

From: [Taylor, Jessica](#)
To: [Norfolk Vanguard](#)
Subject: RE: EN010079 Norfolk Vanguard Natural England Deadline 3 Submission (Ref: 273177)
Date: 14 February 2019 19:04:31
Attachments: [EN010079 273177 Norfolk Vanguard Natural England Comments on App 5.1 Sensitivity Definitions for Benthic Receptors Final.pdf](#)
[EN010079 273177 Norfolk Vanguard Natural England Comments on App 6.1 DCO ES Parameters Comparison Final.pdf](#)
[EN010079 273177 Norfolk Vanguard Natural ENgland Comments on App 23.1 and supporting documentation Final.pdf](#)
[EN010079 273177 Norfolk Vanguard Natural England comments on auk and Gannet displacement Appendix 3.3 Final.pdf](#)
[EN010079 273177 Norfolk Vanguard Natural England Comments on changes made to draft DCO and Explanatory Memorandum submitted at Deadline 2 Final.pdf](#)
[EN010079 273177 Norfolk Vanguard Natural England comments on CRM Appendix 3.2 Final.pdf](#)
[EN010079 273177 Norfolk Vanguard Natural England Comments on RTD displacement Appendix 3.1 Final.pdf](#)
[EN010079 273177 Norfolk Vanguard Natural England's Summary Table of Main Concerns in relation to Offshore Ornithology Update Final.pdf](#)

Dear Sirs,

Please find attached Natural England's submissions at Deadline 3 in relation to the Norfolk Vanguard Offshore windfarm Application, including:

- Comments on Appendix 3.1 – Red-throated diver displacement submitted by the Applicant at Deadline 1 [REP1-088];
- Comments on Appendix 3.2 – Collision Risk Modelling: update and clarification submitted by the Applicant at Deadline 1 [REP1-088];
- Comments on Appendix 3.3 – Operational Auk and Gannet Displacement: update and clarification submitted by the Applicant at Deadline 1 [REP1-088];
- Comments on Appendix 5.1 – Comparison of MarLIN and Norfolk Vanguard sensitivity definitions for benthic receptors [REP1-016].
- Comments on Appendix 6.1 – Relationship Between Design Parameters in Draft Development Consent Order and Environmental Statement submitted by the Applicant at Deadline 1 [REP1-017];
- Comments on Appendix 23.1 – Integrity matrices submitted by the Applicant at Deadline 1 [REP1-010];
- Comments on Development Consent Order schedule of changes submitted by the Applicant at Deadline 2 [REP2-019];
- Comments on Explanatory Memorandum submitted by the Applicant at Deadline 2 [REP2-020 and REP2-021];
- Comments on Draft Development Consent Order submitted by the Applicant at Deadline 2 [REP2-017 and REP2-018];
- Comments on Appendix 23.1 to the comments on responses to Written Questions - Greater Wash SPA common scoter distribution and Norfolk Vanguard Offshore Windfarm submitted by the Applicant at Deadline 2 [REP2-030]; and
- Updated summary table detailing Natural England's main concerns in relation to Offshore Ornithology for Norfolk Vanguard Offshore windfarm application.

As part of this submission Natural England has also reviewed HDD Feasibility Report – Cable Landfall Site at Happisburgh submitted by the Applicant at Deadline 1. Natural England can confirm that we have no comments in relation to this document.

Please note, due to the size of some of the documents and the limited time between upload to PINS website and Deadline 3, Natural England has been unable to review all of the appendices

submitted by the Applicant at Deadline 2. Natural England will review these additional documents for Deadline 4 and, where necessary, provide further comments. This relates to the following documents:

- Comments on Written Representations [REP2-003];
- Comments on responses to the ExA's Written Questions [REP-004];
- Important Hedgerows Plans [REP2-016];
- Outline Access Management Plan [REP2-026];
- Site Characterisation Report [REP2-027 and REP2-028]; and
- Comments on Natural England's Written Representation [REP2-031].

Best wishes,
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NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

**Natural England's comments on Appendix 3.1: Red-throated diver (RTD)
displacement [REP1-008].**

14 February 2019

1. Evidence review

- 1.1. We welcome the RTD displacement evidence review presented by the Applicant in Annex 1 of this Appendix. We note the evidence on RTD displacement that Natural England submitted in point 3.3 of table of key concerns in Appendix 1 of our Relevant Representations [RR-106]. Some of the additional studies we noted in our Relevant Representations are now considered by the Applicant and others have not been. The Applicant's review also contains additional studies to those noted by Natural England.
- 1.2. The Applicant's review does not really appraise the robustness of the different methodologies used in the studies they have reviewed. Consideration should also be given to the robustness of each existing data source through considering criteria including:
- Suitability of the survey platform – earlier studies from Round 1 and 2 offshore wind farms (OWFs) used predominantly boat-based surveys e.g. Kentish Flats: Percival 2009; 2010; 2014, Thanet: Percival 2013. Some species, especially divers and scoters, are known to be highly sensitive to disturbance from boats (Garthe & Huppopp 2004; Kaiser et al. 2006; Schwemmer et al. 2011; Furness et al. 2013).
 - Consistency of survey platform across surveys – some studies change survey platform mid-way through the monitoring programme (generally from boat and/or visual aerial to digital aerial), for example in the post-consent monitoring undertaken at Lincs and Lyn and Inner Dowsing (LID) OWFs reported in Webb et al. (2017), where surveys were first undertaken using visual aerial methods and then switched to digital video (during the construction phase). There have been a number of attempts at calibrating survey data arising from two platforms (e.g. boat and digital video, digital stills and visual aerial, digital video and visual). The outcomes of these calibration studies have varied considerably and the findings are species (or species group) specific.
 - Survey area – the extent of the survey area used determines the maximum extent of sea over which displacement can be detected, meaning that small survey areas are limited in the information they provide, particularly regarding the true spatial extent of displacement. While small survey areas can give an indication of the magnitude of displacement within the areas of sea that they cover, small survey areas pose difficulties in correctly identifying genuine windfarm displacement effects, or indeed the lack of any such effects. For example, an increase in numbers in the sea areas immediately around a constructed windfarm may be interpreted as being evidence of no displacement effect. However, if a significant increase in diver numbers across some much wider area had been recorded too, then the increase observed in the immediate vicinity of the OWF may have been much smaller than that elsewhere – indicative of a displacement effect. Conversely, a decrease in numbers in the sea areas immediately around a constructed windfarm may be interpreted as being evidence of a displacement effect. However, if a significant decrease in diver numbers across some much wider area had been recorded too, then the decrease observed in the immediate vicinity of the OWF may simply be a reflection of that wider change and not indicative of a displacement effect at all. Larger scale surveys enable the true extent of displacement to be captured by putting distribution and abundance changes at different distances around an OWF into a wider geographical context, provided that the survey area encompasses areas sufficiently far from any development that any changes at those far distances can be safely considered to reflect “natural” change rather than a windfarm effect. Post-consent monitoring at Thanet OWF reported in Percival (2013) covered a survey area of 1-2km and studies of pre and post consent monitoring at Kentish Flats OWF (Percival 2009; 2010) covered a survey area of 3km. We would therefore, have lower confidence in the findings of these studies due to restricted survey areas. Larger scale studies covering greater than 10km

have been conducted more recently, e.g. Petersen et al. (2014), Webb et al. (2017), Zydalis et al. (2016), Heinänen et al. (2016) and Mendel et al. (2019).

