Dunes SAC, please can you confirm whether or not you concur with the Applicant's assessment of no AEOI for these sites. If you do not agree, then please set out your specific areas of disagreement.	Natural England can confirm that we support the Applicants conclusions for these sites in relation to the proposals submitted for Norfolk Vanguard	Noted.	No further comments

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23.30	Do you have any comments to make on the Applicant's screening and integrity matrices submitted in the Applicant's Response to Section 51 Advice from the Planning Inspectorate [AS-006].	Both the availability of the documents and significance of them has been missed by NE until review of the ExA questions that refer to Section 51 Advice document amendments. Unfortunately as they are rather large documents Natural England have not had the chance to review and consider any implications in relation to our advice in time for deadline one especially as one of them is 342 pages long. Therefore, Natural England will review these documents and provide Written Representation at Deadline 2.	Noted	No further comments.
23.34	In terms of the seasonal apportioning of impacts for the Alde-Ore Estuary SPA and Ramsar site, what figure do you consider should be applied to lesser black-backed gulls?	Natural England's Response: Non-breeding season apportioning As noted in point 36 of our table of additional detailed comments in Appendix 1 of our Relevant Representations, we agree with the Applicant's use of the figure of 2,000 pairs of LBBG for the Alde-Ore Estuary SPA colony and our preferred approach to the apportionment would be to use the colony figure of 2,000 pairs (or 4,000 adults) and the use of 0.58 (the proportion adults comprise of the population in Furness (2015), i.e. approx. 58%) as used by the Applicant to get the all age colony figure, which we calculate to	In relation to the non-breeding season, no response is required. In relation to the breeding season, the Applicant has provided further evidence in support of the lesser black-backed gull assessment in its response to the Examiners first written questions (WQ 23.35; Norfolk Vanguard Offshore Wind Farm Applicant Responses to the ExA's First Written Questions document reference ExA; WQ; 10.D1.3). This included additional review of the regional population of lesser black-backed gulls and how this relates to the numbers from the Alde-Ore Estuary SPA	As noted in our response to the Applicant's response to ExA question 23.35 [REP2-036], we have previously noted (in comments on draft HRA report) that whilst tracking data are useful and demonstrate connectivity of the Vanguard site with breeding birds from the Alde-Ore Estuary SPA, it can only ever tell part of the story as there will be both individual and between year differences. Whilst in its response to ExA question 23.35, the Applicant has attempted to address some of the

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		equal 6,897 – so if 4,000 of these are adults then the remaining 2,897 are immatures. Then using this figure and the information in the relevant tables of Appendix A of Furness (2015), our preferred apportionment calculations are: • Autumn migration: number of Alde-Ore SPA adult LBBG in North Sea and Channel BDMPS = 100% = 4,000 and the total number of birds of all ages in the BDMPS = 209,007. So the proportion of Alde-Ore SPA adult birds = (4,000/209,007) x 100 = 1.9%. The number of Alde-Ore SPA LBBG of all ages in the North Sea and Channel BDMPS = 100% of adults and 70% of immatures = 4,000 + 2,028 = 6,028. So the proportion of Alde-Ore SPA birds of all ages = (6,028/209,007) x 100 = 2.9%. Both of the figures above are lower than the 3.3% apportionment figure for the autumn used by the Applicant in their report of Information for the Habitats Regulation Assessment and the Applicant's approach can be considered precautionary. • Winter: number of Alde-Ore SPA adult LBBG in North Sea and Channel BDMPS = 50% = 2,000 and the total number of birds of all ages in the BDMPS = 39,314. So the	predicted to be present on the Norfolk Vanguard wind farm.	issues Natural England / RSPB raised regarding additional town colonies that they hadn't previously been included, the foraging behaviour of town colonies compared to more traditional colonies and control of town colony populations, this doesn't really consider the issue of segregation and this issue still requires consideration.

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		proportion of Alde-Ore SPA adult birds = (2,000/39,314) x 100 = 5.1%. The number of Alde-Ore SPA LBBG of all ages in the North Sea and Channel BDMPS = 50% of adults and 5% of immatures = 2,000 + 145 = 2,145. So the proportion of Alde-Ore SPA birds of all ages = (2,145/39,314) x 100 = 5.5%. Both of the of the figures above are close to the 5% apportionment figure for the winter season used by the Applicant in their report of Information for the Habitats Regulation Assessment and the Applicant's approach can be considered reasonable. • Spring migration: number of Alde-Ore SPA adult LBBG in North Sea and Channel BDMPS = 100% = 4,000 and the total number of birds of all ages in the BDMPS = 197,483. So the proportion of Alde-Ore SPA adult birds = (4,000/197,483) x 100 = 2.0%. The number of Alde-Ore SPA LBBG of all ages in the North Sea and Channel BDMPS = 100% of adults and 70% of immatures = 4,000 + 2,028 = 6,028. So the proportion of Alde-Ore SPA birds of all ages = (6,028/197,483) x 100 = 3.1%. Both of the figures above are lower than the 3.3% apportionment figure for the spring used by the Applicant in their report of Information for		

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		the Habitats Regulation Assessment and the Applicant's approach can be considered precautionary. Breeding season apportioning In our Relevant Representations we raised a number of concerns regarding the Applicant's approach to the derivation of the 25% apportionment figure used to account for the contribution of the Alde-Ore Estuary SPA colony of LBBGs to the numbers of birds seen at Norfolk Vanguard during the breeding season: • The figure of 25% used by the Applicant for the breeding season is based on simply summing the totals of counts from LBBG colonies within foraging range of Vanguard (141km mean-maximum range in Thaxter et al. 2012) and that this approach does not take account of the distance each colony is from Vanguard or segregation, which apportioning approaches should do. • There may have been some LBBG colonies within foraging range that have not been included in the Applicant's summed figure, which should be considered. • Given the potential for roof nesting urban colonies to be controlled, we were uncertain about the Applicant's approach to doubling the summed urban colonies figure based on the age of data, and the Applicant's assertion that these colonies would have significantly increased in the interim. NE has not received any further discussions/clarifications from the Applicant regarding resolving our concerns		

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
		on these issues. As highlighted in Section 3 of the offshore ornithology annex of our Written Representations, we recommend that the Applicant considers our concerns raised in our RR and revisits its approach to apportioning of LBBG to the Alde-Ore Estuary SPA during the breeding season, including reviewing the merits of previous approaches undertaken for apportionment to account for the contribution of SPA colonies to the numbers of birds seen at marine renewable development sites during the breeding season, including the approach outlined in the SNH interim guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs, updated November 2018 (SNH 2018) and that undertaken by Natural England during the Galloper offshore wind farm examination (Natural England 2012) We also advise that the Applicant give consideration to the degree to which LBBG distributions are influenced by at-sea foraging area segregation (Bolton et al. 2018). There is the possibility that the Vanguard development areas may in fact be used predominantly or nearly exclusively by birds originating from the nearest relatively large colony due to segregation of resources amongst colonies (Bolton et al 2018), although this would need to be considered in the context of the RSPB's representations		

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
		regarding the potential for urban gull colonies to show different foraging habits to more traditional, coastal colonies		
23.40	Can you please provide reasons in support of your statement that you cannot rule out an AEOI on auks at Flamborough and Filey Coast SPA, and confirm which impacts this would be in relation to.	The Applicant has considered in their Report to Inform Appropriate Assessment that because no significant cumulative displacement impacts were identified for auks at EIA in the ES, the same conclusion about the risk of displacement effects applies to the FFC SPA auk populations. The Applicant has therefore concluded that the potential for an LSE on the SPA populations of these species due to in-combination displacement is negligible and no further assessment is required. As noted in NE's RRs, the Applicant has considered that a value of 1% mortality when combined with the 70% displacement rate is considered appropriate for assessment of cumulative displacement for auks in the ES. As definitive mortality rates associated with displacement for seabirds, including auks are not known, therefore we advise consideration of a range of mortality rates are used in assessments. Whilst we agree that the mortality for auks is likely to be at the low end of the range, we do not agree that using 1% mortality for the cumulative (and hence in-combination) assessment (with 70% displacement) can be considered the worst	The Applicant has provided updated auk displacement assessment at Deadline 1 (Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Operational Auk Displacement: update and clarification (Appendix 3.3, document reference ExA; WQApp3.3; 10.D1.3)). This includes a review of evidence for auk displacement which provides additional support for the absence of impacts for these species. The Applicant considers this will address Natural England's concerns and remove the need for further consideration of the potential for LSE for guillemot and razorbill from the Flamborough and Filey Coast SPA.	Following review of the Applicant's auk displacement update and clarification (Appendix 3.3), Natural England noted a number of outstanding issues/concerns with the cumulative assessments, namely: •Issues with the figures included for a number of the projects (e.g. Hornsea 3, Thanet Extension, Seagreen projects) •Lack of inclusion of figures for Moray West OWF •Queries regarding the BDMPS figures used in the assessments and recommendations that the biogeographic populations are also considered •Actual assessments and conclusions should consider the predicted impacts across the range of values recommended by Natural England (30-70% displacement and 1-10% mortality), rather than just

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
		case scenario. Therefore, our recommendation is a range of mortality rates of 1-10% and displacement rates of 30-70%, with 70% displacement and 10% mortality as the worst case. We noted in our RRs that within the Natural England assessment scenario of 30% displacement and 1% mortality to 70% displacement and 10% mortality, a number of the annual predicted cumulative additional auk mortalities equate to greater than 1% of baseline mortality of both the largest BDMPS and the biogeographic populations. This is not insignificant and we again advise further consideration be given to this once the figures are agreed. In turn, this undermines the logic regarding auk displacement in the Report to Inform HRA, which is essentially that because there is no significant cumulative displacement impact at EIA, there is no possibility of a LSE at the site level. Therefore, we advise that once the figures are agreed and the summed figures accurately presented that the assessment and conclusion of the LSE screening for auk in-combination displacement from FFC SPA is reviewed by the Applicant.		focusing on the Applicant's preferred rates (see REP1-008 in REP3-051 for full details). Therefore, at present Natural England is not in a position to reach any firm conclusions regarding the level of cumulative impact on auks from the operational phase and hence on in-combination impacts to the auk features of the Flamborough and Filey Coast SPA.
23.41	Can you explain why you do not agree with the Applicant's approach in the	As noted in our the ornithology Appendix of our RRs, we welcome that the Applicant has given consideration in its Information for the HRA report to the distribution of common	The Applicant has produced the figure requested by Natural England which shows that the offshore cable route does not overlap with any concentrations of common scoter,	We welcome that the Applicant has provided in Appendix 23.1 the required figure of common scoter distribution and the offshore cable

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	Information for the HRA report [APP-045] in which a LSE for common scoter is screened out for the Greater Wash SPA.	scoter (and foraging terns) and how these distributions may overlap with the offshore cable corridor. We would suggest that the Applicant provides a figure(s) to back up these statements. However, we consider that the LSE screening should be a coarse filter and as the offshore cable route passes through the Greater Wash SPA, this would indicate a potential impact pathway for species sensitive to disturbance/displacement from the presence of vessels and hence an LSE concluded for the common scoter, RTD and tern qualifying features. The analysis of whether the cable corridor overlaps spatially with the distributions of these species should then be considered within the Appropriate Assessment.	using the data presented in Natural England and JNCC (2016). This figure is presented in Appendix 23.1.	corridor. However, as noted in our response to ExA question 23.41 (see Annex A of REP1-088) and in our response to the Applicant's Section 51 advice [REP2-038], we consider that the LSE screening should be a coarse filter and as the offshore cable route passes through the Greater Wash SPA, this would indicate a potential impact pathway for species sensitive to disturbance/displacement from the presence of vessels and hence an LSE concluded for the common scoter and RTD features of this site. The analysis of whether the cable corridor overlaps spatially with the distributions of these species should then be considered within the Appropriate Assessment. However, based on the figure presented by the Applicant in Appendix 23.1, we conclude no AEOI on the common scoter feature of the greater Wash SPA from offshore export cable laying for Vanguard alone.
23.43	In relation to red-throated diver for the Outer Thames	To clarify just the concern with regard to vessel movements from the operational phase and how these may be mitigated apply	Further consideration of the potential effects of disturbance due to operation and maintenance vessel movements has been	Discussions with the Applicant regarding mitigation for operational phase disturbance to RTD from

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	Estuary SPA, please clarify whether all of the concerns noted in section 4.2.6 of your RR [RR-106] apply or just the concern with regard to vessel movements.	for red-throated diver for the Outer Thames Estuary.	included in Norfolk Vanguard Offshore Wind Farm Offshore Ornithology: Red-throated diver displacement (Appendix 3.1, document reference ExA; WQApp3.1; 10.D1.3).	Outer Thames Estuary SPA (as well as mitigation for construction and operational phase disturbance to the Greater Wash SPA RTD) are on-going. Please see section 5 of our Deadline 3 response to the Applicant's Appendix 3.1 on RTD displacement [REP1-008 in REP3-051] for further information regarding this issue.
23.47	In light of the information contained in the Change Report [AS-009], and in particular the amended proposal for up to 36 piles in total for the two offshore electrical platforms and an increase in the diameter of the pin piles from 3m to 5m, please confirm whether you concur with the findings contained in the ES	Natural England is supportive of the general approach set out in the change report, and broadly agrees with the conclusions presented. However, we have the following additional comments: a) In-combination – The change report does not fully detail how these changes may impact any in-combination assessment. Whilst it is the view of Natural England that this increase is unlikely to alter the conclusions laid out in the original application you should undertake this assessment and present the results. b) Temporal WCS - The Applicant states in paragraph 36 of the change report 'In addition to the spatial extent of underwater noise impacts, consideration was also given	Please see the Applicant's comments on the response to Q1.2	No further comments.

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
	and the Change Report.	to the temporal worst case scenario (wcs). The ES assessed a total duration of 1,260 hours of piling activity (equivalent of 52.5 days), for all project infrastructure which could be piled over a 4 year construction duration.' However, table 2.8 details a WCS of 59 days. Therefore the Applicant should clarify this discrepancy. c) There are no units against 'average piling time per foundation' in table 2.2. Whilst it has been assumed that this is in hours this should be confirmed by the applicant. A full copy of our response to the Applicant in this regard can be found in Annex D.		
23.48	Confirm the extent to which you consider the HRA report is legally compliant in light of the judgment in People over Wind, Peter Sweetman v Coillte Teoranta Case C-323/17.	It is the opinion of Natural England that for the most part the HRA is legally compliant in light of Sweetman ruling as long as all documents and mitigation requirements are secured in DCO/DML. The Applicant should ensure this happens based on final discussions.	The Applicant notes this comment and considers that the HRA is legally compliant as set out in the Applicant's response to Q23.15. Mitigation measures are secured in the DCO either through Requirements (Schedule 1, Part 3) or Conditions in the DMLs (Schedules 9-12).	No further comments.
23.49	Appendix 5.2 of the HRA Report screened out likely	(i) Unless the Applicant commenced these surveys in Sept 2018 and these surveys are ongoing until Spring this year there isn't	i) The Applicant can confirm that no additional surveys were started in September 2018. As set out in the Applicant's own	No further comments.