- Time frame – to detect and quantify changes in bird abundance and distribution it is necessary to collect data over several years both pre construction and post construction to account for inter-annual natural variation. If only one (or maybe even just two) year(s) of survey data are available for one or other phase of development that is to be compared, attempts to detect and quantify displacement effects arising from a development are entirely dependent upon the untested assumption that the abundance and distribution of birds captured within each dataset is representative of the average conditions under each phase of the development. If that is not true, due to marked inter annual variation, then conclusions of comparisons may be fundamentally wrong. We note that the study conducted at London Array OWF (APEM 2016) referred to by the Applicant was conducted prior to completion of the post-construction monitoring programme (which has since completed). Therefore, the findings of the study are limited by only having one year post construction data and two years pre-construction. Additionally, in some cases (particularly non-English studies) only post-construction data has been used, e.g. in studies of multiple OWFs in the German North Sea (Zydalis et al. 2016; Heinänen et al. 2016). If only post-construction data is available, the methods of assessing displacement are more limited.

- 1.3. Furthermore, consideration should also be given to the analysis methods used to detect and quantify displacement, as some methods (e.g. measures of absolute change) are more influenced by natural variation in numbers or changes in survey platform than others (e.g. relative or proportional measures of change).
- 1.4. Based on the Applicant's evidence review, they conclude that an evidence-based displacement rate of 90% and a consequent mortality rate of 1%, including birds within 2km of the wind farm boundary is an appropriately precautionary combination for RTD displacement. However, in light of the Applicant's additional evidence and our own review and evidence presented in our Relevant Representations [RR-106] (see point 3.3 of our Table of additional detailed comments in Appendix 1). **Natural England's position remains that there is no compelling evidence to warrant a change to our current advice of 100% displacement within 4km buffer of the wind farm boundary (as advised in the joint SNCB displacement interim advice note, SNCBs 2017) 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-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 point 3.3 of our Table of additional detailed comments in Appendix 1 of our Relevant Representations [RR-106]) 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.
- 1.5. However, we 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.

2. Assessment of operational disturbance and displacement from project alone (Section 1.1.1.1)

- 2.1. We welcome that the assessment in Section 1.1.1.1 has been updated in this Appendix to include the correct data (using abundances of birds in flight and on the water) in the assessments of Vanguard East and Vanguard West, and that the impact assessments have been conducted on a range of displacement rates of 90-100% displacement and 1-10% mortality across a 4km buffer. We also welcome that the Applicant has included consideration of the lower and upper confidence limits of the bird abundance data in the assessments.
- 2.2. We agree with the conclusions made by the Applicant in this Appendix for the Natural England preferred worst case scenario of 100% displacement and 10% mortality for all of the scenarios assessed in Section 1.1.1.1 on potential impacts of operational disturbance and displacement from the project alone.
- 2.3. We note that in terms of RTD displacement from the operational phase of the proposed Vanguard development, the worst case scenario is for all of the turbines to be built within the Vanguard West array.

3. Cumulative operational disturbance and displacement (Section 1.1.1.2)

- 3.1. We welcome that all offshore wind farms (OWFs) in the south-west North Sea BDMPS have been considered in the cumulative operational displacement assessment in this Appendix, and that none of these sites have been considered as part of the baseline. However, in Table 1.9 many of the OWFs are listed as having no RTD displacement assessments or qualitative assessments with no numbers available. As noted in our Relevant Representations we would recommend that a better approach may be to take the same approach as for auks, i.e. present the seasonal mean peak abundances (as we would assume that even if no RTD displacement assessment was done, the survey data from the relevant Environmental Statements would be available) and then sum figures across the OWFs and put this through the matrix. However, we note that not all Round 1 or 2 OWFs may have survey data covering the OWF sites and a 4km buffer and therefore, the data may not be 'like for like' in terms of the survey areas covered.
- 3.2. An alternative way of undertaking the cumulative RTD assessment using a 'like for like' approach could be to take a similar approach to that taken by Thanet Extension, currently in Examination, which used the predicted density map and the underlying dataset of the SeaMaST project (Seabird Mapping and Sensitivity Tool) described in Bradbury et al. (2014) as a common data source of RTD density in the North Sea. The underlying dataset can be accessed from Natural England following a specific data-request. This approach is outlined in Annex C of Thanet Extension's Appendix 1, Annexes A to G to Deadline 1 Submission¹.
- 3.3. We also note, that the figures presented in Table 1.10 for the Thanet Extension OWF do not appear to be correct. From Thanet Extension's Annex 3 on range of displacement matrices for seabirds recorded in Thanet Extension (APEM 2018), we make the figures for each season for 90-100% displacement and 1-10% mortality across the site and 4km buffer to be: autumn = 0, midwinter = 4 – 43, spring = 2 – 26, annual = 6 – 69. This is because there are separate matrices produced in APEM (2018) for each season for each of the Thanet Extension site only and the Thanet Extension 4km buffer only, meaning that for each season the figures from the Thanet Extension site only need to be summed with the figures for the Thanet Extension 4km buffer only to give the total for the Thanet Extension site + 4km buffer, which are the figures required for the cumulative assessments.
- 3.4. **Therefore, based on the issues outlined above, at present Natural England is not in a position to reach any conclusion regarding the level of cumulative impact on RTD from the operational phase.**

¹ Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010084/EN010084-001076-Vattenfall%20Wind%20Power%20LTD%20-%20summary%20of%20RR%20annex%20A%20-%20G.pdf>

4. Potential impacts during construction (Section 1.1.2)

- 4.1. **Offshore export cable installation:** We welcome that the assessment has considered Natural England's worst case scenario of 100% displacement and 10% mortality. We would suggest that in paragraph 65 in addition to noting that at 10% mortality 4-8 birds would be expected to die, the Applicant should also present the percentage of baseline mortality that this equates to. Natural England calculates that a maximum of 8 deaths equates to 0.37% of baseline mortality of smallest BDMPS and therefore, we agree with the Applicant's conclusion of a minor adverse impact for installation of the Vanguard export cable alone at the EIA scale.
- 4.2. However, we 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, these issues currently remain unresolved.
- 4.3. **Vanguard East and West:** We welcome that the impact assessments in this Appendix for construction of Vanguard East and Vanguard West alone and Vanguard East and Vanguard West combined have been conducted on a mortality rate of 10%. **We now agree with the figures and conclusions made by the Applicant in this section regarding the worst case 10% mortality scenario.**

5. Operational vessel movements (Section 1.1.3)

- 5.1. It is likely that RTDs would be already displaced from the constructed Vanguard OWF due to the presence of the turbines, so there may well be no additional displacement impact from the operational vessel movements during operation and maintenance whilst the vessels are located within the Vanguard sites(s). However, the operation and maintenance vessels have to get to the Vanguard site(s) and as the operation and maintenance port is to be confirmed, these movements could potentially occur through the Outer Thames Estuary SPA or the Greater Wash SPA, both of which are designated for their non-breeding RTD features. The Applicant states that the existing shipping activity in the area is an average of almost 100 vessel movements per day and that the addition of 1.2 vessel movements due to operation and maintenance of the Vanguard OWF will be negligible.
- 5.2. However, we note that an increase of 1.2 vessels movements to almost 100 average existing movements is a 1% increase. More trenchantly, consideration should be given as to the speed at which the operation and maintenance vessels will be moving, as there is significant potential that they could travel at greater speeds, and following different routes than shipping vessels and hence be more disturbing. However, as noted in our response to Examining Authority question 23.14 [RR-106], in the instance that the operations and maintenance 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 for this aspect. The same would apply for the RTD feature of the Greater Wash SPA with regard to disturbance and displacement due to operations and maintenance vessel movements.

6. References

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- SNCBs (2017) *Joint SNCB Interim Displacement Advice Note: Advice on how to present assessment information on the extent and potential consequences of seabird displacement from Offshore Wind Farm (OWF) developments, January 2017*. Available from: http://jncc.defra.gov.uk/pdf/Joint_SNCB_Interim_Displacement_AdviceNote_2017.pdf

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NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Natural England's comments on Appendix 3.2: Collision Risk Modelling (CRM) update and clarification [REP1-008].

14 February 2019

1. Estimation of seabird flight densities (Section 1.1)

1.1. We welcome the additional information provided by the Applicant in Section 1.1 of Appendix 3.2 around the justification for the use of the median flight densities. However, Natural England continues 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. This advice is based on the best use of the available data recognising the below limitations:

- There is only data from surveys covering 2 years (or 32 months for Vanguard East) from which to determine an average collision prediction for the lifetime of the project i.e. 30yrs. Therefore due to natural variables it is more appropriate to use the mean in this scenario;
- The median is sensitive to the distribution of the data; and
- Using the median results in half the data being ignored

1.2. For the Marine Science Scotland stochastic Collision Risk Model the mean densities should also be used and there are three options for entering this data (see model user guide, available from:

<https://www2.gov.scot/Topics/marine/marineenergy/mre/current/StochasticCRM/userguide>).

1.3. We are uncertain of what the tables of figures in Annex 3 are showing. The table headings state that they are incorporating uncertainty in all of density, avoidance rates, flight height distribution and nocturnal activity or incorporating uncertainty in one of these input parameters in turn. Clarification is required as to whether these are outputs using the Applicant's stochastic model for the various parameters (as was presented in the original ES submission, Chapter 13) or are they for varying each parameter in turn using the deterministic/Band (2012) model. The table headings in this Annex also suggest that these use mean seabird densities. However, the outputs appear to be very similar to those run using the median bird densities, so clarification is required as to whether these outputs are from models run using the mean bird densities, the median bird densities or the mean of the median bird densities.

2. CRM input parameters (Section 1.2 and Annex 1)

2.1. The Applicant has now provided in Annex 1 of Appendix 3.2 all of the input parameters required for us to run the Band (2012) model and check the outputs. We note that the seabird density data included in the CRM input parameters is for the median densities of birds in flight and that the mean densities are not produced in Annex 1. As noted above, we consider the standard approach of using mean bird densities to be the appropriate method to use. However, we note that the mean densities are presented in the Tables in Annex 1 of Appendix 13.01 of the original submission documents. Therefore, we have used the mean bird density figures presented in the relevant tables of Annex 1 of Appendix 13.01 to evaluate the Band (2012) CRM predictions using the mean densities now presented by the Applicant in Tables A4.1 – A4.10 of Annex 4 of the CRM update and clarification (i.e. Appendix 3.2).

3. Comparison of deterministic model outputs using R with Band (2012) model outputs (Section 1.3 and Annex 2)

- 3.1. We welcome that the Applicant has presented example Band (2012) model input and output sheets for Norfolk Vanguard East for gannet and kittiwake in Annex 2 of Appendix 3.2. However, we note that the densities of birds in flight entered into these Band (2012) model sheets are the median densities rather than the mean densities as is standard practice. As noted above, we consider the mean bird densities to be the appropriate data to use in the deterministic/Band model. Therefore, we advise that the input and output spreadsheets for Option 2 are presented using this data.
- 3.2. We note that Band (2012) model outputs for Option 2 have been presented. Given the issues regarding reliability concerns with the site-specific flight height data collected from the digital aerial survey data noted in the original Environmental Statement submission (see section 4.7 of Appendix 13.01) Natural England agrees with the use of this Option for Norfolk Vanguard.
- 3.3. However, it appears from the information provided by the Applicant in paragraph 16 of Appendix 3.2 that Option 2 estimates have been generated by relating generic flight height data to the Vanguard specific turbine parameters to calculate the percentage of birds at potential collision height (%PCH), and then using Option 1 as opposed to Option 2 within the CRM spreadsheet. This is not an accepted methodology. The Applicant asserts that this has no effect on the mortality calculated since Option 1 and Option 2 are identical in structure, differing only in the data source for %PCH. However, checks undertaken by Natural England indicate that this approach gives different outputs in this instance (the Applicant's figures are higher than those generated running Option 2 correctly with the Band spreadsheet). This issue has been previously discussed by Natural England with regard to the Navitus Bay project (Natural England 2014). The reasons for this discrepancy are likely to be linked to the fact that the generic flight height data are referenced to mean sea level (MSL), but the CRM calculations have been based upon turbines referenced to highest astronomical tide (HAT).
- 3.4. Additionally the %PCH values derived from the generic Johnston et al. (2014) data (are applicable at Vanguard given the specification of the turbines considered), have been calculated by simply summing the proportions of birds between the lower and upper rotor heights. Natural England understands that this approach is not strictly correct (Bill Band pers. comm.) as it does not take into account the particular form of integration across the rotor swept height that is employed within the Band modelling toolkit in arriving at the appropriate %PCH number for use in Option 2 of the CRM model. This leads to further uncertainty regarding the accuracy of the assessment.
- 3.5. In this context it is not clear why the Applicant considers that their approach simplifies the presentation of the spreadsheet outputs. Natural England advises that if the generic flight height distribution data from Johnston et al. (2014) is to be used with the 'basic' Band model (i.e. Option 2), that Option 2 is correctly run using the Band (2012) model and that output spreadsheets selecting this Option are presented for stakeholders to review.