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	significant effects at Broadland SPA and Ramsar site on the basis of low numbers of wintering birds but, NE (Appendix 4 #12) [RR-106] suggests that the low numbers were due to the cropping regime at the time of the survey. (i) Please comment on the feasibility of conducting further surveys to optimise the accuracy of numbers of wintering birds by the time the examination closes. (ii) What would 'suitable mitigation measures' comprise and how would they be secured? (iii) If no additional measures were to be implemented, can NE confirm whether	sufficient time within examination process to conduct further surveys to optimise the accuracy of numbers of wintering birds. (ii) NE would defer to the Applicant to identify mitigation measures and would suggest the ExA direct this question to Local Planning Authority (LPA) to determine how to secure them. (iii) Natural England considers that further work on non-seabird migration modelling and hence CRM needs to be undertaken, particularly regarding Broadland and Breydon SPAs. We would also again suggest the CRM is undertaken again using the Vanguard turbine specifications and site locational information. There may also be a need to consider cumulative CRM impacts on non-seabird migrants as Vanguard East is located immediately north of East Anglia 3 and so birds migrating north and south may encounter both sites. Also if Vanguard is built across both Vanguard East and Vanguard West then birds migrating east-west as could encounter both sites. Therefore, we advise that once the figures are agreed and the summed figures accurately presented that the assessment and conclusion of the LSE screening is reviewed by the Applicant.	response, it was agreed with NE during the Evidence Plan Process (Norfolk Vanguard - Onshore Wintering Bird Surveys Survey Methodology Approach Update Response March 2016) that one year of surveys was appropriate. The potential for local cropping patterns to influence the findings of the surveys was taken into account. Whilst some fields were recently ploughed, the majority of crops were in place over winter within the wintering bird survey area (winter crop, fallow (grass)) which would provide suitable foraging habitat for pink-footed geese, and as such the survey results recorded over winter in 2016/2017 provided a robust estimate of the use of these habitats by qualifying features of the Broadland SPA and Ramsar site. ii) Mitigation measures have been proposed to account for changes in cropping patterns and for wintering birds to use different habitats for foraging and resting on an interannual basis and are set out in Paragraph 224 and 225 of the OLEMS (document reference 8.7) and secured through DCO Requirement 24. This includes a commitment to not undertake winter works in any one area in consecutive years. The area of arable land located within 5km of the Broadland SPA and Ramsar site and within the onshore project area is approximately	

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
	it agrees with the Applicant's conclusion of no LSE at Broadland SPA and Ramsar site? (iv) If the answer to (iii) is no, the ExA is mindful of the need to consider the Sweetman judgement which stipulates that mitigation should not be taken into account at the screening stage. As such, does NE suggest that there would be a LSE on the Broadland SPA and Ramsar site? If this is the case, for which features and which potential impacts? Is NE content that there would be no adverse effect on integrity?	(iv) Natural England requires further information from the Applicant in order to determine LSE or AEOI, including further work on non-seabird migration modelling and CRM.	20ha, which represents a negligible amount of the available arable land within 5km of the SPA (see Paragraph 196 of Chapter 23 Onshore Ornithology document reference 6.1.23 for further information), and therefore the use of the mitigation measures set on in the OLEMS (document reference 8.7) are considered appropriate. iii) As outlined in the Applicant's response to Q23.51 submitted at Deadline 1, the assessment of non-seabird collision risk has not been updated at this stage so the Applicant is not in a position to respond to this question at present. This aspect will be addressed for subsequent submissions. iv) As above.	
23.50	Do you consider there are potential likely significant	Natural England considers that further work on non-seabird migration modelling and hence CRM needs to be undertaken,	The Applicant will give consideration to non-seabird migrant collision risk in due course	No further comments.

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
	effects for non-seabird migrants of Broadland and Breydon SPA and North Norfolk Coast SPA? If so, for which qualifying features and which potential impacts?	particularly regarding Broadland and Breydon SPAs. We would also again suggest the CRM is undertaken again using the Vanguard turbine specifications and site locational information. There may also be a need to consider cumulative CRM impacts on non-seabird migrants as Vanguard East is located immediately north of East Anglia 3 and so birds migrating north and south may encounter both sites. Also if Vanguard is built across both Vanguard East and Vanguard West then birds migrating east-west as could encounter both sites. Therefore, we advise that once the figures are agreed and the summed figures accurately presented that the assessment and conclusion of the LSE screening is reviewed by the Applicant.	and will thereafter provide an update as necessary.	
23.53	Please clarify whether Likely Significant Effects (LSE) should be identified for Wash and North Norfolk Coast SAC, Winterton-Hersey Dunes SAC and Humber Estuary SAC and if so why?	In our Relevant Representations submitted on 31 August 2018, Para 2.2 we outlined the features for which outstanding concerns remain. We also advise that Natural England does not consider it appropriate that no further work on non-seabird migration modelling and hence CRM has been undertaken since East Anglia 3. Whilst the sites may be of a similar	An update of the non-seabird collision risk assessment has not yet been undertaken. This will be provided for a future deadline.	No further comments.

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
	Confirm otherwise whether you agree with the onshore European sites and features screened in by the Applicant for which a LSE has been identified?	area to the East Anglia 3 site, there are coastal SPAs with wintering waterbirds that are qualifying species that are in the shadow of the Vanguard sites – particularly • Broadland SPA • Breydon Water SPA, • and potentially also the North Norfolk Coast SPA. These sites should therefore also be screened in."		
23.56	Please provide further clarification in relation to your RR (para 4.5.12) [RR-106]. In particular why, in relation to Norfolk Valley Fens SAC, should horizontal directional drilling be required for the watercourses which feed into Blackwater Drain, given that [RR-106]	4.5.12 'There appears to be 2 Horizontal Directional Drilling (HDD) sites very close to Blackwater Drain tributary crossings (Norfolk Vanguard Information to Support HRA 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'. Appendix 4 Para 90 states '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	The two HDDs referred to are two compounds for a single HDD required at the point where Norfolk Vanguard cables cross Hornsea Project Three. The Applicant has received advice from Natural England in their review of Appendix 2 Clarification Note: Norfolk Vanguard Water Dependent Designated Sites and also during a meeting held between the Applicant and Natural England on 22nd January 2019. The Applicant will provide Natural England with further clarification on the water supply	No further comments.

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
	Appendix 4 para 90 states the qualifying features of the SAC at Booton Common are water sensitive habitats reliant on the groundwater supply and not surface water from the Blackwater Drain?	Blackwater Drain to maintain their structure and function as stated. Measures to safeguard water quality should be employed at watercourse crossings. As the crossing sites are upstream of the Booton Common SSSI, and the Wensum SSSI, the use of HDD may reduce the potential for any pollution and water quality issues on the designated sites. However, the final project design should be informed by potential impacts on water dependant designated sites. Natural England provided comment on Appendix 2 Clarification Note: Norfolk Vanguard Water Dependent Designated Sites to the Applicant on 08 January 2018. The information provided within Appendix 2 does not currently contain sufficient information or detail to ascertain potential effects on water dependant designated sites, and does not reference WETMECS as identified by the EA. If the installation of the cable route may affect the water supply to these sites, then a detailed assessment should be undertaken and mitigation measures implemented to minimise any identified effects.	mechanisms prior to the Issue Specific Hearings planned in February. These items remain under discussion between the Applicant and Natural England. The current position is set out within a Statement of Common Ground submitted at Deadline 1 [Rep1 - SOCG - 13.1].	
23.58	Clarify what further detail in the outline Code of Construction	Our Relevant Representation 4.5.3. states that 'There is insufficient detail in the Code of Construction Practice (CoCP) for measures	These items remain under discussion between the Applicant and Natural England. The current position is set out within a	No further comments.

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
	Practice [APP-025] you consider necessary in relation to sediment control and reinstatement of work areas to safeguard designated sites, specifying the measures for each site where further detail is considered to be required,	to safeguard the designated site 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' (where the drilling fluid leaves the bore and escapes into the surrounding substrate). Paragraph 1166 within the Information for the Habitats Regulations Assessment sets out a number of mitigation measures that 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. However, as raised in our Relevant Representations No 67., none of the points regarding sediment management and decommissioning of sediment traps post construction highlighted in Para 1166 are detailed in the current CoCP. Details of actual methods employed are needed in relation to sediment control, and reinstatement of all work areas. Interceptor drains are an important part of sediment control and therefore need to be combined with sediment management measures in 11.1.1. In relation to onshore ecology 22.7.6.6.2, Para 371 and Para 372, waiting for natural	Statement of Common Ground submitted at Deadline 1 (Rep1 - SOCG - 13.1).	

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
		regeneration to occur leaves areas at risk of erosion and/or colonisation by invasive or injurious weeds. More proactive reinstatement will be needed, appropriate to the existing and adjacent vegetation, e.g. replacing turfs or reseeding with appropriate species mix. Effective development and delivery of these plans will be crucial to achieve the required mitigation. Plans will need to be site specific, not just generic across the whole work area. Further detail is required for: • River Wensum SAC • Norfolk Valley Fens SAC The Broads SAC SSSIs downstream including, Dillingham Carr, Gressenhall SSSI and River Wensum SSSI		
23.61	In [RR-106] you state that you do not agree that adverse effects on integrity (AEOI) can be excluded for	Our Relevant Representations (Paragraph 3.1.2) states that' On the basis of information submitted, Natural England is not satisfied that it can be concluded beyond all reasonable scientific doubt that the project	These items remain under discussion between the Applicant and Natural England. The current position is set out within a Statement of Common Ground submitted at Deadline 1 (Rep1 - SOCG - 13.1).	No further comments.

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
	any of the sites assessed by the applicant. Do you agree that an AEOI can be ruled out for any of the features of any of the onshore European sites for which a LSE has been identified?	would not have an adverse effect on the integrity of' a number of terrestrial sites namely: • River Wensum SAC; • Paston Great Barn SAC; • Norfolk Valley Fens SAC, and; • The Broads SAC. Features for which concerns remain are: River Wensum SAC • Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation; • Desmoulin`s whorl snail Vertigo moulinsiana; Paston Great Barn SAC • Barbastelle Barbastella barbastellus		

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
		Norfolk Valley Fens SAC • Alkaline fens; • Northern Atlantic wet heaths with Erica tetralix • European dry heaths • Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) • Calcareous fens with Cladium mariscus and species of the Caricion davallianae • Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) Narrow-mouthed whorl snail Vertigo angustior Desmoulin`s whorl snail Vertigo moulinsiana. The Broads SAC • Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.		

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
		• Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation • Transition mires and quaking bogs • Calcareous fens with Cladium mariscus and species of the Caricion davallianae • Alkaline fens • Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) • Desmoulin`s whorl snail Vertigo moulinsiana Fen orchid Liparis loeselii • Ramshorn snail Anisus vorticulus From the information provided, we are satisfied that there is unlikely to be a significant effect on Annex II species Otter Lutra lutra associated with The Broads SAC.		
23.62	Confirm whether your concerns relating to Norfolk	Features for which outstanding concerns remain are listed below and outlined in our Relevant Representations (2.2.2).	These items remain under discussion between the Applicant and Natural England. The current position is set out within a	No further comments.

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
	Valley Fens SAC and the Broads SAC and Ramsar apply to all features?	Norfolk Valley Fens SAC: • Alkaline fens; • Northern Atlantic wet heaths with Erica tetralix • European dry heaths • Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) • Calcareous fens with Cladium mariscus and species of the Caricion davallianae • Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) Narrow-mouthed whorl snail Vertigo angustior • Desmoulin`s whorl snail Vertigo moulinsiana The Broads SAC and Ramsar:	Statement of Common Ground submitted at Deadline 1 (Rep1 - SOCG - 13.1).	

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
		• Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. • Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation • Transition mires and quaking bogs • Calcareous fens with Cladium mariscus and species of the Caricion davallianae • Alkaline fens • Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) • Desmoulin`s whorl snail Vertigo moulinsiana • Fen orchid Liparis loeselii • Ramshorn snail Anisus vorticulus • Not Annex II species Otter Lutra lutra.		
24.3	Significant limitations to the onshore	Chapter 22 states that access for field surveys was only gained for 50% of the	These matters remain under discussion, as per the Statement of Common Ground	No further comments.

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
	ecological surveys are identified in Paragraphs 82-83 of Chapter 22 ES – APP-347] due to landowner access not being possible for the entire onshore project area. A precautionary approach is said to be adopted where survey data is not available. Please confirm that, notwithstanding your comments on the River Wensum, Norfolk Valley Fens and The Broads SACs, you are satisfied that the Applicant's ecological assessment has been undertaken in a sufficiently precautionary manner and that appropriate mitigation has been	onshore project area and was conducted outside the optimal survey period. We are satisfied that the great crested newt (GCN) plans reflect our advice given earlier in the year. The report identifies where licenses may be required for bats and water voles. 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. Nesting and ground nesting birds should be included with OLEMS measures to safeguard protected species if they are unexpectedly found, i.e. work to cease immediately. We therefore do not agree that appropriate mitigation has been developed or secured in the CoCP or Outline Landscape and Environmental Management Strategy (OLEMS) as yet. We advise that any future ecological assessments undertaken cover a greater area and are conducted within the optimum survey window. This requirement should be included within any DCO and the Applicant	between Norfolk Vanguard Limited and Natural England (Rep1-SOCG-13.1).	

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
	developed and secured.	should refer to Natural England's EPS standing advice for further details.		
24.9	Confirm, in light of your comments at Appendix 4, point 14 of your RR [RR-106] whether you agree with the Applicant's assessment of residual significance in the onshore ornithology chapter and, if not, why not?	Natural England's Relevant Representation point 14 states that '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. The residual impact in the ornithology chapter has been assessed based on embedded mitigation and project commitments made during the design process. In light of the Sweetman ruling mitigation measures should not be considered as part of the project, and the screening stage of HRA should not take account of them. Natural England do not currently agree with the residual impact for birds • Impacts to wintering / on passage bird species	These matters remain under discussion, as per the Statement of Common Ground between Norfolk Vanguard Limited and Natural England (Rep1-SOCG-13.1).	No further comments.

Qu No	Question	Natural England response at Deadline 1	Applicant's response	Natural England Comments
		• Impacts to breeding bird species • Bird species during operational lighting and noise as identified in Chapter 23 Table 23.32. 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.		
24.15	Comment on the Applicant's approach to the assessment in light of the gaps to surveys identified.	Further Assessments should be undertaken during the optimum survey window and provide a good coverage of the rochdale envelope.	Noted. Survey methodologies for Phase 1 Habitat Surveys 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.	No further comments.

THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Natural England's Comments on Applicants Response to Natural England's Written Representations: Annex C [REP2-031]

13 March 2019

Norfolk Vanguard Offshore Wind Farm – Comments on Applicants Response to Natural England's Written Representations: Annex C [REP2-031] provided by the Applicant at Deadline 2

Following submission of REP2-031 by the Applicant at Deadline 2 regarding the construction and operation of Norfolk Vanguard Offshore Wind Farm, Natural England has reviewed this document, and provided comment within the remit of Natural England. These comments are colour coded as:

Green Comments – Comments support/agree with Natural England position or does not impact on Natural England concerns or Natural England has no further comments in this regard

Amber Comments – Natural England comments may be in contradiction further advice needed, or potential new issue not included in Natural England comments

Red Comments – Comments in direct contradiction/argument with Natural England position or represents a significant issue not mentioned in Natural England comments

Table 1: Natural England Comments on Applicants Response to Natural England's Written Representations: Annex C [REP2-031] provided by the Applicant at Deadline 2

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
1. INTRODUCTION			
1.1	In this appendix Natural England sets out what we consider to be the main issues in relation to the Habitats Regulation Assessment (HRA) for Haisborough Hammond and Winterton (HHW) SAC, drawing upon information contained in the original application documents.	No response	No further comments
1.2	Natural England identified a number of areas of uncertainty within the original information provided by the Applicant. These were set out in our Relevant	The Relevant Representation from Natural England informed the production of the Statement of Common Ground (SoCG) with Natural England that was	No further comments.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	Representations, submitted to PINS on 31 August 2018.	submitted at Deadline 1 (document reference Rep1-SoCG-13.1)	
1.3	Within our Relevant Representation Natural England was unable to advise beyond all scientific doubt that the project both alone and in-combination would not have an adverse effect on the integrity of the Haisborough Hammond and Winterton SAC Annex I sandbanks and reef features due to several reasons.		No further comments.
1.4a	These main outstanding concerns relate to: the ability to effectively implement some of the proposed mitigation measures, for example micro-siting around *Sabellaria spinulosa* reef;	The Applicant's response to these topics are provided against the detailed comments in Sections 2 to 4 below.	Comments provided below.
1.4b	the evidence presented to support the successful avoidance of reef and the ability of reef to recover if impacted through cable installation, particularly the mapping of extent of *Sabellaria spinulosa* reef and the analyses applied to the data;		Comments provided below.
1.4c	the ability to use 'sensitive' cable protection, i.e. that which has the least environmental impact at each particular location;		Comments provided below.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
1.4d	the ability to remove cable protection at the time of decommissioning and therefore consideration as to whether this should be considered temporary or permanent habitat loss;		Comments provided below.
1.4e	the lack of empirical data that relate to interventions of similar spatial and temporal scale to the proposals and for this particular sandbank system to support the modelling for sandwave levelling;		Comments provided below.
1.4f	the lack of evidence that sandwave levelling ensures cables remain buried and therefore the assessment which indicates that there will be no future need for reburial or cable protection;		Comments provided below.
1.4g	the assessment that there will be a low impact magnitude in terms of Haisborough Hammond and Winterton 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; and		Comments provided below.
1.4h	the lack of detail as to how single build vs. phased build both alone and / or in-		Comments provided below.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	combination with Norfolk Boreas has been assessed against the conservation objectives for the site.		
1.5	This Written Representation is intended to provide more detail on certain issues raised in our Relevant Representations and any updates on those issues. Where relevant this Written Representation will refer to the specific sections of the Relevant Representation.	Noted	No further Comments
2. ANNEX 1 SANDBANKS			
2.1 Adverse effect on sandbank feature			
2.1.1	Based on our current understanding, Natural England does not consider it likely that human activities taking place within the site have the potential to permanently impact on the large-scale topography of the Haisborough Hammond and Winterton SAC Annex I sandbanks. However, they could, have an impact on the other variables that help define the extent and distribution of a sandbank, namely sediment composition and presence and distribution of biological communities.	The Applicant agrees that the project will not permanently impact on the large-scale topography of the Haisborough Hammond and Winterton Special Area Conservation (SAC) Annex I Sandbanks. The Information to Support HRA report (document reference 5.3) provides an assessment of the potential impacts on sediment composition and presence and distribution of biological communities. Whilst the Applicant agrees that placement of cable protection would be a persistent change to the substrate (as assessed in the Information to Support HRA report), the scale of the impact is extremely	Natural England notes that the applicant considers the amount included in the HRA is conservative, but that doesn't mean that it is acceptable within the SAC The site condition is currently under review with a restore objective due to existing infrastructure. Therefore the placement of rock protection is unlikely to aid in the recovery of the site. In addition the impacts to a particular sandbank may mean that it no longer contributes to the overall sandbank system. It is not just about extent of impact area compared to the entire site but should also take into account objectives relating to form and function. Please see advice

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	Of note for the activities taking place and proposed within the site are operations associated with the deposition of material (e.g. rock and concrete mattress placement/armouring), or other alteration of surface sediment (e.g. cabling operations), that are likely to lead to a persistent change to substrate which is not suitable habitat for sandbank communities.	small in the context of the SAC and the Sandbank feature (discussed further below). Sediment composition would not change as a result of cabling operations due to the Applicant's commitment to ensure that any sediment arising within the SAC would be deposited back into the SAC.	note provided at Deadline 4 for further information. Please note that Natural England believes that it is likely that *Sabellaria spinulosa* will recolonise an area of disturbance, but the evidence presented doesn't support the recovery of 'reef' and therefore the recoverability is unknown. Also Natural England doesn't consider reef on artificial structures and reef as defined at the time of designation and therefore we don't agree with the applicant's comment in relation to cable protection. Please see *Sabellaria spinulosa* advice note also provided at Deadline 4 for further information. As previously stated the provision of a principle Cable Specification and installation plan has been a minimum expectation for cable routes through designated sites since the Triton Knoll (Electrical System) NSIP examination. However, this is not the same thing as a cable burial risk assessment which utilises detailed geotechnical and geophysical data to fully understand the ability to bury the cables using all of the potential installation techniques and scenarios. Please see out joint position statement with the Applicant to be submitted at Deadline 4
2.1.2	As such, some of the sandbank's extent and distribution is likely to be lost, in that	As discussed in section 7.4.1.1.2 of the Information to Support HRA report (document reference 5.3), the	Whilst Natural England do not have the data to quantify the changes, the comment refers to a

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	there are areas present within the site that no longer represent sandbank feature, as defined by sediment composition and/or biological communities, because the substrate has been changed. We believe that there has been physical change in sediment composition as a result of pipelines and their protection material in the HHW SAC, but it is unclear what impact this may have on overall sediment composition and distribution. Furthermore, due to lack of evidence about deposits within the site, partially due to lack of historical data, it is currently not possible to quantify the loss of extent.	maximum extent of cable protection within the Hammond and Winterton SAC is 0.05km^2 which represents 0.003% of the 1468km^2 SAC area. The Applicant expects to be able to bury cable within any Annex 1 Sandbank feature and therefore the worst case scenario for cable protection would be 0.012km^2 on Annex I Sandbank at cable and pipeline crossing locations. This represents 0.002% of the 669km^2 area of Annex 1 Sandbanks within the SAC. It is unclear why Natural England believe there has been a physical change in sediment composition as a result of pipelines given the acknowledgement that there is a lack of evidence and historical data.	knowledge and vulnerability assessment that this has resulted in changes even though there are limitations in understanding the scale of the impacts. The addition of substrate of a different material to that in the natural environment will obviously result in a change of habitat. Please see *Sabellaria spinulosa* advice note also provided at Deadline 4 for further information.
2.1.3	Natural England has recently produced revised conservation advice for Annex I Sandbanks feature of Haisborough Hammond and Winterton SAC which sets a restore objective for: • the presence and spatial distribution of subtidal sandbank communities. • the total extent and spatial distribution of subtidal sandbanks to ensure no loss of integrity, while allowing for natural change and succession; and	Noted, the Applicant has reviewed Natural England's conservation advice. The Information to Support HRA report (document reference 5.3) provides an assessment of the potential impacts on sandbank communities. It should be noted that the sandbank community is characterised by species that are habituated to the naturally unstable nature of the sandbank system as well as the long-term exposure to commercial fishing activities. As noted in the response to paragraph 2.1.2, the potential loss of extent would be 0.002% of the area	We welcome the Applicant's additional review of Natural England's conservation advice. However, Natural England continues to advise against the use of cable protection within designated sites as the addition of hard substrata is often incompatible with the conservation objectives for Annex I sandbanks and reef features. Please see cable protection and *Sabellaria spinulosa* advice notes provided at Deadline 4 for further information.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	• the species composition of component communities.	of sandbanks within the SAC; the Applicant considers that this highly localised change would not affect the overall integrity of the site.	
2.1.4	This revised conservation advice can be found by following this link (available online only): https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0030369&SiteName =haisborough&countyCode=&responsiblePerson=&unitI d=&SeaArea=&IFCAArea	The species / communities listed by NE in the conservation objectives are: The infaunal and epifaunal communities found on the crests of sandbanks are relatively species poor as a result of the highly dynamic sediment environment and the associated impacts of disturbance, smothering and scour. The low diversity communities are dominated by polychaetes (primarily *Nephtys cirrosa* and Ophelia sp.) and the amphipods (*Bathyporeia elegans, Gastrosaccus* sp. and *Urothoe* spp.). Some brittlestars (*Ophiocten* sp.) and sandeel (*Ammodytes* sp.). Slightly higher diversity communities consist of hardy polychaetes and amphipods approximate to the biotope A5.233 (*Nephtys cirrosa* and *Bathyporeia* spp. in infralittoral sand). The areas of the site where sediment movements are reduced (flanks and troughs) support an abundance of attached bryozoans, hydroids and sea anemones. *Sabellaria spinulosa* and other tube building worms (e.g. keel worms and sand mason worms) are found, along with bivalves and crustaceans. None of the listed species are rare, scarce or notable. A number of infaunal species would be likely to remain in the sediment under or surrounding cable protection and the majority of those species that are	As above.

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		associated with areas of the site where sediment movements are reduced (flanks and troughs) are common and/or regularly associated with sublittoral rocky or boulder communities, and can be expected to colonise cable protection (e.g. the ecological group 'Small epifaunal species with robust, hard or protected bodies', which includes the keel worm *Pomatoceros triqueter* is able to colonise artificial substratum (Tillin & Tyler-Walters, 2014))	
2.1.5	Natural England has recently undertaken a condition assessment of the features within Haisborough Hammond and Winterton SAC (unpublished) and our latest view on condition is that the sandbank feature is in unfavourable condition and needs to be restored to favourable condition. Restoration of the feature requires an overall reduction, or removal, of pressures associated with human activities that cause impacts to the sandbanks' extent and distribution, delineated by both substratum and biological communities. As such, any human activities which can cause pressures resulting in changes to substratum or biological communities to the sandbank feature may present a risk to the site's restoration.	The Applicant notes that the condition assessment is unpublished and NE do not state what is required to restore the site. Although the revised conservation objectives are stated to have targets, these are entirely qualitative and give no indication of what 'overall reduction' would be. The Applicant also notes NE's position in paragraph 3.7.2. "*We agree that potential beneficial effects may occur from introduction of hard substrate into a soft substrate system. However, within MPAs, this must be considered secondary to the requirement to recover or maintain the features for which the site is designated."* As discussed in the response to paragraphs 2.1.2 and 2.1.3, impacts would be highly localised. In addition, the effects of cable installation would be temporary and short term, as discussed in the Information to Support HRA report (document reference 5.3) and therefore would not affect the overall restoration of the sandbank extent and communities.	As above.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
2.1.6	We note that there is no expectation that The Applicant should demonstrate recovery of the site. Recovery is an objective for all sectors placing pressure on the site, including oil and gas, renewables, aggregates and fisheries. We do, however, expect The Applicant to demonstrate the risk levels that they believe their proposed operations will present to the restoration of the extent and distribution of the sandbank feature. As a minimum, this would be to demonstrate that proposed activities will be mitigated to not impede restoration, i.e. that activities will not increase the site's exposure to damaging pressures, particularly in regard to changes in extent and distribution of substratum and biological communities. We note that The Applicant may find our discussion of mitigation below helpful in this.	As above.	
2.1.7	We note the Applicant's conclusion of "high confidence that the seabed will recover to a new natural equilibrium state within a timescale of months to years." We would suggest that approaching a new equilibrium may not be in accord with restoration of the site, if that new equilibrium is without the sediment	As noted in the opening comments from NE (para 2.1.1) "*Natural England does not consider it likely that human activities taking place within the site have the potential to permanently impact on the large-scale topography."* As outlined in the response to paragraph 2.1.1, sediment will be retained within the system and therefore the system will not be without the sediment composition.	Natural England are referring to current levels of human activities within the site, for example fishing, which have different impact levels to the current proposal. Please see advice notes also provided at Deadline 4 for further information.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	composition or biological communities expected from the designated feature.	As discussed in the response to paragraphs 2.1.3 and 2.1.4, the biological communities of the site are relatively species poor, consisting primarily of hardy polychaetes and amphipods or other common and regularly occurring species associated with sublittoral rocky or boulder communities, therefore cable installation works and the small scale of cable protection will not significantly alter the community and the site will not be without the biological communities expected from the designated feature.	
2.1.8	Conservation objectives must be considered against the total impact, rather than individual impacts split by different sections of the project lifecycle, as is currently the case in the application. We currently cannot provide advice on the total impact including all remedial work during O&M with the information provided, which is highlighted in our response to the first set of examiners written questions.	The Information to Support HRA report (document reference 5.3) takes a conservative approach to the assessment of the project by considering the worst case for each of the construction, operation and decommissioning phases of the project. This is standard practice. The Applicant considers that the assessment is sufficiently representative of the project lifecycle through the assessment of the following impacts: Physical disturbance – the effects would be temporary and localised. It is likely that the site would have recovered from installation impacts before any potential maintenance would be required. The potential for disturbing communities, in particular *Sabellaria* reef that has recolonised the site during this recovery is considered in Section 7.4.2.1.2 of the Information to Support HRA report. The area affected by any repairs or reburial would also be highly	Please see advice notes provided at Deadline 4 for further information,

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		localised and recovery from each event can be expected. Increased suspended sediment and smothering – as above, the effects would be temporary and localised. It is likely that the site would have recovered from installation impacts before any potential maintenance would be required. Given the likely short term, localised nature of these impacts, there is unlikely to be a significant additive effect across the project life cycle. Habitat loss – this is assessed as a permanent impact i.e. throughout the project life cycle and beyond. Introduction of new substrate - this is assessed as a permanent impact	
2.1 Mitigation of adverse effect on sandbanks			
2.2.1	Natural England suggests that there are a number of ways that The Applicant could discuss how the proposed operations could aid in restoration of the sandbank feature and the site as well as deliver net gain. Ongoing and new activities must look to minimise, as far as is technically practicable, changes in substratum and the biological communities within the site to minimise further impact on feature extent and distribution, demonstrating the risk levels that proposed operations will	As noted by NE in paragraph 2.1.6, "*there is no expectation that The Applicant should demonstrate recovery of the site. Recovery is an objective for all sectors placing pressure on the site, including oil and gas, renewables, aggregates and fisheries*." Cable protection will be minimised as far as is technically practicable, and the extent, type, location etc. of cable protection must be agreed with the MMO in consultation with Natural England prior to construction through the scour protection and cable protection plan, as required under Schedules 9 and	Natural England has raised our concerns in relation to Cable protection and these discussions remain on going. Please see cable protection, *Sabellaria spinulosa* and small scale loss advice notes also submitted at Deadline 4 for further information.