4. Deterministic CRM outputs for lower and upper parameter values (Section 1.4 and Annex 4)

- 4.1. We welcome that the Applicant has provided in Annex 4 of Appendix 3.2 deterministic model predictions for the five key species (gannet, kittiwake, lesser black-backed gull, herring gull and great black-backed gull) for the various input parameter scenarios, i.e. varying:
- Bird density (mean and upper and lower 95% confidence intervals)
 - Recommended avoidance rates and \pm recommended standard deviations
 - Flight height distribution data (mean and upper and lower 95% confidence intervals)
 - Covering the Natural England recommended range of nocturnal activity factors of 1-2 for gannet and 2-3 for kittiwake and large gulls.
- 4.2. We note that the variation of the avoidance rates, flight heights and nocturnal activity factors have been based on using the median bird densities, rather than the mean densities, which we consider to be the appropriate density data to use for the deterministic/Band (2012) model. We therefore advise that these scenarios are run using the mean density data, so that the full uncertainty/variability in these input parameters can be properly assessed.

5. Comparison of Vanguard CRM outputs with those obtained using the MSS CRM (Section 1.5)

- 5.1. We note that in Section 1.5 of Appendix 3.2 the Applicant has compared their stochastic model with the MSS stochastic model in terms of running both models effectively as deterministic models. We note that the outputs presented for kittiwake in Table 2 are based on median bird densities rather than mean bird densities. However, whilst it is reassuring that running both models as deterministic models gives very similar figures, this has totally ignored the stochastic element of the models. The Applicant has said that the stochastic elements cannot be directly compared due to the two models not using the same probability distributions for all the stochastic parameters. We still do not have any information or R code for the Applicant's model and therefore we have been unable to check it, but clearly there are 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.
- 5.2. 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 cumulative/in-combination assessments.
- 5.3. Accordingly, we recommend that if stochastic model outputs are to be considered in the assessments, that these are outputs from the MSS stochastic model.
- 5.4. In addition, the Applicant states that the MSS stochastic model does not allow nocturnal flight activity rates to be entered for each month separately, but rather only as a single value applied in all months.

- 5.5. In contrast the Norfolk Vanguard model allows the seasonal variation identified in Furness et al. (2018) to be incorporated. As noted in our response to the Applicant's response to the Section 51 advice [REP2-038], Natural England does not consider that there is sufficient evidence to apply different rates to the Norfolk Vanguard data for the breeding season and non-breeding seasons for gannet (or kittiwake), as applied by the Applicant.

6. Herring gull CRM (Section 1.6)

- 6.1. We welcome that the Applicant has included a full assessment of CRM impacts to herring gull from Vanguard alone in Section 1.6 of Appendix 3.2.
- 6.2. However, we note that the CRM predictions presented in Table 4 of Appendix 3.2 are the outputs for the Applicant's stochastic CRM. As noted above, we do not consider the Applicant's stochastic model is appropriate to use in assessments. We also note that these predictions are based on using the median bird densities and our position is that the mean densities are the appropriate values to use in CRM. Therefore, we request that the CRM predictions for the MSS model and deterministic/ Band (2012) are presented using the mean bird densities and that these are the figures that assessment conclusions are based on.
- 6.3. We note that from Tables A4.4 and A4.9 of Annex 4 of Appendix 3.2, the annual predictions using the mean densities and the deterministic/Band (2012) model Option 2 model are 42 birds (0-164 based on the lower and upper 95% CIs of density) for Vanguard East and 3 birds (0-12 based on the lower and upper 95% CIs of density) for Vanguard West. Such levels of impact equate to less than 1% of baseline mortality of the largest herring gull BDMPS in Furness (2015) and of the biogeographic population. Therefore, we can conclude no significant effect at the EIA scale from collision risk to herring gull from Vanguard alone. Whilst we continue to hold the reservations raised in Section 3 above regarding the Applicant's use of Option 1 rather than Option 2 to produce Option 2 estimates, we note that doing this correctly would not alter this conclusion in this instance.
- 6.4. Given the predictions using the mean bird densities exceed 10 birds, we continue to advise that a full cumulative CRM assessment is also undertaken for herring gull.

7. Comparison of annual mortality estimates calculated as the sum of monthly medians, median of months and sum of monthly means (section 1.7)

- 7.1. As noted above, we do not consider that the Applicant's stochastic model is appropriate to use for CRM assessments.

8. Conclusions of impacts of CRM predictions from Vanguard alone for EIA

- 8.1. It appears that the greatest uncertainty in the predictions from the variations of Band model outputs presented in Tables A4.1-A4.10 in Annex 4 of Appendix 3.2 occurs due to the variability/uncertainty in the bird density. Therefore, 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) 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.

- 8.2. 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.
- 8.3. From Table 1 below, 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 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. Whilst we continue to hold the reservations raised in Section 3 above regarding the Applicant's use of Option 1 rather than Option 2 to produce Option 2 estimates, we note that doing this correctly would not alter this conclusion.
- 8.4. Natural England notes that cumulative collision impacts from other offshore wind farms, and impacts on Special Protection Areas (i.e. Habitats Regulations Assessment issues) alone or in-combination are not considered in Appendix 3.2.

Table 1. Deterministic/Band (2012) Option 2 CRM predictions and proportions of baseline mortality of relevant reference populations using the mean and 95% confidence intervals of seabird density along with mean values for avoidance rates, flight height distributions and nocturnal activity (from Tables A4.1-A4.10 of Annex 4 of Appendix 3.2).

Species	Site	Deterministic/Band Option 2 CRM prediction			Mortality rate (%) ¹	Reference population ²		Baseline mortality		% baseline mortality that CRM predictions equate to					
		Mean density	Lwr 95% CI	Upr 95% CI		Largest BDMPS	Biogeographic	Largest BDMPS	Biogeographic	Largest BDMPS			Biogeographic		
										Mean	Lwr 95% CI	Upr 95% CI	Mean	Lwr 95% CI	Upr 95% CI
Gannet	VE	211	35	513	19.1	456,298	1,180,000	87,153	225,380	0.24	0.04	0.59	0.09	0.02	0.23
	VW	82	18	195						0.09	0.02	0.22	0.04	0.01	0.09
Kittiwake	VE	376	41	991	15.6	829,937	5,100,000	129,470	795,600	0.29	0.03	0.77	0.05	0.01	0.12
	VW	103	10	256						0.08	0.01	0.20	0.01	0.001	0.03
Lesser black-backed gull	VE	24	0	96	12.6	209,007	864,000	26,335	108,864	0.09	0.00	0.36	0.02	0	0.09
	VW	44	2	126						0.17	0.01	0.48	0.04	0.002	0.12
Herring gull	VE	42	0	164	17.4	466,511	1,098,000	81,173	191,052	0.05	0.00	0.20	0.02	0	0.09
	VW	3	0	12						0.004	0.00	0.01	0.002	0.00	0.01
Great black-backed gull	VE	121	3	410	18.5	91,399	235,000	16,909	43,475	0.72	0.01	2.43	0.28	0.01	0.94
	VW	43	1	135						0.25	0.00	0.80	0.10	0.002	0.31

¹ Taken from the Applicant's Table 13.60 of the original ES submission Chapter 13 and Table 3 of Appendix 3.2: CRM update and clarification for herring gull

² From Furness (2015)

9. References

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.

Furness, R.W. (2015) *Non-breeding season populations of seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS)*. Natural England Commissioned Report Number 164. 389 pp.

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THE PLANNING ACT 2008
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NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Natural England's comments on Appendix 3.3 – Operational Auk and Gannet Displacement: update and clarification [REP1-008].

14 February 2019

1. Evidence Review

- 1.1. We welcome the auk displacement evidence review presented by the Applicant in Annex 1 of this Appendix. The Applicant's review presents evidence for guillemot and razorbill, but not puffin. Based on the Applicant's evidence review, they conclude that the appropriate (and still precautionary) rates of displacement from wind farms for these species are 50% from within the wind farm itself and 30% within a 1 km buffer, combined with a maximum consequent mortality for displaced individuals of 1%.
- 1.2. We note that while some studies have found a strong displacement effect of guillemots and razorbills from offshore wind farms, other studies have found none. For example displacement of guillemots and razorbills have been reported in the non-breeding season in the southern North Sea of distances from 2 to 4km (Petersen et al. 2004) and Petersen & Fox (2007) demonstrated the exclusion of guillemots out to at least 2km at Horns Rev development site. However, this has not been the case for other studies, e.g. guillemots at Robin Rigg wind farm in Scotland (Vallejo et al. 2017). We note that displacement of auks may be state-specific (breeding or non-breeding) or it may be due to habitat quality and/or availability (e.g. birds will be more easily displaced from poorer quality habitat or where habitat is not limiting). We also note that the Applicant's evidence review does not provide much actual evidence to justify a 1% mortality rate as being precautionary. Therefore, in light of the evidence presented by the Applicant in Annex 1 of Appendix 3.3., **Natural England's position currently remains as stated in our Relevant Representations [RR-106]:** *'Natural England notes that definitive mortality rates associated with displacement for seabirds, including auks are not known and therefore we advise consideration of a range of mortality rates are used in assessments. Whilst Natural England agrees 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 assessment (with 50% displacement from the OWF and 30% within a 1km buffer) can be considered the worst case scenario. Therefore, our recommendation remains that a range of mortality rates of 1-10% and displacement rates of 30-70%, with 70% displacement and 10% mortality as the worst case across the site plus 2km buffer (for both assessments of impacts alone and cumulatively/in-combination).'*
- 1.3. We note that in Appendix 3.3, the Applicant has produced impact figures for a range of rates of 30-70% displacement and 1-10% mortality, which covers the range requested by Natural England and the Applicant's preferred level and consider that the impact likely lies somewhere within this range. However, we note that the Applicant has based their conclusions, particularly for the cumulative operational displacement, on their preferred displacement and mortality rates. The current displacement guidance (SNCBs 2017) advises: *'While presenting the full range of potential displacement and mortality impacts, SNCBs encourage developers to indicate their interpretation of the most likely displacement levels and mortality scenarios by highlighting a range of cells within the matrix, and simultaneously to provide sufficient empirical/modelling evidence to support any highlighted subset of cells. SNCBs also advise that a range of displacement values are taken through to the assessment of population impacts and not a single figure. The range of population impacts can then also be presented as a matrix so that those levels of displacement which might exceed a particular level of population impact can be easily identified and evaluated. But if only a single figure can be taken forward, this in most cases should be the more precautionary of the sub-set selected.'*
- 1.4. Therefore, we advise that whilst the Applicant's preferred range of displacement and mortality rates (based on their evidence review) fall within the Natural England preferred range of rates, the cumulative displacement assessments should also consider the predicted impacts across the range of values recommended by Natural England, rather than just focusing on the Applicant's preferred rates.

2. Assessment of operational disturbance and displacement from project alone (Section 1.1)

- 2.1. We welcome that the assessment in Section 1.1 presents displacement impact predictions covering a range of displacement and mortality rate scenarios from 30%-70% displacement and 1-10% mortality over the site and 2km buffers for the Vanguard East and West options individually and combined in Tables 2-4 for the auk species, and 60-80% displacement and 1% mortality for gannet in Table 5. We also welcome that the Applicant has included consideration of the lower and upper confidence limits of the bird abundance data in the assessments for both auks and gannet (Tables 2-5).
- 2.2. We note that the Applicant has now also produced in Tables 2-5 displacement impact figures using the median bird abundance figures as well as mean abundance figures. The use of median abundances departs from the current recommended advice (SNCBs 2017) regarding displacement assessments – the current advice (SNCBs 2017) states: ‘*SNCBs recommend assessing impacts of displacement based on the overall mean seasonal peak numbers of birds (averaged over the years of survey) in the development footprint and appropriate buffer.*’ Therefore, Natural England has not checked or considered the figures presented in Tables 2-5 for the median abundance data.
- 2.3. **Puffin:** We agree with the figures presented in Table 2 for the mean abundance data and upper and lower 95% confidence limits. Based on the Natural England preferred range of 30-70% displacement and 1-10% mortality, we agree with the Applicant’s conclusions of negligible to minor adverse impact from operational displacement from the Vanguard project alone for puffin.
- 2.4. **Razorbill:** We agree with all the figures presented in Table 3 for the mean abundance and upper and lower 95% confidence limits for Vanguard West, and all of these for Vanguard East with the exception of the winter season figures. We advise that the Applicant checks the mean peak winter abundance figure for razorbill for Vanguard East, as we calculate that this should be 491 – see Table 12.1a of Appendix 13.01 of the original submission, as the mean peak estimate for razorbill in the Vanguard East site + 2km buffer for winter period (Nov-Dec) is 491 (from Dec) and not 279 as used by the Applicant (which appears to be from Nov). Therefore, the number of razorbills at risk of mortality in this season is between 1.5 (for 30% displacement and 1% mortality) and 34.3 (for 70% displacement and 10% mortality). As a result of this error, the Applicant should also check the annual summed totals and figures for razorbill for Vanguard East + Vanguard West. However, once these calculations are clarified, we note it is likely that the Applicant’s conclusions of a minor adverse impact from operational displacement from the Vanguard project alone will prove acceptable to Natural England.
- 2.5. **Guillemot:** We agree with the figures presented in Table 3 for the mean abundance data and upper and lower 95% confidence limits. Based on the Natural England preferred range of 30-70% displacement and 1-10% mortality, we agree with the Applicant’s conclusions of a minor adverse impact from operational displacement from the Vanguard project alone for guillemot.
- 2.6. **Gannet:** We assume that the figures presented in Table 5 are all based on using the migration free breeding season definition from gannet in Furness (2015) rather than the full breeding season. As noted in our Relevant Representations, given that Norfolk Vanguard is located within the mean-maximum foraging range of gannets from the Flamborough & Filey Coast SPA colony, we advise that the gannet breeding should also be defined as the full breeding season rather than just the migration-free breeding season, with the autumn and spring migration period definitions adjusted accordingly to account for any overlap of months with the full breeding season – this applies for