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	present to the restoration of the extent and distribution of the sandbank feature.	10 Part 4 Condition 14(1)(e), and Schedules 11 and 12 Part 4 Condition 9(1)(e) of the dDCO. The Applicant has demonstrated through the Information to Support HRA report (document reference 5.3), the risk levels of the proposed works to the site conservation objectives, through the assessment undertaken for each relevant activity in each stage of the project lifecycle.	
2.2.2	Understanding the mitigation put in place by The Applicant that decreases seabed impact from a worst case scenario could potentially aid in demonstrating that the proposed operations could be considered as reducing impedance of recovery. While Natural England would not expect The Applicant to include a large amount of comparative assessment within their application, it may prove helpful to provide a tabular summary of major mitigation actions that ameliorate impact on seabed. Examples of mitigation measures undertaken by other activities in SACs designated for similar features include reduction of footprint associated with vessel stabilisation through use of alternative work vessels, provision of evidence to quantify footprint of rock armouring potentially needed for works	Section 10.7.1 of Environmental Statement (ES) Chapter 10 Benthic Ecology, outlines the embedded mitigation the Applicant has committed to. Of note, with regards to Sandbanks is the commitment to use HVDC technology which results in the following reductions: There would be two cable trenches instead of six for Norfolk Vanguard (and two cable trenches for Norfolk Boreas, considered in the CIA); The volume of sediment arising from pre-sweeping and cable installation works is reduced; The area of disturbance for pre-sweeping and cable installation is reduced; The space required for cable installation is reduced, increasing the space available within the cable corridor for micrositing;	Natural England was anticipating that a list of all mitigation would be included in a table for ease of reference: - including but not limited to: reduction of cable trenches, micro siting, removal of redundant infrastructure, sandwave levelling.

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	and reuse of existing stabilisation material footprints.	The potential requirement for cable protection in the unlikely event that cables cannot be buried is reduced; and The number of export cables required to cross existing cables and pipelines and the associated cable protection is reduced. The Applicant agrees that the examples provided by NE would lead to localised reductions of impact (e.g. the use, if practicable, of alternative work vessels such as dynamic positioning (DP), however these differences would be minimal as this represents a temporary and localised effect (the worst case area for the footprint of vessels during construction is 0.3km^2 and 0.58km^2 per year during operation). The Applicant will assess the suitability of these options during the development of Construction Method Statements pre-consent.	
2.2.3	We also suggest that any operations or evidence The Applicant can undertake or provide that reduces uncertainty around impact to feature and site could support provision of a more robust assessment that better reflects the nature of any impacts associated with planned activities.	The Applicant has sought to use available evidence; if Natural England is aware of further evidence, referenced examples would be welcome. The In Principle Monitoring Plan (document reference 8.12) proposes to undertake pre- and post-construction geophysical surveys of the seabed.	No further comments.
2.2.4	Natural England welcome the commitment by the Applicant to ensure that the	As per the Applicant's response to First Written Questions (Q5.3), the Applicant suggests this is	No further comments.

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	dredged material from sandwave clearance operations will be deposited within Haisborough Hammond and Winterton SAC (HHW) such that the sediment will remain within the sandbank system. It is acknowledged that there will need to be further agreement on the disposal location/s post-consent based on the pre-construction surveys, as we would wish areas of Annex I *Sabellaria* reef to be avoided when depositing the sediment, but we believe that this is achievable. This should be secured in the DML.	already secured in the DMLs as the final approach to cable installation, including the methodology for pre-sweeping must be agreed with the MMO (in consultation with the relevant statutory bodies) through the Cable Specification and Monitoring Plan, as required under dDCO Schedules 11 and 12, Part 4 Condition 9(1)(g). The methodology for the cable installation strategy and sediment disposal (if required) will be determined following pre-construction surveys (required under dDCO Schedules 11 and 12 Condition 13(2)(b)). The method and location for sediment disposal will be dependent on the installation strategy and cable route, taking into account the location of Annex 1 *Sabellaria* reef at that time (as established by pre construction surveys), in order to provide the required buffer between disposal and reef.	
2.3 Sandwave Levelling			
2.3.1	The main factors that are considered to influence the recovery potential (i.e. the mechanism and speed of recovery) of the levelled sandwaves are: The dimensions of the dredged area, particularly the width and depth of the dredged channel relative to the overall sandwave height, and the alignment of the dredged channel relative to the crest axis; and	Noted	No further comments.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	The degree of sediment mobility at the dredge location, which is in turn controlled by the environmental forcing conditions and water depth		
2.3.2	Natural England is aware that Hornsea Project Three OWF (also in the planning system) proposes sandwave levelling within an Offshore SAC namely North Norfolk Sandbanks. Therefore we thought it appropriate to undertake a review to compare the evidence presented to support this application with that for HOW03 and North Norfolk Sandbanks. In summary both HOW03 and Norfolk Vanguard come to the same conclusions – i.e. no significant impacts from sandwave clearance on relevant MPAs, with the evidence in the Norfolk Vanguard's assessment providing more confidence in the conclusions. Therefore, we are more confident in the conclusions, but there still remains some uncertainty around site specific impacts from the actual cable installation that are set out in the detailed comments below.	The Applicant welcomes the confirmation that the Norfolk Vanguard and Hornsea Project Three assessments of impacts to Sandbanks concur that there would be no significant impacts from sandwave clearance and that the Norfolk Vanguard assessment provides NE with more confidence in the conclusions. The uncertainty is noted and the Applicant has drawn upon existing survey data as evidence where possible. The In Principle Monitoring Plan (document reference 8.12) proposes to undertake pre- and post-construction geophysical surveys of the seabed.	As stated, Natural England are more confident in the conclusions, however, there still remains some uncertainty around site specific impacts from the actual cable installation.
2.3.3	There is no discussion in the application about the fact that even with sandwave levelling cables may be sub optimally buried and require protection or become	The worst case scenario for the O&M phase is based upon the potential for suboptimal burial *in the absence of* sandwave levelling. The assessment is therefore conservative, and should the sandwave levelling installation strategy be adopted, it is expected that	No further comments.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	exposed over the life time of the protect resulting in further impacts to the site.	suboptimal burial would be reduced and therefore O&M impacts would be less than presented in the ES (document reference 6.1) and Information to Support HRA report (document reference 5.3).	
2.3.4	Natural England advises that a pre-construction sandwave levelling report and assessment is required to ensure that the results of any further monitoring and specific site characteristics are taken into consideration and the impacts remain within the parameters assessed especially in relation to orientation of levelling to wave and interaction with troughs. This should be secured as part of the DML.	The Applicant is willing to commit to a pre-construction sandwave levelling report and will discuss with NE the proposed wording to be included in the DMLs to secure this.	Natural England welcomes this commitment and are happy to discuss this further with the Applicant.
2.3.5	The assumption to date was that the levelling within HHW SAC would be over discrete waves / banks, not levelling across a larger number of smaller features. This situation may impact differently on the conservation objectives for the site and a more detailed HRA assessment is required before we can agree with the conclusions of the HRA that there is no adverse effect on Integrity from sandwave levelling.	The worst case scenario assumptions are as presented to NE previously, including in the Preliminary Environmental Information Report (PEIR), although noting that the total extent of potential levelling has been significantly reduced through the Applicant's commitment to use HVDC export cables, and therefore reducing the number of cable trenches from six to two for Norfolk Vanguard. The extent of Sandwave levelling in the SAC has been informed by analysis which is reported in ES Appendix 5.1 Norfolk Vanguard Offshore Windfarm Export Cable Installation Study. It is not clear what Natural England are referring to with the statement that "*This situation may impact differently on the conservation objectives for the site*	Natural England is wanting to understand the different impacts between impacts to discrete banks verses impacts to a larger number of smaller features. The impacts are likely to be different and it may mean that more than WCS may be appropriate depending on the activity and/or the particular feature (as in the individual sandbanks).

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		and a more detailed HRA assessment is required". A detailed assessment of the worst case scenario is provided in the Information to Support HRA report (document reference 5.3).	
2.4 Cable Protection			
2.4.1	Currently 10% cable protection is proposed as a contingency should cables be sub optimally buried within the SAC which if permitted as set out would result in persistent habitat loss of Annex I sandbank feature. Habitat change is a pressure different to habitat loss, but it is still a change to the feature that the site was designated for. Sandbanks features have high sensitivity to both habitat loss and habitat change.	"*10% cable protection*" refers to the proportion of the potential length of the export cable pairs that could require cable protection. As discussed in section 7.4.1.1.2 of the Information to Support HRA report (document reference 5.3) and in response to paragraph 2.1.2 above, the maximum extent of cable protection within the SAC is 0.05km^2 which represents 0.003% of the 1468km^2 SAC area; of which 0.012km^2 of cable protection could be located on Annex I Sandbank (0.002% of the 669km^2 area of Annex 1 Sandbanks within the SAC). The Applicant has assessed this as permanent habitat loss (section 7.4.1.1.2 of the Information to Support HRA report) and concludes that this extremely small-scale habitat loss would not affect the form and function of the Sandbank. Introduction of new substrate is also assessed in section 7.4.2.1.2 of the Information to Support HRA report. This would only affect the localised footprint where cable protection is placed. It would not lead to wider changes in the surrounding soft sediment communities, noting that this includes low diversity	Natural England acknowledge that based on previous cable installations (requiring c.6% of their cable lengths to be protected) the developer has presented reasonable justification for the WCS of 10% along the entire export cable length requiring cable protection and this could potentially meet EIA requirements . However, it doesn't take into account the localised diversity of sediment types and structure, which would result in cable protection being concentrated in particular areas/habitats rather than a uniform distribution. Therefore assessing WCS of 10% of the cable length within an SAC requiring protection, based on evidence from entire export cable routes measuring 10s of kilometres, with multiple sediments types, is not appropriate for HRAs. The Applicant is providing further assessment on this. Please see Joint position statement submitted by the Applicant at Deadline 4.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
		and hardy species as well as those that can be expected to colonise cable protection (e.g. *Sabellaria spinulosa* and keel worms, as discussed in response to paragraphs 2.13 and 2.1.4 above).	
2.5 Cable Installation			
2.5.1	As with the other documents provided, Natural England is of the view that the reasoning is not unsound, but it could have been evidenced further to support and give us the necessary confidence. Overall we believe that it is likely that the sediments will recover from cable installation, assuming that the sediments are what is stated here and if no protection/ sand wave clearance occurs. Although it should be recognised that in coarser sediment areas scarring will remain. But if the benthos recovers, which is likely if the sediment composition remains unchanged we believe that it is unlikely to impact the conservation objective for the site.	The Applicant has sought to use available evidence; if Natural England is aware of further evidence, referenced examples would be welcome. The Applicant believes it is likely that the sediments will recover from cable installation, including sand wave clearance, since sediment will be retained within the system, as outlined in the responses to paragraphs 2.1.1 and 2.2.4 and presented within the Information to Support HRA report (document reference 5.3). The Applicant also believes that there will be no significant change to the benthos due to cable installation (as outlined in the responses to paragraphs 2.1.3, 2.1.4 and 2.4.1 and presented within the Information to Support HRA report), since there will be no change to sediment composition as a result of cable installation works. In addition, the extent of cable protection represents only 0.003% of the SAC area and the biological communities of the SAC are relatively species poor, consisting primarily of hardy polychaetes and amphipods or other common and regularly occurring species associated with sublittoral rocky or boulder communities.	Please see our joint position statement submitted at Deadline 4 by the Applicant.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
2.5.2	More information on cable burial operations is needed for us to reconsider our current position that adverse effect on integrity of the site cannot be ruled out. We acknowledge that much of the technical detail will only be available post-consent, and as such, we strongly recommend that The Applicant's assessment must be considered with sufficient precaution added to allow for significant, post-consent increases in worst case scenarios, especially when operations occur within Marine Protected Areas.	As acknowledged by Natural England, additional information would be provided post consent. The Applicant is committed to providing further detail prior to construction through the Construction Method Statement (required under dDCO, Schedules 11 and 12, Part 4 Condition 9(1)(c)) and Cable Specification Installation and Monitoring Plan (required under dDCO Schedules 11 and 12, Part 4 Condition 9(1)(g)). The assessment is based upon a worst case scenario which the Applicant feels provides sufficient and appropriate precaution. The worst case scenario also includes contingency estimates as requested by Natural England during the Evidence Plan Process and therefore post-consent increases in worst case scenarios are highly unlikely and would be subject to additional licencing or variation to the DCO. Where Natural England refers to "Marine Protected Areas" (MPAs), the Applicant reiterates that the only MPA of relevance to this assessment is Haisborough, Hammond and Winterton SAC.	As above
2.5.3	Based on lessons learnt our standard advice is for the early provision of a pre consent Cable Burial Risk Assessment for activities within Marine protected areas which pose a significant risk to interest features and there is limited confidence in the proposed installation activities. Ideally, the cable burial risk assessment should be	The Applicant has discussed this with Natural England, and is exploring the feasibility of producing a pre-consent Cable Burial Risk Assessment based on the existing 2016 site specific survey data.	Natural England welcome this commitment and will continue to liaise with the Applicant in this regard.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	based on the data from a recent comprehensive geotechnical and geophysical survey campaign. But consideration of the likely success of the installation techniques in particular sandwave levelling and alternative options to that of cable burial in relation to contingency measures should the cable be sub optimally buried. Natural England would welcome further discussions with the applicant on this.		
3. REEFS			
3.1 Adverse effect on reef features			
3.1.1	Based on the information presented and flawed methods used for assessment, Natural England cannot currently provide an evidence-based opinion on the actual scale of the potential impacts to the Annex I *Sabellaria spinulosa* reef feature of the HHW SAC.	The Applicant believes Natural England is referring to the methodology used to map the extent of *Sabellaria* reef as part of the characterisation of the baseline for the assessment. The Applicant acknowledges that Natural England disputes this methodology, however, as presented in the SoCG (Rep1-SOCG-13.1), irrespective of the methodology the Applicant and Natural England agree on the general extent and location of the potential feature. The Applicant therefore feels that the baseline reef extent used by the Applicant (comparable as it is to Natural England's map of reef extent), provides a sufficient baseline and therefore poses no reason that Natural England cannot currently provide an opinion on the potential impacts to the Annex I *Sabellaria* reef feature of the SAC.	Please see cable protection, *Sabellaria spinulosa* and small scale loss advice notes also submitted at Deadline 4 for further information.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
		The Applicant notes that the future location and extent of *Sabellaria* reef at the time of construction is unknown as the species is ephemeral in nature and the location/extent is therefore likely to change prior to construction. The Applicant suggests that this is the key limitation with regards to Natural England providing an evidence-based opinion on the actual scale of the potential impacts to the Annex I *Sabellaria* reef feature of the Haisborough Hammond and Winterton SAC and as such, the Applicant has committed to undertaking pre-construction surveys (as required by dDCO Schedules 11 and 12 Part 4 Condition 13(2)(a)) and to agree cable installation methods and routing with the MMO through the Construction Method Statement (required under dDCO, Schedules 11 and 12, Part 4 Condition 9(1)(c)) and Cable Specification Installation and Monitoring Plan (required under dDCO Schedules 11 and 12, Part 4 Condition 9(1)(g)).	
3.1.2	Based on our current understanding, Natural England considers it likely that operations and activities already taking place within the site have the potential to impact on variables that are used to delineate the extent and distribution of area to be managed as *Sabellaria* reef (sediment composition and biological assemblages), structure and function (physical structure and biological structure), and supporting processes (supporting habitats).	The Applicant agrees that operations and activities already taking place within the site (as well as natural variation) have the potential to impact on *Sabellaria* reef. The Applicant does not agree that cable protection is not a suitable habitat for Annex I reef communities. The Applicant notes that *Sabellaria* reef can develop on artificial hard substrate as noted in the JNCC (2016)2 definition:	As stated previously, Natural England do not consider the establishment of *Sabellaria spinulosa* on artificial substrate is Annex I reef as designated and therefore we believe that cable protection would result in permanent habitat loss. Please see *Sabellaria spinulosa* advice note provided at Deadline 4 for further information.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	Of note for the activities taking place and proposed within the site are operations associated with the deposition of material (e.g. rock and concrete mattress placement/ armouring), or other alteration of surface sediment (e.g. cabling operations), that are likely to lead to a persistent change to substrate which is not suitable habitat for mixed sediment Annex I reef communities.	"*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." The Applicant notes that Ørsted (Hornsea Project Three) referenced some Dutch studies that provide some evidence that *Sabellaria spinulosa* will colonise artificial structures with similar biological communities to those of natural rocky reef, but until these papers are reviewed in detail by the SNCB's NE's advice remains unchanged in relation to requirement to protect the existing habitat and features which support the Annex I reef (see paragraph 3.2.1 below). The Applicant agrees with Ørsted that *Sabellaria spinulosa* will colonise artificial structures. The Applicant understands that Natural England is currently discussing with other Statutory Nature Conservation Bodies (SNCB)s whether it is agreed that such aggregations would count as Annex 1 reef (as mentioned in para 3.5.9).	
3.1.3a	Fishing byelaw: Defra's revised approach to fisheries requires that fishing activity in European Marine Sites are managed in line with the requirements of Article 6 of the Habitats	Noted	No further comments.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	Directive. Towed demersal gear is considered a red risk interaction with *Sabellaria* spp. reef, meaning the use of towed demersal gear over *Sabellaria* spp. reef is not considered compatible with achieving the conservation objectives for the feature.		
3.1.3b	*Sabellaria* spp. reef is sensitive to the following pressures exerted by towed demersal gear: Abrasion/disturbance of the substrate on the surface of the seabed; Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion; Removal of non-target species; and iv. Physical change (to another sediment type)	Noted	No further comments.
3.1.3c	Reef in Haisborough Hammond and Winterton SAC is currently considered to be in unfavourable condition, in part due to insufficient fisheries management. Natural England has advised that all areas of S. spinulosa reef within Haisborough Hammond and Winterton SAC are closed to towed demersal gears in order to remove these pressures and so enable the	Noted, however Natural England state that it is not possible to quantify the loss of extent (paragraph 3.2.1 below) and the Natural England conservation advice, referenced in paragraph 3.2.4 below, states3: "Annex I biogenic ross worm *Sabellaria spinulosa* reef has been detected at several locations within the site.	Under Article 6.2 of the Habitat regulations there is a requirement to put in place management measures for the restoration of the site. Therefore, putting in place management measures to remove the anthropogenic pressures, in the most suitable sediment areas and allowing time for said recovery meets the Habitat Regulation requirements. Ongoing reviews of these areas and the wider designated