EIA and HRA. However, as noted in our Relevant Representations, Natural England has considered the seasonal definitions it advises above for gannet and notes that consideration of the full breeding season and adjusted migration periods rather than the definitions used by the Applicant makes no change to the Applicant's conclusions of negligible to minor adverse impact significance for gannet from Vanguard alone at the EIA scale as regards operational disturbance/displacement impacts. This is because the predicted impacts remain well below 1% of baseline mortality of the largest BDMPS and biogeographic populations.

- 2.7. Natural England would appreciate clarity regarding the non-breeding season apportioning rates used by the Applicant (see our response to the Applicant's response to Examining Authority's first written question 23.44) [REP2-036]. This is relevant for the consideration of operational disturbance/displacement impacts on the gannet feature of the Flamborough & Filey Coast SPA. As set out in our Statement of Common Ground with the Applicant [REP1-049], Natural England has advised that there is a Likely Significant Effect on this feature from operational disturbance/displacement.

3. Auk Cumulative Disturbance and Displacement (Section 1.2)

- 3.1. We welcome that the OWFs considered in the cumulative impacts tables (Tables 7, 9 and 11) have been updated to include figures for Hywind and Kincardine OWFs and that updated figures have been presented for Hornsea 3, Thanet Extension and Seagreen A and B. With regard to these updated figures, we note:
- There are significant ongoing concerns with the Hornsea 3 baseline data and abundance/density figures that are being considered during the Examination for this project, meaning that the figures for this project are not yet agreed and may require updating.
 - The figures presented in Tables 7, 9 and 11 for the Thanet Extension OWF do not appear to be correct. From Thanet Extension's Annex 3 on range of displacement matrices for seabirds recorded in Thanet Extension (APEM 2018), there are separate matrices produced for each season for each of the Thanet Extension site only and the Thanet Extension 2km buffer only, meaning that for each season the figures from the Thanet Extension site only need to be summed with the figures for the Thanet Extension 2km buffer only to give the total for the Thanet Extension site + 2km buffer, which are the figures required for the cumulative assessments.
 - The figures for Seagreen A and B appear to be those from the 2018 Environmental Statement (ES) submission rather than the original 2012 ES. We recommend that for the cumulative assessments that the figures from the 2012 submission are presented, as these are based on the legally secured 2014 consent. However, additional rows could be added to the cumulative table for a higher tier to include figures from the new application for these projects, although the summed cumulative totals should be based on the consented project figures for the Seagreen projects. This would also apply to the other OWFs in the Forth and Tay where applications have recently been submitted for changes to the consented OWFs.
- 3.2. We note that in Appendix 3.3, the heading for Table 6 suggests that the largest BDMPS figures presented in this table are those for the North Sea from Furness (2015). However, we note that the largest BDMPS figures listed in this table of 2,045,078 for guillemot and 868,698 for puffin do not match the largest BDMPS figures for the UK North Sea and Channel BDMPS in Furness (2015) for these species, which are 1,617,306 for guillemot and 231,957 for puffin. We suggest that the Applicant checks the figures they are using, as this will affect the baseline mortality calculations (using the figures for the largest BDMPS from Furness 2015 of 231,957 for puffin 1,617,306 for guillemot will reduce the baseline mortality figure) and hence the proportion of baseline mortality that the additional cumulative impacts accounts for. We would also advise that the Applicant considers assessment of cumulative impacts against baseline mortality of the biogeographic population as well as the largest BDMPS figure (as done for RTD in the assessment in Appendix 3.1), as for EIA the level of potential impact likely lies somewhere within this range.
- 3.3. As noted in our responses to the Applicant's response to the Section 51 advice [REP2-038], we note that the cumulative assessments (Tables 7, 9 and 11) include figures for Moray East OWF, but do not include Moray West OWF – this project should also be included in cumulative and in-combination assessments.
- 3.4. There is an error in the number of birds presented in the puffin cumulative table (Table 7) for Vanguard East in the breeding season – the figure should be 67 and not 0.
- 3.5. The Applicant has presented matrix tables for cumulative displacement for puffin, razorbill and guillemot for the full range of displacement and mortality rates from 1-100% across in Tables 8, 10 and 12, so the figures for the preferred Natural England range of 30-70% displacement and 1-10% mortality can be obtained (however we note

the issues raised above with the cumulative totals currently presented in these tables). However, the Applicant has based their impact assessment on their preferred displacement and mortality rates based on the evidence review in Annex 1 of Appendix 3.3. As noted in Section 1 above, Natural England still notes that definitive mortality rates associated with displacement for seabirds, including auks, are not known and therefore we advise consideration of a range of mortality rates are used in assessments. Whilst Natural England agrees 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 assessment (with 50% displacement from the OWF and 30% within a 1km buffer) can be considered to robustly reflect a realistic worst case scenario. Therefore, our recommendation remains that a range of mortality rates of 1-10% and displacement rates of 30-70%, with 70% displacement and 10% mortality should be considered to reflect the worst case scenario across the site plus 2km buffer (for both assessments of impacts alone and cumulatively/in-combination).

- 3.6. We note that the Applicant's assessment and conclusions of operational cumulative displacement assessments for puffin, razorbill and guillemot are based on the Applicant's preferred mortality and displacement rates (which from the assessments in Section 1.2 of Appendix 3.3 appear to be using 50% displacement and 1% mortality). As noted in Section 1 above, the SNCBs encourage developers to indicate their interpretation of the most likely displacement levels and mortality scenarios by highlighting a range of cells within the matrix, and simultaneously to provide sufficient empirical/modelling evidence to support any highlighted subset of cells. SNCBs also advise that a range of displacement values are taken through to the assessment of population impacts and not a single figure. The range of population impacts can then also be presented as a matrix so that those levels of displacement which might exceed a particular level of population impact can be easily identified and evaluated. But if only a single figure can be taken forward, this in most cases should be the more precautionary of the sub-set selected.
- 3.7. Therefore, whilst we acknowledge that the Applicant has presented cumulative matrices covering the full range of up to 100% displacement and 100% mortality (in Tables 8, 10 and 12), we advise that the actual assessments and conclusions should also consider the predicted impacts across the range of values recommended by Natural England (30-70% displacement and 1-10% mortality), rather than just focusing on the Applicant's preferred rates.
- 3.8. Therefore, based on this issues outlined above, whilst the impacts from the project alone can be agreed (based on the Natural England preferred range of 30-70% displacement and 1-10% mortality), **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.**
- 3.9. We note that no gannet cumulative displacement assessment has been included in Appendix 3.3. However, we welcome the Applicant's commitment in this Appendix that this will be provided in a subsequent clarification note.

4. References

APEM (2018) *Thanet Extension Environmental Statement Volume 4, Chapter 4, Annex 3 – Range of Displacement Matrices for Seabirds Recorded in Thanet Extension*. APEM Scientific Report P1227-02, for Vattenfall Wind Power Limited, June 2018. Available from:

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SNCBs (2017) *Joint SNCB Interim Displacement Advice Note: Advice on how to present assessment information on the extent and potential consequences of seabird displacement from Offshore Wind Farm (OWF) developments, January 2017*. Available from:

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Vallejo, G.C., Grellier, K., Nelson, E.J., McGregor, R.M., Canning, S.J., Caryl, F.M., & McLean, N. (2017). Responses of two marine top predators to an offshore wind farm. *Ecology and Evolution*, 7(21), 8698–8708. <https://doi.org/10.1002/ece3.3389>.



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NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

**Natural England's comments on Appendix 5.1 – Comparison of
MarLIN and Norfolk Vanguard sensitivity definitions for benthic
receptors [REP1-016].**

14 February 2019

1. Introduction

- 1.1. The Applicant submitted an additional Appendix at Deadline 1: Appendix 5.1 – Comparison of MarLIN and Norfolk Vanguard sensitivity definitions for benthic receptors [REP1-016].
- 1.2. The Applicant suggested in their response to Qu 5.21 of Examining Authority's first written questions that the sensitivity definitions presented in Table 10.3 of ES Chapter 10 Benthic Ecology are more refined and conservative than those presented in the latest MarLIN Marine Evidence based Sensitivity Assessment.
- 1.3. Appendix 5.1 [REP1-016] provides an overview of the approach used by MarLIN to define sensitivity along with a comparison of the Norfolk Vanguard definitions presented in Table 10.3 of ES Chapter 10.
- 1.4. Natural England reviewed this document and provided brief comment in our response to other consultee responses to first written round of Examining Authority's Questions as Qu. 5.21 provided at Deadline 2 [REP2-036].
- 1.5. Natural England agrees that elements of this approach are more precautionary however, the information is open to misinterpretation. Full details are provided below.

2. Overarching Comments

- 2.1. Natural England agrees that the timescales used in the Applicant's sensitivity definitions for benthic receptors are generally more precautionary or similar to those used by MarLIN.
- 2.2. However, the sensitivity definitions used by Norfolk Vanguard are generally qualitative parameters for levels of impact rather than quantitative as for the MarLIN definitions.
- 2.3. This is of particular concern as qualitative descriptions make it easier for the information to be misinterpreted.
- 2.4. Natural England advise that as per our standard advice for sustainable development the Applicant uses the MarLIN sensitivity definitions because:
 - a. these are considered standard practice;
 - b. they underpin Natural England's conservation advice, particularly our Advice on Operations; and
 - c. this allows for equal assessment and comparison of impacts across industries and developments.



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**Natural England's Comments on Appendix 6.1 – Relationship
Between Design Parameters in Draft Development Consent Order
and Environmental Statement (Q6.6; Q20.3 and Q24.2) submitted by
the Applicant at Deadline 1 [REP1-017]**

14 February 2019

Norfolk Vanguard Offshore Wind Farm – Comments on Appendix 6.1 – Relationship Between Design Parameters in Draft Development Consent Order and Environmental Statement (Q6.6; Q20.3 and Q24.2) submitted by the Applicant at Deadline 1 [REP1-017].

Following submission of Appendix 6.1 – Relationship between design parameters in Draft Development Consent Order and Environmental Statement (Q6.6; Q20.3 and Q24.2) submitted by the Applicant at Deadline 1 [REP1-017] 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

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 comments

Table 1: Natural England comments on Appendix 6.1 – Relationship Between Design Parameters in Draft Development Consent Order and Environmental Statement (Q6.6; Q20.3 and Q24.2) submitted by the Applicant at Deadline 1

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
Schedule 1, Part 3: Requirements			
Schedule 1, Part 3, 2(1)(a)	wind turbine generator must not exceed a height of 350 metres when measured from HAT to the tip of the vertical blade	The offshore project parameters are outlined in Table 5.3 of Chapter 5 Project Description. This is used as the worst case scenario in Table 16.6 of Chapter 16 Aviation and Radar.	Natural England notes that maximum tip height above HAT of 350m is used in Table 5.3 and has no further comments.
Schedule 1, Part 3, 2(1)(b)	wind turbine generator must not exceed a height of 200 metres to the height of the centreline of the generator shaft forming part of the hub when measured from HAT	A maximum height of 198.5m is assessed in the ES and this will be revised in the draft DCO at Deadline 2.	Natural England welcomes this change and notes that Applicant has amended some sections of the draft DCO submitted at Deadline 2 to reflect this. However, this is not consistent, for example P. 146, Part 4 1(1)(b) of the Draft Development Consent Order (tracked changes) (Document Reference: 3.1) submitted by the Applicant at Deadline 2 still refers to a figure of 200m.