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	reefs to recover and the site to achieve its conservation objectives. Natural England have advised that fisheries closures protect areas which are suitable for reef formation, as described in the Conservation Advice package, rather than solely where reef is present at any given time, due to S. spinulosa reef extent being variable in space and time and reliant on the physical and biological processes that allow reefs to form	However due to the ephemeral nature of the reef its presence can be highly variable in both space and time and therefore estimating its total extent is not possible." It is therefore unclear how a restoration objective can be measured.	site will establish if further management measures are required.
3.1.3d	Eastern Inshore Fisheries and Conservation Authority are currently developing fisheries closures for within 6nm. Closures for beyond 6nm are being progressed through the Joint Recommendation process under the Common Fisheries Policy and one such area coincides with the Applicant's cable corridor.	Noted.	No further comments.
3.2 Favourable condition status of the reef features			
3.2.1	Some extent and distribution of area to be managed as reef could have been lost, in that there are areas present within the site that no longer represent reef feature either due to changes in substrate or movement of the reef feature. However, due to lack of evidence about deposits present within the site, partially due to lack of historical data,	Noted, the Applicant agrees with Ørsted (Hornsea Project Three) that *Sabellaria spinulosa* will colonise artificial structures with similar biological communities to those of natural rocky reef.	Natural England does not consider that the establishment of *Sabellaria Spinulosa* on artificial substrate is Annex I reef as designated and therefore we believe that cable protection would result in permanent habitat loss. Please see *Sabellaria spinulosa* advice note also submitted at Deadline 4 for further information.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	it is currently not possible to quantify the loss of extent. NB: We recognise that in the cable protection clarification note provided by Hornsea Project Three (REF1 – 183 and REF1-138) the Applicant has referenced some Dutch studies that provide some confidence that *Sabellaria spinulosa* will colonise artificial structures with similar biological communities to those of natural rocky reef, but until these papers are reviewed in detail by the SNCB's our advice remains unchanged in relation to requirement to protect the existing habitat and features which support the Annex I reef		
3.2.2	Natural England has recently produced revised conservation advice for Annex I Reefs feature of Haisborough Hammond and Winterton SAC which sets a restore objective for: a) the presence and spatial distribution of reef communities; b) the total extent and spatial distribution and types of reef (and each of its subfeatures); and c) the species composition of component communities	Noted, however as discussed in the Applicant's response to paragraph 3.1.3c, it unclear how Natural England proposes to measure, and therefore manage a restoration objective when Natural England also states that it is not possible to quantify the total extent, or loss of extent of *Sabellaria* reef.	Natural England will measure a restore objective through monitoring of the reef.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
3.2.3	In addition Annex I reef extent attribute states: When *Sabellaria* reef develops within the site, its extent and persistence should not be activities, accepting that, due to the naturally dynamic nature of the feature, its extent will fluctuate over time.	The feature is naturally dynamic, and the fluctuating extent that Natural England refers to supports the potential for recovery within the ranges of natural variation as the species is ephemeral in nature. In the unlikely event that *Sabellaria* reef has developed to such an extent that it is not possible to route the cable trenches through the 2 to 4km wide corridor (which provides approximately 1.05km to 3.75km space for micrositing), then the proportion of temporary disturbance to such a large area of reef would be very small, combined with the likely recoverability of reef, resulting in no adverse effect on integrity (AEoI) (as discussed in Section 7.4.2.1.1 of the Information to Support HRA report). Given the conditions listed in the definition of *Sabellaria* reef by JNCC (2016), as discussed in the response to paragraph 3.1.2, it is considered that, once the disturbance has ceased (i.e. cable laying or placement of cable protection) S. spinulosa could once again settle and form reef aggregations. Given the small scale of cable protection, 0.003% of the SAC (as discussed in paragraph 2.1.2), and the potential for cable protection to become colonised by *Sabellaria* reef, the extent and persistence of reef in the SAC would not be compromised by Norfolk Vanguard. The Applicant maintains the position presented in the Information to Support HRA report, that there would be no AEoI.	Please see cable protection, *Sabellaria spinulosa* and small scale loss advice notes also submitted at Deadline 4 for further information.
3.2.4	This revised conservation advice can be found by following this link (available	Noted.	No further comments.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	online only): https://designatedsites.naturalengland.org.uk/Marine /MarineSiteDetail.aspx?SiteCode=UK0030369&SiteName=haisborough&countyCode=&responsiblePerson=&unitId=&SeaArea=&IFCAArea=		
3.2.5	Natural England have recently undertaken a condition assessment of the features within Haisborough Hammond and Winterton SAC (unpublished) and our latest view on condition is that the reef feature is in unfavourable condition and needs to be restored to favourable condition. Installation of infrastructure may have a continuing effect on extent and distribution of the reef within the site. Restoration of the feature requires an overall reduction, or removal, of pressures associated with human activities that cause impacts to the reefs' extent and distribution, delineated by both substratum and biological communities. As such, any human activities which can cause pressures resulting in changes to substratum or biological communities to the reef feature may present a risk to the site's restoration. Activities must look to minimise, as far as is practicable,	The Applicant notes that the condition assessment is unpublished and Natural England do not state what is required to restore the site. Although the revised conservation objectives are stated to have targets, these are entirely qualitative and give no indication of what 'overall reduction' is required. The Applicant also notes NE's position in paragraph 3.7.2. "We agree that potential beneficial effects may occur from introduction of hard substrate into a soft substrate system. However, within MPAs, this must be considered secondary to the requirement to recover or maintain the features for which the site is designated." As discussed in the response to paragraphs 2.1.2 and 2.1.3, impacts would be highly localised. In addition, cable protection could become colonised by *Sabellaria* reef and would therefore not limit the recovery potential.	Please see previous points.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	damaging the established, i.e. high confidence, reef within the site.	The Applicant has demonstrated through the Information to Support HRA report (document reference 5.3), the risk levels of the proposed works to the site conservation objectives, through the assessment undertaken for each relevant activity in each stage of the project lifecycle.	
3.2.6	We note that there is no expectation that The Applicant should demonstrate recovery of the site. Recovery is an objective for all sectors placing pressure on the site, including oil and gas, renewables, aggregates and fisheries. We do, however, expect The Applicant to demonstrate the risk levels that they believe their proposed operations will present to the restoration of the extent and distribution of the reef feature. We note that The Applicant may find our discussion of mitigation below helpful in this. As a minimum, this would be to demonstrate that proposed activities will be mitigated to not impede restoration, i.e. that activities will not increase the site's exposure to damaging pressures, particularly in regard to changes in extent and distribution of substratum and biological communities.	As above.	No further comments
3.4 Micro-routing as mitigation			

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
3.4.1	We believe that with the current cable corridor routing, primary mitigation (i.e. avoiding Annex I reefs within SACs and/or biogenic or geogenic reefs outside SACs within the Norfolk Vanguard offshore cable corridor) will not always be possible. We do not consider the Applicant's consideration of routing through 'lower quality' reef to be acceptable in terms of restoration of conservation objectives as the 'lower quality' reef mentioned by the Applicant is still contained within area to be managed as reef, with the protection provided by Annex I status.	Natural England's Relevant Representation states 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 Applicant agrees that micrositing to avoid reef should be possible and has committed to undertake pre-construction surveys (as required by dDCO Schedules 11 and 12 Part 4 Condition 13(2)(a)) and to agree cable installation methods and routing with the MMO through the Construction Method Statement (required under dDCO, Schedules 11 and 12, Part 4 Condition 9(1)(c)) and Cable Specification Installation and Monitoring Plan (required under dDCO Schedules 11 and 12, Part 4 Condition 9(1)(g)). It should be noted that the Applicant does not refer to routing through lower quality reef, having committed to micrositing around all reef, where possible. The Applicant believes this is a pre- emptive position from Natural England based on the Hornsea Project Three Application. It should be noted however that by definition, "low reef" is inherently patchy (with only 10-20% coverage, Gubbay (2007)4) and therefore increases the potential for micrositing. Medium reef also has high potential for micrositing, being classified by 20-30% coverage. In the unlikely event that *Sabellaria* reef has developed to such an extent that it is not possible to route the cable trenches through the 2 to 4km wide corridor (which provides approximately 1.05km to	As set out in our response to the Applicant's response to our answer to the first set of Examiners question 5.6. 1) Natural England agrees that there is an element of patchiness to *Sabellaria spinulosa* reef (Gubbay 2007). However, the point here is that when undertaking Annex I reef surveys an area with the same side scan sonar 'reef' return is identified and the extent of that habitat is mapped. That potential reef area is then ground truthed using grab samples and drop down video to determine the reefiness qualities i.e. elevation, abundance and patchiness. The micro siting condition is to avoid areas of reef no matter what the quality. Therefore the suggestion to go through areas of reef that has less coverage is outside the proposed mitigation. For this to be feasible there would need to be a 15-20m wide corridor (similar to a dual carriageway travelling in both directions) with no *Sabellaria spinulosa* in it. And recognising that similar to a road the bend radius of a cable is about 5m making the ability to weave around features challenging if not impossible. Hence the requirement to avoid areas. 2) The fisheries byelaw areas have been identified to manage DEFRA's 'Red' risks from ongoing fisheries and enable recovery of the Annex I reef features. Any anthropogenic

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
		3.75km space for micrositing), then the proportion of temporary disturbance to such a large area of reef would be very small, combined with the likely recoverability of reef, resulting in no AEoI (as discussed in Section 7.4.2.1.1 of the Information to Support HRA report). Given the conditions listed in the definition of *Sabellaria* reef by JNCC (2016), as discussed in the response to paragraph 3.1.2, it is considered that, once the disturbance has ceased (i.e. cable laying or placement of cable protection) S. spinulosa could once again settle and form reef aggregations.	impacts should not hinder the management of these areas. In allowing cable installation through these areas it would almost certainly slow the trajectory of recovery and temporarily reverse any recovery that management measure had achieved. Whilst it is acknowledged that these management areas will include areas where reef may be absent at any given moment in time, the sediment included is considered by Natural England to have the potential for reef to develop. Hence the management for recovery. Previously it has been agreed that if the Annex I preconstruction surveys show that reef is absent at the time of construction then cable installation could happen within the byelaw areas of the Wash. However, as demonstrated by the Race Bank OWF located in the Wash and North Norfolk Coast SAC the cable installation is no longer considered a one off activity especially where reburial and/cable repairs are required over the life time of the project. Which would further hinder the management measures. 3) In addition to this if cable protection is installed then there will be a permanent change to the habitat and therefore we believe that there will be a loss of feature extent and the management measures for the site would be hindered.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
			Therefore we advise that if cable installation with the byelaw area is permitted by the Secretary of State then there would need to be a restriction of no cable protection in that area. But given this is likely to be an area of mixed sediment rather than sand it is likely to be the most challenging habitat for installing cable within the site. Accordingly consideration of the most appropriate installation technique would be required
3.4.2	We welcome the Applicant's desire to avoid areas of higher quality reef and/or restrict cable installation to the periphery of reef features, and we consider that both of these mitigations may decrease impact on individual reefs. However, we do not consider that they will lower the risk related to leaving the overall reef feature in unfavourable condition.		See comments above
3.3.3	We acknowledge that the Applicant considers that *Sabellaria* biotopes have a wide distribution throughout the southern North Sea benthic ecology study area. Natural England agrees with this statement, however, this does not preclude mitigation measures being sought to avoid areas of Annex I reef.	The Applicant notes the agreement and highlights that the mitigation proposed includes micrositing around Annex I reef where possible.	No further comments.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
3.3.4	The primary mitigation for impact to *Sabellaria spinulosa* reef in the application is "where possible" avoidance of reef area. We note that if the suggested mitigation is successful in its entirety (i.e. all reef feature is avoided) we would agree with the assessment of magnitude. However, we advise that it is necessary to look at this primary mitigation with a degree of precaution, and question whether there are any studies from HHW or IDNRRB that could inform likelihood of success.	The Applicant notes that "where possible" is a necessary caveat to the mitigation in accordance with Natural England's Relevant Representation: "Relevant Representation states 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." However, as discussed in the Applicant's response to paragraphs 3.3.1 and 3.3.2, in the unlikely event that *Sabellaria* reef has developed to such an extent that it is not possible to route the cable trenches through the 2 to 4km wide corridor (which provides approximately 1.05km to 3.75km space for micrositing), then the proportion of temporary disturbance to such a large area of reef would be very small, combined with the likely recoverability of reef, resulting in no AEoI (as discussed in Section 7.4.2.1.1 of the Information to Support HRA report). The Applicant has sought to use available evidence, if Natural England is aware of monitoring studies from the Haisborough, Hammond and Winterton SAC and Inner Dowsing, Race Bank and North Ridge SAC, referenced examples would be welcome.	See comments above.
3.4 Core Reef			
3.4.1	The Applicant provided an assessment of likelihood of reef being present in the area	The Applicant believes Natural England is referring to the methodology used to map the extent of *Sabellaria*	No further comments.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	of SAC intersected by the cable corridor prior to construction. This uses Natural England's concept of core reef and the reef index (Roberts et al, 2016). A core reef approach requires a historical evidence dataset of suitable confidence, which limits its application not least in offshore sites due to the resources required to develop a sufficient evidence base. It has been the SNCB's consistent opinion on offshore casework that a core reef approach is unlikely to be applicable to the assessment of *Sabellaria spinulosa* reef in MPAs because results of the reef index are highly dependent on the number of surveys undertaken in the area of interest.	reef as part of the characterisation of the baseline for the assessment. The Applicant acknowledges that Natural England disputes this methodology, however, as stated in response to paragraph 3.1.1, and as presented in the SoCG (Rep1-SOCG-13.1), irrespective of the methodology the Applicant and Natural England agree on the general extent and location of the potential feature. The Applicant therefore feels that the baseline reef extent used by the Applicant (comparable as it is to Natural England's map of reef extent), provides a sufficient baseline and therefore poses no reason that Natural England cannot currently provide an opinion on the potential impacts to the Annex I *Sabellaria* reef feature of the SAC.	
3.4.2	It should be noted that a trial is being agreed of use of the core reef approach at Thanet Extension OWF on the basis that this is outside a designated site. This may change opinion on use of core reef approach in the future, but this data will not be in time for this application. Alternative reef indices are being agreed to account for the lower availability of survey data.	Noted.	No further comments.
3.5 Cable Protection			
3.5.1	Contrary to point 66 and 349 of Vanguard Information to support HRA (APP – 045),	Section 5 of Appendix 25.6 of the Consultation Report outlines the discussion and agreement with Natural	Please see *Sabellaria spinulosa* advice note also submitted at Deadline 4 for further information.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	Natural England didn't agree in the January 2018 evidence plan working group meeting that cable protection was a temporary impact for *Sabellaria spinulosa* reef. Please see further points below in relation to why this is the case. Therefore Natural England doesn't agree with Table 7.4 and other locations within the Vanguard Information to support the HRA that there will be no habitat loss.	England regarding permanent loss of *Sabellaria* reef during the Expert Topic Group on 31 January. The Applicant maintains its position that, in the unlikely event that *Sabellaria* reef cannot be avoided by micrositing, the reef can be expected to colonise cable protection (as discussed in the Applicant's responses to paragraphs 3.1.2, 3.3.1 and 3.3.2), therefore there would be no permanent loss of *Sabellaria* reef. The Applicant therefore also maintains the position stated in the Information to Support HRA report (document reference 5.3) that the temporary and localised impacts associated with Norfolk Vanguard would result in no AEoI of the Haisborough, Hammond and Winterton SAC in relation to the conservation objectives for Annex I Reef and therefore the Applicant considers that the proposed cable protection should be permitted. Natural England state below (paragraph 3.5.9) that they do not yet have a position on the status of *Sabellaria* reef which is growing on artificial substrate. The Applicant suggests that this is a key example of why it is most appropriate to agree cable protection with the MMO in consultation with Natura England prior to construction through the Scour Protection and Cable Protection Plan (as required under dDCO Schedules 11 and 12 Part 4 Condition 9(e), in accordance with the Outline Scour Protection and Cable Protection Plan (document reference 8.16)) based on the preconstruction survey data, latest	

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
		scientific understanding and relevant guidance at that time. See the Applicant's response to paragraph 2.4.1 above with regards to the conservation objectives for Annex I Sandbanks.	
3.5.2	Natural England advises against the use of cable protection within designated sites as the addition of hard substrata is often incompatible with the conservation objectives for Annex I sandbanks and reef features.	As above.	Please see generic cable protection and *Sabellaria spinulosa* advice notes provided at Deadline 4 for further information.
3.5.3	Natural England agrees that 10% is conservative, but equally that doesn't make it acceptable in terms of impact to nature conservation and MPAs. In order for it to be considered as part of the application we provide advice on the worst case scenario being applied for, i.e. 10% in this case. However, we would welcome further discussion with the Applicant to see if some agreement can be found between us in relation to the contingency measure.	The Applicant welcomes Natural England's position that a contingency of 10% of the cable length is conservative. The Applicant notes that (as stated in the Applicant's response to paragraph 2.5.2), the inclusion of a contingency estimate for cable protection was in response to advice from Natural England during the Evidence Plan Process, based on their lessons learnt from other projects, acknowledging that there are a number of uncertainties regarding the ground conditions and ability to bury cables along the offshore cable corridor. The Applicant has committed to undertaking detailed pre-construction surveys (as required by dDCO Schedules 11 and 12 Part 4 Condition 13(2)(a)) and to agree cable installation methods with the MMO through the Construction Method Statement (required under dDCO, Schedules 11 and 12, Part 4 Condition 9(1)(c)) and Cable Specification Installation and	Natural England acknowledge that based on previous cable installations (requiring c.6% of their cable lengths to be protected) the developer has presented reasonable justification for the WCS of 10% along the entire export cable length requiring cable protection and this could potentially meet EIA requirements . However, it doesn't take into account the localised diversity of sediment types and structure, which would result in cable protection being concentrated in particular areas/habitats rather than a uniform distribution. Therefore assessing WCS of 10% of the cable length within an SAC requiring protection, based on evidence from entire export cable routes measuring 10s of kilometres, with multiple sediments types, is not appropriate for HRAs.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
		Monitoring Plan (required under dDCO Schedules 11 and 12, Part 4 Condition 9(1)(g)). Cable protection will be minimised as far as is technically practicable, and the extent, type, location etc of cable protection must be agreed with the MMO in consultation with Natural England prior to construction through the scour protection and cable protection plan, as required under Schedules 9 and 10 Part 4 Condition 14(1)(e), and Schedules 11 and 12 Part 4 Condition 9(1)(e) of the dDCO. The Applicant believes that the 10% contingency allows for a conservative worst case scenario and given the small impact upon the site (0.003% of the SAC, as discussed in paragraph 2.1.2), and the potential for cable protection to become colonised by species associated with the SAC including *Sabellaria* reef, the Applicant feels that even this worst case scenario will not cause an AEoI.	
3.5.4	Overall, it is the view of Natural England that cable protection should not be used within MPAs as it has the potential to cause long-term impacts. Theoretically impacts may not be permanent if a condition is put in place to remove cable protection at decommissioning stage, however, at present there is uncertainty both around the ability to remove cable protection and around what the impacts of removal would be on the designated features of the site.	The Applicant has assessed cable protection as a permanent impact on the basis of that it is unlikely to be practicable to lift cable protection, in particular there are potential Health and Safety implications with such operations which may not be acceptable.	Natural England, therefore, advises that as this impact will result in permanent loss of habitat it is not possible to rule out Adverse effect on integrity.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
3.5.5	Natural England note that Coolen (2017) and similar studies discuss the positive effects of rock protection in terms of wider North Sea biodiversity. They do not consider it in terms of MPAs and their conservation objectives. We advise that considering rock protection installation as a positive effect is not in line with the Habitat Regulations which are protecting the features the site is designated for.	It should be noted that the Applicant does not refer to cable protection being a beneficial impact. The Applicant believes this is a pre-emptive position from Natural England based on the Hornsea Project Three Application. The Applicant does, however agree that there are various references that support the conclusion that cable protection can become colonised by species associated with the SAC such as *Sabellaria* reef and keel worms. This allows the conclusion that there would be no AEoI on the communities of the Haisborough, Hammond and Winterton SAC.	Natural England agrees that this was not referred to in the Applicant's application, this was placed into the Annex to ensure Natural England's position in this regard was understood as it is applicable to all OWF projects.
3.5.6	Sensitive cable protection measures – In our opinion this is unlikely to be possible in mobile sediment environments as it requires mimicking the natural sediment size and composition with the cable protection.	It should be noted that the Applicant does not refer to sensitive cable protection measures. The Applicant believes this is a pre-emptive position from Natural England based on the Hornsea Project Three Application. The Applicant proposes that it would be most appropriate to agree the type and source of cable protection (as well as the quantity, extent and location) with the MMO in consultation with Natural England through the Scour Protection and Cable Protection Plan (as required under dDCO Schedules 11 and 12 Part 4 Condition 9(e), in accordance with the Outline Scour Protection and Cable Protection Plan (document reference 8.16)). This would be based on the preconstruction survey data, latest scientific understanding, and relevant guidance at that time.	Natural England agrees that this was not referred to in the Applicant's application, this was placed into the Annex to ensure Natural England's position in this regard was understood as it is applicable to all OWF projects.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
3.5.7	Natural England questions whether sensitive cable protection measures can be undertaken due to engineering requirements. The evidence presented for Race Bank OWF marine licence variation and marine licence re the type of protection that can be technically used, such as similar grain size has been discounted because it could be moved during a storm and doesn't provide sufficient protection again anchors and fisheries (Ref. WSP Remedial Burial Assessment – SJ20180628115546973)	As above.	Natural England agree that this was not referred to in the Applicant's application, this was placed into the Annex to ensure Natural England's position in this regard was understood as it is applicable to all OWF projects.
3.5.8	There is also the added concern that any protection of this nature will be displaced over time and there will need to be operation and maintenance work over the life time of the project to recharge any cable protection; thus ultimately requiring the use of rock protection anyway and subsequently increasing the amount of rock in the marine environment. And as noted for Hornsea Project 3 there would be no ability to review/control this going forwards as often the O&M assessment simply says 'where rock has been previously placed' with no information on amount and locations.	As above.	Natural England agree that this was not referred to in the Applicant's application, this was placed into the Annex to ensure Natural England's position in this regard was understood as it is applicable to all OWF projects.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
3.5.9	Between the SNCB's there is ongoing discussions in relation to the Annex I status of any *Sabellaria spinulosa* reef growing over artificial substrate such as cable protection.	Noted, the Applicant suggests that this is a key example of why it is most appropriate to agree cable protection with the MMO in consultation with Natura England prior to construction through the Scour Protection and Cable Protection Plan (as required under dDCO Schedules 11 and 12 Part 4 Condition 9(e), in accordance with the Outline Scour Protection and Cable Protection Plan (document reference 8.16)) taking account of the latest scientific understanding and relevant guidance at that time.	Please see *Sabellaria spinulosa* advice note also submitted at Deadline 4 for further information.
3.5.10	Natural England agrees that in some locations and in a wider seas context that cable protection may become infilled or even buried, but currently this is not a valid argument for lack of longer term impact within an MPA. Habitat change is a pressure different to habitat loss, but it is still a change to the feature that the site was designated for, although Natural England recognise that *Sabellaria spinulosa* has medium sensitivity to habitat change.	*Sabellaria* reef can be expected to colonise cable protection (as discussed in the Applicant's responses to paragraphs 3.1.2, 3.3.1 and 3.3.2), therefore there would be no Annex I reef habitat loss. As discussed in the response to paragraphs 2.1.2 and 2.1.3, impacts associated with cable protection would be highly localised, therefore there would be no AEoI of the Haisborough, Hammond and Winterton SAC. It should be noted that Gibb5 et al. (2014) reports that *Sabellaria spinulosa* reef has medium sensitivity to habitat change where the change represents an increase in fine sediments which is not applicable to Norfolk Vanguard. Gibb et al. (2014) also states that *Sabellaria spinulosa* reef is considered to be 'Not Sensitive' to a change which results in increased coarseness as the resulting habitat is suitable for this species. This scenario is analogous to the introduction of cable protection creating increased hard substrate.	Natural England does not consider that the establishment of *Sabellaria Spinulosa* on artificial substrate is Annex I reef as designated and therefore we believe that cable protection would result in permanent habitat loss

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
3.5.11	Therefore, Natural England advises the Applicant seeks to find alternatives to rock armouring for cable protection. If the Applicant determines that there is no alternative to rock armouring then details should be provided as to how this will be removed at decommissioning stage and this should be secured as part of DCO.	The Applicant has stated that cable protection would be left in situ. As discussed above in response to paragraph 3.5.1 and 3.5.2, the Information to Support HRA report assesses the impact of cable protection and concludes no AEoI, taking into account that it would not be removed at the decommissioning stage. It should also be noted that, as stated by Natural England in paragraph 3.5.4, "at present there is uncertainty both around the ability to remove cable protection and around what the impacts of removal would be on the designated features of the site."	See previous points.
3.6 Survey Evidence			
3.6.1	Natural England has concerns about the analysis and interpretation of benthic survey results. We had the opportunity through the Benthic EWG to provide initial comments to The Applicant on the quality of their benthic analysis. Where the Applicant provided comment, we remain uncertain that the analyses have been undertaken to the standards that we would expect in a development of this nature.	As stated in response to para 3.1.1, the Applicant acknowledges that Natural England disputes the methodology used to map the extent of *Sabellaria* reef as part of the characterisation of the baseline for the assessment, however, as presented in the SoCG (Rep1-SOCG-13.1), irrespective of the methodology the Applicant and Natural England agree on the general extent and location of the potential feature. The Applicant therefore feels that the baseline reef extent used by the Applicant (comparable as it is to Natural England's map of reef extent), provides a sufficient baseline and therefore poses no reason that Natural England cannot currently provide an opinion on the potential impacts to the Annex I *Sabellaria* reef feature of the SAC. The Applicant notes that the future location and extent of *Sabellaria* reef at the time of construction is	See previous points.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
		unknown as the species is ephemeral in nature and the location/extent is therefore likely to change prior to construction. The Applicant suggests that this is the key limitation with regards to Natural England providing an evidence-based opinion on the actual scale of the potential impacts to the Annex I *Sabellaria* reef feature of the Haisborough Hammond and Winterton SAC and as such, the Applicant has committed to undertaking pre-construction surveys (as required by dDCO Schedules 11 and 12 Part 4 Condition 13(2)(a)) and to agree cable installation methods and routing with the MMO through the Construction Method Statement (required under dDCO, Schedules 11 and 12, Part 4 Condition 9(1)(c)) and Cable Specification Installation and Monitoring Plan (required under dDCO Schedules 11 and 12, Part 4 Condition 9(1)(g)).	
3.7 Colonisation of foundation/ cable protection/ scour protection may affect benthic ecology			
3.7.1	Whilst it is true that hard substrate used to be naturally more prevalent in the North Sea this is not the recent and current situation and is not a justification that anthropogenic introduction of hard substrate, and any associated changes to the fauna are acceptable. Additionally as noted here, these earlier natural hard substrates were oyster reefs, gravel field and peat deposits, not terrestrial-sourced granite from Norwegian quarries.	It should be noted that the Applicant does not refer to hard substrate formerly being more prevalent in the North Sea to provide justification that anthropogenic introduction of hard substrate is acceptable. The Applicant believes this is a pre-emptive position from Natural England based on the Hornsea Project Three Application.	Natural England agrees that this was not referred to in the Applicant's application, this was placed into the Annex to ensure Natural England's position in this regard was understood as it is applicable to all OWF projects.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
3.7.2	We agree that potential beneficial effects may occur from introduction of hard substrate into a soft substrate system. However, within MPAs, this must be considered secondary to the requirement to recover or maintain the features for which the site is designated. As such, any potential benefits from hard substrate in HHW SAC are contradicted by the impact that the hard substrate will have on the features of the site and the achievement of recovery.	The Applicant agrees that there are various references that support the conclusion that cable protection can become colonised by species associated with the SAC such as *Sabellaria* reef and keel worms. This allows the conclusion that there would be no AEoI on the communities of the Haisborough, Hammond and Winterton SAC.	As above, Natural England does not consider the colonisation of *S. spinulosa* on artificial substrate as Annex I designated reef. Please see *Sabellaria spinulosa* advice note also submitted at Deadline 4 for further information.
3.7.3	A change of habitat is just as significant as loss of habitat, when that habitat is the designated feature.	As discussed in response to paragraphs 3.1.2, 3.3.1 and 3.3.2, *Sabellaria* reef can be expected to colonise cable protection, therefore there would be no loss of Annex I reef habitat. Gibb et al. (2014) states that *Sabellaria* reef is considered to be 'Not Sensitive' to a change which results in increased coarseness as the resulting habitat is suitable for this species. In addition, as discussed in the response to paragraphs 2.1.2 and 2.1.3, impacts associated with cable protection would be highly localised, therefore there would be no AEoI of the Haisborough, Hammond and Winterton SAC.	As above, Natural England does not consider the colonisation of *S. spinulosa* on artificial substrate as Annex I designated reef.
3.8 Invasive non-native species			
3.8.1	We suggest that The Applicant continues to consider potential interaction with	The risk of spreading non-native invasive species would be mitigated through use of best-practice	No further comments.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	Didemnum vexillum before construction, given that it has been found subtidally in the North Sea, and that it is known to be both invasive and can invade sediment seabeds.	techniques, including appropriate vessel maintenance following guidance from the International Convention for the Prevention of Pollution from Ships (MARPOL). These commitments are secured in the Project Environmental Management Plan (PEMP) required under DCO Schedules 9 and 10 Part 4 Condition 14(1)(d) and Schedules 11 and 12 Part 4 Condition 9(1)(d), in accordance with the Outline PEMP (document reference 8.14) provided with the DCO application.	
4. SPECIFIC COMMENTS REGARDING HABITATS REGULATIONS ASSESSMENT			
4.1 Avoidance of Annex I *Sabellaria spinulosa* reef			
4.1.1	The primary mitigation for impact to *Sabellaria spinulosa* reef in the application is "where possible" avoidance of reef area. We note that if the suggested mitigation is successful in its entirety (i.e. all reef feature is avoided) we would agree with the assessment of magnitude. However, we advise that it is necessary to look at this primary mitigation with a degree of precaution, and question whether there are any studies from HHW or Inner Dowsing North Ridge and Race Bank SAC that could inform likelihood of success.	See above, response to paragraph 3.3.4	As above, Natural England, therefore, advises that as this impact will result in permanent loss of habitat it is not possible to rule out Adverse effect on Integrity.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
4.1.2	In addition Natural England has concerns with the caveat 'where possible', due to the increased level of risk to the integrity of the site such a caveat would endorse as there are no parameters to assess and agree what is "possible".	The Applicant notes that "where possible" is a necessary caveat to the mitigation in accordance with Natural England's Relevant Representation: "Relevant Representation states 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." As discussed in the Applicant's response to paragraphs 3.3.1, 3.3.2 and 3.3.4, in the unlikely event that *Sabellaria* reef has developed to such an extent that it is not possible to route the cable trenches through the 2 to 4km wide corridor (which provides approximately 1.05km to 3.75km space for micrositing), then the proportion of temporary disturbance to such a large area of reef would be very small, combined with the likely recoverability of reef, resulting in no AEoI (as discussed in Section 7.4.2.1.1 of the Information to Support HRA report). The Applicant has committed to agreeing cable installation methods and routing with the MMO through the Construction Method Statement (required under dDCO, Schedules 11 and 12, Part 4 Condition 9(1)(c)) and Cable Specification Installation and Monitoring Plan (required under dDCO Schedules 11 and 12, Part 4 Condition 9(1)(g)).	Natural England continue to have concerns with the caveat 'where possible' due to the increased level of risk to the integrity of the site such a caveat would endorse as there are no parameters to assess and agree what is "possible" and this will not change throughout the course of this application.
4.1.3	Using the Applicant's survey data and the recent site survey data it is highly probable	The Applicant notes that Natural England's Relevant Representation states:	No further comments.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	that the area to be managed as a fisheries byelaw area for the recovery of reef could straddle the cable route. We therefore advise that this leaves insufficient space in the proposed cable corridor to micro-route around the byelaw area and any additional reef feature. Whilst we continue to advocate that the standard mitigation measure/marine licence conditioned to avoid reef features should be included in the Projects DML, it may not be feasible to do so.	"Relevant Representation states 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 Applicant also notes that that the Eastern Inshore Fisheries and Conservation Agency's proposal to establish a fisheries byelaw area, in accordance with Natural England's advice, is in relatively early stages having not yet been issued for consultation at the time of writing. As discussed in the Applicant's response to paragraphs 3.3.1 and 3.3.2, in the unlikely event that *Sabellaria* reef has developed to such an extent that it is not possible to route the cable trenches through the 2 to 4km wide corridor (which provides approximately 1.05km to 3.75km space for micrositing), then the proportion of temporary disturbance to such a large area of reef would be very small, combined with the likely recoverability of reef, resulting in no AEoI (as discussed in Section 7.4.2.1.1 of the Information to Support HRA report). The Applicant has committed to agreeing cable installation methods and routing with the MMO through the Construction Method Statement (required under dDCO, Schedules 11 and 12, Part 4 Condition 9(1)(c)) and Cable Specification Installation and Monitoring Plan (required under dDCO Schedules 11 and 12, Part 4 Condition 9(1)(g)).	

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
4.1.4	We do not consider the Applicant's consideration of routing through 'lower quality' reef to be acceptable in terms of restoration of conservation objectives as the 'lower quality' reef mentioned by the Applicant is still contained within area to be managed as reef, with the protection provided by Annex I status. As part of the SOCG between NE and the Applicant it has now been agreed that all quality of Annex I reef will be avoided	As discussed in the Applicant's response to paragraphs 3.3.1, 3.3.2 and 4.1.4, it should be noted that the Applicant does not refer to routing through lower quality reef, having committed to micrositing around all reef, where possible. The Applicant believes this is a pre-emptive position from Natural England based on the Hornsea Project Three Application. It should be noted however, that by definition, "low reef" is inherently patchy (with only 10-20% coverage, Gubbay (2007)7) and therefore increases the potential for micrositing. Medium reef also has high potential for micrositing, being classified by 20-30% coverage.	Please see previous comments in relation to micro siting around *Sabellaria spinulosa* reef
4.1.5	In addition the evidence presented in the HRA to support conclusions on recoverability predominantly relates to individuals/abundance, and doesn't take into account repeated O&M impacts or cable protection. Therefore we have limited confidence in the ability of reef to recover from cable installation and ongoing maintenance activities. Therefore, we further advocate that the standard mitigation measure of avoidance is adhered to.	The following references, considered in the Information to Support HRA report, refer to *Sabellaria* reef rather than (or as well as) individuals: •Tillin, H.M. & Marshall, C.M. (2015) *Sabellaria spinulosa* on stable circalittoral mixed sediment. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [online]. Plymouth: Marine Biological Association of the United Kingdom. Available from: http://www.marlin.ac.uk/habitats/detail/377 •Holt, T.J., Rees, E.I., Hawkins, S.J., & Reed, R. (1998) Biogenic reefs: An overview of dynamic and sensitivity characteristics for conservation management of marine SACs. Scottish Association of Marine Sciences (UK Marine SACs Project), Oban.	As above, Natural England does not consider the colonisation of *S. spinulosa* on artificial substrate as Annex I designated reef.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
		Sabellaria reef can be expected to colonise cable protection (as discussed in the Applicant's responses to paragraphs 3.1.2, 3.3.1 and 3.3.2). In addition, Gibb8 et al. (2014) states that *Sabellaria* reef is considered to be 'Not Sensitive' to a habitat change which results in increased coarseness as the resulting habitat is suitable for this species. The Applicant notes that Natural England expects *Sabellaria* reef to recover following circa. 100 years of extensive and repeated commercial fisheries dredging, should the area become closed to fishing via a fisheries byelaw closure area. It is therefore highly likely that the same logic would apply to short term and localised cable installation and potential maintenance activities for Norfolk Vanguard.	
4.1.6	Furthermore whether reef is avoided or not during installation there does remain a risk during O&M cable remediation activities that reef could establish across the cable corridor or nearby areas where remediation activities needed to occur. Accordingly, every effort should be made, with input from the MMO and NE, to minimise the impacts at the time of undertaking the works.	The Information to Support HRA report (document reference 5.3) considers potential temporary disturbance impacts on *Sabellaria* reef during maintenance on the assumption that reef could have colonised/recolonised following cable installation. This assessment concludes there would be no AEoI. The Applicant is willing to consult with the MMO and Natural England prior to undertaking intrusive maintenance works within the Haisborough, Hammond and Winterton SAC.	Natural England welcome this commitment from the Applicant, and would like to see this conditioned in the DCO / DML In addition it would be good to get monitoring of impacts and recovery.
4.2 Long term loss of seabed habitat including from cable protection			

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
4.2.1	Without removal at decommissioning the impacts are likely to persist and depending on the location may hinder the conservation objectives of the designated sites. Currently there is no guarantee of removal. The documents provided for the current Race Bank marine licence application includes two options for rock armouring removal that involve dredging up the material. The document provided was purely a method statement and didn't take into consideration the feasibility and confidence in being able to decommission in similar environments; including the associated impacts. For example the two options presented involve dredging to no lower than 30cm below seabed, and in undertaking this activity there would almost certainly be disturbance to, or removal of, the interest features of the site.	It should be noted that the Applicant does not refer to removal of cable protection. The Applicant believes this is a pre-emptive position from Natural England based on the Hornsea Project Three Application. The Applicant has assessed cable protection as a permanent impact on the basis that it is unlikely to be practicable to lift cable protection, in particular there are potential Health and Safety implications with such operations which may not be acceptable.	As above, Natural England, therefore, advises that as this impact will result in permanent loss of habitat it is not possible to rule out Adverse effect on Integrity.
4.2.2	We suggest that there needs to be some evidence presented where rock armouring has been decommissioned, in similar sediment types, and monitoring provided of the associated impacts. To date all the evidence presented to NE from OWF developers is that rock armouring cannot currently be feasibly removed. A good example of this issue is within Thanet OWF, where a section of cable under rock armouring needed to be replaced. It was	As above.	As above, Natural England, therefore, advises that as this impact will result in permanent loss of habitat it is not possible to rule out Adverse effect on Integrity.

NE para no.	Natural England comment	Applicant's Response:	Natural England further Comments
	determined that removing that hard substrate to access the cable wasn't feasible, so a new cable section was spliced in around the existing cable leaving the original section with protection in situ. See Natural England's recent cable's paper (Natural England, 2018).		
4.2.3	Whilst the information presented provides a robust argument for WCS presented as being 10% of cable to be rock armoured within a designated site, it doesn't take into account the impacts from any secondary scouring that may happen.	The Applicant queries whether the reference to "information presented" refers to the Hornsea Project Three Application as stated in the response to paragraph 4.2.2. The Applicant has referred to secondary scour in its response to First Written Questions (Q5.9).	Natural England considers it a mute-point by the applicant as our comment is applicable to both projects.
4.2.4	Overall, it is the view of Natural England that cable protection should not be used within MPAs as it has the potential to cause long-term impacts. Theoretically impacts may not be permanent if a condition is put in place to remove cable protection at decommissioning stage. However, at present there is uncertainty both around the ability to remove cable protection and around what the impacts of removal would be on the designated features of the site	See response to paragraph 3.5.4.	As above.

THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Natural England's comments on outstanding documents submitted by the Applicant at Deadline 2 and 3

13 March 2019

1. Introduction

1.1. In this document Natural England provides comment, where necessary, on any outstanding documents which have been submitted by the Applicant at earlier deadlines and that are relevant to Natural England. This document is divided by theme.

1.2. This submission brings Natural England up-to-date with all previous submissions.

2. General

2.1. Deadline 2 submission - Comments on Written Representations [REP2-003].

2.1.1. Please see separate document, entitled Natural England's Comments on Applicants Response to Natural England's Written Representations [REP2-003] also provided at Deadline 4, with full comments on this document.

2.2. Deadline 2 submission - Comments on responses to the ExA's Written Questions [REP2-004].

2.2.1. Please see separate document, entitled Natural England's Comments on Applicants Response to Natural England's Response to First Round of Written Questions [REP2-004] also provided at Deadline 4, with full comments on this document.

2.3. Deadline 3 Submission - Applicant's Comments on Deadline 2 Submissions [REP3-037].

2.3.1. Natural England notes that the Applicant has no comments on Natural England's Response to Written Representations and Other Supporting Documents submitted by other parties; or Natural England's comments on responses by all other parties to the Examining Authority's first written questions.

2.3.2. Therefore, Natural England have no further comments in this regard.

2.3.3. Natural England notes that the Applicant will be providing further clarifications and updates in regard to Offshore Ornithology at subsequent deadlines and Natural England will provide comment on these as necessary.

3. Benthic Ecology

3.1. Deadline 2 Submission - Site Characterisation Report [REP2-027 & REP2-028].

3.1.1. Natural England notes that the total volume of sediment to be disposed of following cable installation has been updated to remove the 3,000,000m3 associated with export cable trenching works as the Applicant states that as this sediment would not be raised there is no requirement for disposal. Natural England would support this change.

4. Onshore Ecology

4.1. Deadline 2 Submission - Outline Access Management Plan [REP2-026].

4.1.1. Natural England has no comments on this document.

4.2. Deadline 2 Submission - Important Hedgerows Plans [REP2-016].

4.2.1. Natural England notes the submission of the Important Hedgerow Plan and will provide comment on this document as part of ongoing discussions with the Applicant regarding Hedgerows and Paston Great Barn SAC by Deadline 6.

4.3. Deadline 3 Submission - Plan Showing Indicative Tree Removal – submitted in 3 parts [REP3-032, REP3-033 & REP3-034]

4.3.1. Currently the documents (Part 1-3) only present likely tree removal areas where the cable corridor crosses roads.

4.3.2. It would be useful to provide an indication of tree removal in respect of the rest of the cable corridor especially in relation to hedgerows and bat commuting and foraging habitat.

4.3.3. Natural England would expect this to be provided as part of ongoing discussions regarding bats. Natural England therefore has no comment on the information as currently provided, but may comment in the future.

4.4. Deadline 3 submissions – Various Landscape Character Assessment Documents [REP3-011 to REP3-022].

4.4.1. Natural England has no comments on any of these documents.

5. Offshore Ornithology

5.1. Deadline 3 Submission - Migrant non-seabird Collision Risk Modelling [REP3-038].

5.1.1. Please see separate document, entitled Natural England's comments on Migrant Non-seabird Collision Risk Modelling also provided at Deadline 4, with full comments on this document.

6. Marine Mammals

6.1. Deadline 3 Submission - Draft Habitats Regulation Assessment - For Review of Consented Offshore Wind Farms in the Southern North Sea Harbour Porpoise SCI [REP3-036].

6.1.1. Natural England notes that this is the HRA that was completed for the Review of Consents (RoCs) consultation run by BEIS last year submitted as supporting information.

6.1.2. Natural England has therefore already provided comments to BEIS on the RoCs document.

7. Coastal Processes

7.1. Deadline 3 Submission - Consideration of EN-1 Climate Change policy in the Application [REP3-010].

7.1.1. Natural England has no comments on this document.

THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Natural England's generic position on Cable protection

13 March 2019

1. Standard advice

1.1. Natural England advises against the use of cable protection within designated sites as the addition of hard substrata is often incompatible with the conservation objectives for Annex I sandbanks and reef features.

2. The use of 10% Worst Case Scenario (WCS)

2.1. We acknowledge that based on previous cable installations (requiring c.6% of their cable lengths to be protected) the developer has presented reasonable justification for the WCS of 10% along the entire export cable length requiring cable protection and this could potentially meet EIA requirements[1]. However, it doesn't take into account the localised diversity of sediment types and structure, which would result in cable protection being concentrated in particular areas/habitats rather than a uniform distribution. Therefore assessing WCS of 10% of the cable length within an SAC requiring protection, based on evidence from entire export cable routes measuring 10s of kilometres, with multiple sediments types, is not appropriate for HRAs.

2.2. That said Natural England highlights that for Hornsea Project 3 whilst the MMO accepts the 10% figure as appropriate, it has highlighted other projects which have required substantially more cable protection [REP1-095 and REP3-092]. The MMO has also advised that if the volume of cable protection detailed in the DMLs is not used during construction then they would expect to see a separate marine licence application for remedial cable protection during the operational phase. The MMO does not feel it is possible to fully assess the impacts on designated sites over the lifetime of the Proposed Development [REP6-073].

2.3. Therefore, Natural England is in agreement with the MMO that the 10% should only be assessed and restricted to the construction phase. Any further request for cable protection over the life time of the project should be dealt with through a separate marine licence.

3. Habitat Features

3.1. The ability to bury cables and thus the need for cable protection should be based on project specific information on the habitats/features present and the underlying substrata and allow for sufficient contingency around changing installation tools and/or technical hiccups.

3.2. We note that the Applicant plans to provide a further cable burial risk assessment document to **hopefully provide a greater level of certainty in relation to any requirement for cable protection noting that the Applicant considered the placement of cable protection to be a contingency measure within Haisborough, Hammond and Winterton SAC.**

[1] NB: The EIA doesn't take into account localised sediments and habitats. Including priority habitats of high conservation importance under Section 40 to of the NERC act 2006 i.e. *Sabellaria spinulosa* reef. Natural England advises that reef should be avoided and where this is not possible every effort should be made to minimise the impacts as much as possible.

4. Temporary vs. permanent loss

4.1. Natural England advises that the placement of cable protection is a permanent impact and that to date no empirical evidence has been presented to demonstrate the successful decommissioning / removal of cable protection where the habitat is returned to its pre impact state.

5. During construction

5.1. Could the Applicant please confirm that the 10% (and/or the to be revised figure) of cable protection was to be placed during the construction phase and that any subsequent cable protection would be applied for separately? However, if the Applicant would like flexibility to place the 10% of cable protection in new areas over the life time of the project then there needs to be an agreed approach on how impacts to priority habitats and/or interest features will be avoided and/or minimised during subsequent cable protection placement and this should be assessed as part of the consenting process. We advise that a Site Integrity Plan should be submitted which goes one step further than a Cable Installation Plan to ensure that these HRA concerns are addressed.

5.2. Natural England queries how the regulator will be certain that 10% of the length of the cable corridor within a designated site hasn't been exceeded? If the Secretary of State is minded to consent the project, and noting the point above about concentration of cable protection on particular habitats/features, further DCO/DML restrictions may be appropriate.

5.3. Natural England queries if it would be better to set out in the DCO/DML what 10% of the cable length the designated site would be and what the maximum volume of rock armouring/cable protection would equate to? This is to make it clear to all parties what the thresholds are.

6. Summary

6.1. Presently there is insufficient data for Natural England to agree:

a) that the WCS is appropriate for designated sites;

b) that there would be no adverse effect on integrity; and

c) any mitigation/compensation measures.

THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Statutory Nature Conservation Bodies (SNCB's) generic advice in relation to colonisation of *Sabellaria spinulosa* reef on artificial substrate being considered as Annex I reef and contributing to the favourable condition status as reef

13 March 2019

1. Introduction

1.1. This note provides the SNCB's advice in relation to colonisation of *Sabellaria spinulosa* reef on artificial substrate being considered as Annex I reef and contributing to the favourable condition status of Annex I reef t

1.2. Please note should further evidence be presented then this position may change.

2. Increase in *Sabellaria spinulosa* reef feature vs. loss of another Annex I habitat

2.1. Areas of Annex I features within Marine Protected Areas (MPAs) are delineated as much as possible at the time of designation with reference to any supporting habitats/sediments and/or sub features. All Annex I habitats have equitable protection, therefore it is not appropriate to trade one habitat in a site for another. For example, if the site is designated for both sandbanks and reef and rock protection is placed on the sandbank feature and then *Sabellaria* reef colonises this rock protection it cannot be considered as a benefit to the site that you have taken one feature in the site and swapped it for another.

2.2. Furthermore, possible gain of *Sabellaria spinulosa* reef and definite loss of sandbank feature is not acceptable mitigation under recent ECJ ruling Please see Briels judgement: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:62012CC0521&from=EN**.**

3. Establishment of *Sabellaria spinulosa* reef on artificial substrata over laying suitable habitat for reef development

3.1. In theory this shouldn't happen as there is the standard marine licence mitigation condition to avoid reef or areas to be managed as reef at the time of construction. The developers first choice is also to use the appropriate tools to install the cable to the optimum cable burial depth so that further cabling activities i.e. reburial and protection are not required.

3.2. However, Natural England's 'Cables' paper (Natural England, 2018) which summarises our experience of cable installation over the last 10 years is demonstrating that cable installation is more challenging than predicted with the need for cable protection therefore on the increase to protect the developers assets.

3.3. Offshore windfarm developers are stating in their applications that rock protection can be colonised by *Sabellaria spinulosa* reef and therefore doesn't preclude the recovery of the reef features. Whilst Natural England (and other SNCBs) agree that *Sabellaria spinulosa* could colonise rock protection we consider the establishment of *Sabellaria spinulosa* reef on artificial substrate as not "counting" towards favourable condition of the feature and/or site. This is because it is not a replacement for Annex I *Sabellaria spinulosa* reef on natural

site sediment as set out at the time of designation and within the conservation advice package for the site.

4. Consideration of possible mitigation

4.1. The fact that new areas of habitat may be created elsewhere in the same site does not appear to be relevant, even if a net beneficial effect is predicted. There is still a possible adverse – even irreparable – effect on the existing natural habitat, and thus on the integrity of the site. The new habitat will be, to some extent, artificially created and cannot become a true natural habitat for some, possibly quite considerable, time.

4.2. As was pointed out by counsel for the Stichting hearing, there can be no certainty that steps to create a new area of a particular habitat will in fact ever achieve the desired outcome and, in application of the precautionary principle, absence of uncertainty is a condition for approval in the context of Article 6(3) of the Habitats Directive. Outcomes cannot be guaranteed in heavily- managed agriculture; it is all the more difficult to guarantee them when seeking to encourage nature to take its course. The Court has stated that there must be no remaining scientific doubt before it can be concluded that there are no lasting adverse effects on the integrity of a site. The same standard must in Natural England's view be applied to predictions of success for planned new areas of created 'natural' habitat.

4.3. NB: Whilst this case law is primarily in relation to mitigation vs compensation when avoiding adverse effect on integrity; it still serves as underpinning the general principal of not considering the possible creation of new habitat as in some way reducing the consideration of habitat loss elsewhere.

5. Decommissioning

5.1. Offshore windfarm developers have suggested that views on the acceptability of colonisation of rock armouring may have changed by the time of decommissioning, including a potential argument to retain the rock armouring in situ within designated sites. Whilst, Natural England acknowledges this may be the case, we can't foresee what will happen over the next 20 - 30 years and a further assessment would need to be made at that time. **Therefore, based on best available evidence our advice remains unchanged that *Sabellaria spinulosa* on artificial substrate is not Annex I reef.**

5.2. It should also be noted that should decommissioning happen there are still no guarantees that site/features will be returned to pre impact states, thus further hindering the recovery of Annex I reef features.

6. References

Natural England (2018) Natural England Offshore wind cabling: ten years experience and recommendations. (A copy of this document was also submitted at Deadline 1).

THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Natural England advice note regarding consideration of small scale habitat loss within Special Areas of Conservation (SACs) in relation to cable protection

13 March 2019

In relation to consideration of small scale habitat loss within Special Areas of Conservation (SACs) in relation to cable protection Natural England provides the following advice:

1.1. Natural England will usually consider permanent, long-lasting and irreversible loss to be an adverse effect unless it can be clearly demonstrated otherwise.

1.2. The following points should be considered (but not exclusively) when providing evidence to underpin an assessment of whether an impact is likely to be an adverse effect:

- Location of the predicted loss in terms of whether it sits on a designated or supporting feature of the site;
- Duration of the loss – for loss to be considered temporary it must be clearly time-limited to the point where the impact is predicted to return to the same pre-impact condition and must include a detailed remediation plan using proven techniques as part of the licence;
- Scale of the loss in relation to the feature / sub feature of the site including consideration of the quality and rarity of the affected area;
- Impact on structure, functioning or supporting processes of the habitat;
- Feature condition; and
- Existing habitat loss within the same site/ feature/ sub feature.

1.3. Whilst there are no hard and fast rules or thresholds, in order for Natural England to advise that there is no likelihood of an adverse effect the project would need to demonstrate the following:

1) That the loss is not on the priority habitat/feature/ sub feature/ supporting habitat and/or
2) That the loss is temporarily and reversible (within guidelines above) and/or
3) That the scale of loss is so small as to be de minimus alone and/ or
4) That the scale of loss is inconsequential including other impacts on the site/ feature/ sub feature

1.4. It is noted that Applicant's will argue that they have provided the above information and provided the necessary assessment and evidence. However, as set out in (C-294/17 Cooperatie Mobilisation for the Environment UA and Others v College van gedeputeerde staten van Limburg and Others) and other case law relating to People over Wind (2018) for a plan/project to be consented within a designated site there needs to be sufficient certainty in the evidence presented and the recoverability of the features and/or absolute certainty that any proposed mitigation measures will remove an adverse effect on integrity.

1.5. Therefore, we welcome any further work the applicant can do to provide more certainty in relation to the Worst Case Scenario presented and/or minimise the impacts as much as possible.

1.6. Please see our joint position statement provided at Deadline 4 in which the Applicant has committed to providing further evidence in this regard.