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
Schedule 1, Part 3, 2(1)(c)	wind turbine generator forming part of the authorised project must not exceed a rotor diameter of 303 metres	The offshore project parameters are outlined in Table 5.3 of Chapter 5 Project Description.	Natural England notes that maximum turbine rotor diameter of 303m is used in Table 5.3 and has no further comments.
Schedule 1, Part 3, 2(1)(d)	wind turbine generator forming part of the authorised project must not be less than 680 metres from the nearest wind turbine generator in either direction perpendicular to the approximate prevailing wind direction (crosswind) or be less than 680 metres from the nearest wind turbine generator in either direction which is in line with the approximate prevailing wind direction (downwind)	The offshore project parameters are outlined in Table 5.3 of Chapter 5 Project Description. A minimum spacing of 680m has been used as the worst case scenario for Chapter 8 Marine Geology, Oceanography and Physical Processes, Chapter 14 Commercial Fisheries and Chapter 15 Shipping and Navigation.	No comments.
Schedule 1, Part 3, 2(1)(e)	wind turbine generator forming part of the authorised project must not have a draught height of less than 22 metres from MHWS	The offshore project parameters are outlined in Table 5.3 of Chapter 5 Project Description. A draught height of 22m from MHWS has been used as the worst case scenario for Chapter 15 Shipping and Navigation.	Natural England notes that minimum clearance above sea level of 22m is used in Table 5.3 and have no further comments.
Schedule 1, Part 3, 3(1)	The total number of wind turbine generators forming part of the authorised project must not exceed 200	The offshore project parameters are outlined in Table 5.3 of Chapter 5 Project Description. The maximum total infrastructure numbers are used in the calculations of worst case scenarios in ES Chapters 8 to 18 where relevant.	Natural England notes that Table 5.3 uses a range between 90 x 20MW to 200 x 9MW turbines and has no further comments.
Schedule 1, Part 3, 3(2)	The total number of offshore electrical platforms forming part of the authorised project must not exceed two	The offshore project parameters are outlined in Table 5.3 of Chapter 5 Project Description. The maximum total infrastructure numbers are used in the calculations of worst case scenarios in ES Chapters 8 to 18 where relevant.	Natural England notes that Table 5.3 describes up to two offshore electrical platforms to be located:: Both in Norfolk Vanguard West; Both in Norfolk Vanguard East; or One in Norfolk Vanguard West and one in Norfolk Vanguard East and has no further comments.

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
Schedule 1, Part 3, 3(3)	The total number of accommodation platforms must not exceed two	The offshore project parameters are outlined in Table 5.3 of Chapter 5 Project Description. The maximum total infrastructure numbers are used in the calculations of worst case scenarios in ES Chapters 8 to 18 where relevant.	Natural England notes Table 5.3 describes up to two accommodation platforms (one in Norfolk Vanguard East and one in Norfolk Vanguard West) and has no further comments.
Schedule 1, Part 3, 3(4)	The total number of meteorological masts must not exceed two	The offshore project parameters are outlined in Table 5.3 of Chapter 5 Project Description. The maximum total infrastructure numbers are used in the calculations of worst case scenarios in ES Chapters 8 to 18 where relevant.	Natural England notes Table 5.3 describes up to two meteorological masts (one in Norfolk Vanguard East and one in Norfolk Vanguard West) and has no further comments.
Schedule 1, Part 3, 3(5)	The total number of LIDAR measurement buoys must not exceed two and the total number of wave measurement buoys must not exceed two	The maximum wave buoy and LiDAR parameters are outlined in Table 5.19 of Chapter 5 Project Description. The maximum total infrastructure numbers are used in the calculations of worst case scenarios in ES Chapters 8 to 18 where relevant.	Natural England notes that a maximum of two of each LiDAR measurement buoys and wave measurement buoys are included in Table 5.19 and has no further comments.
Schedule 1, Part 3, 4(1)	The dimensions of any offshore electrical platforms forming part of the authorised project (excluding towers, helipads, masts and cranes) must not exceed 100 metres in height when measured from HAT, 120 metres in length and 80 metres in width	The maximum height is outlined in Table 5.3 of Chapter 5 Project Description.	Natural England notes that maximum height of 100m is listed in Table 5.3. However, this table does not include maximum length or width and therefore should be updated accordingly.
Schedule 1, Part 3, 4(2)	The dimensions of any accommodation platform forming part of the authorised project (excluding helipads) must not exceed 100 metres in height when measured from HAT, 90 metres in length and 60 metres in width	The maximum height is outlined in Table 5.3 of Chapter 5 Project Description.	Natural England notes that maximum height of 100m is listed in Table 5.3. However, this table does not include maximum length or width and therefore should be updated accordingly.
Schedule 1, Part 3, 4(3)	Each meteorological mast must not exceed a height of 200 metres above HAT.	The offshore project parameters are outlined in Table 5.3 of Chapter 5 Project Description.	Natural England notes that maximum height of 200m is listed in Table 5.3 and has no further comments on this.

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
Schedule 1, Part 3, 4(4)	Each meteorological mast must not have more than one supporting foundation	The maximum meteorological mast parameters are outlined in section 5.4.5 and Table 5.18 of Chapter 5 Project Description.	Section 5.4.5 states ' <i>the foundations used may be jacket, gravity base or monopile</i> '. Table 5.18 describes the number of meteorological masts and then provides maximum dimensions, but it does not explicitly state that the mast will only have one supporting foundation. This should be clarified.
Schedule 1, Part 3, 5(1)	<p>The total length of the cable for Work No 1(e) (array) and the volume of cable protection must not exceed 600 kilometres and 209,000m³</p> <p>The total length of the cable for Work No 3 (interconnector link) and the volume of cable protection must not exceed 150 kilometres and 38,000m³</p> <p>The total length of the cable for Work No 4A and 4B (export cable) and the volume of cable protection must not exceed 400 kilometres and 119,836m³</p>	<p>The maximum cable length parameters are outlined in Table 5.3 of Chapter 5 Project Description and used in the calculations of the worst case scenario in the relevant offshore ES Chapters.</p> <p>It should be noted that the Applicant has committed to the use of HVDC export cables which would be laid in pairs, therefore it is the total length of export cable trenches (i.e. 200km) rather than the total cable length (400km) that has been included in the relevant impact assessments. This is based on 4 cables laid in 2 trenches with an average length of 100km each.</p> <p>Cable protection parameters are given in Table 5.23 of Chapter 5 Project Description and assessed as either volumes or areas (depending on which is the most relevant to the receptor) in the relevant offshore ES chapters where appropriate.</p> <p>It is acknowledged that there is a typographical error in ES Chapter 5 paragraph 225 which includes an incorrect length of unburied export cable as identified in response to Q6.11. The correct parameters are</p>	<p>Natural England notes that the figures stated correlate with figures for cable length and volume of cable protection provided in Table 5.3 and Table 5.23, however, as noted in our Relevant Representation [RR-106] cable protection permitted should be recorded and limited on the DMLs using both volume of material and area of impact.</p> <p>Natural England, is pleased to see that this has been included in draft DCO submitted by the Applicant at Deadline 2, however, we would seek clarification as to why the ES includes a figure of 222,086m² for the export cable whereas a total figure of 122,086m² has been included in draft DCO.</p> <p>Please note, Natural England strongly 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.</p>

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
		provided in Table 5.23 of Chapter 5 Project Description and assessed in the relevant ES Chapters.	
Schedule 1, Part 3, 6(1)(a)	In relation to a wind turbine generator, each foundation using piles must not have more than four driven piles	Section 5.4.3 of Chapter 5 Project Description describes the types of piles considered for wind turbine foundations. The maximum number of driven piles considered per foundation is four based on the quadropod foundation. This has been assessed in Chapter 12 Marine Mammals, as outlined in Table 12.24.	<p>Natural England notes that options presented in Table 12.24 include:</p> <ul style="list-style-type: none"> • 1 (monopile); • 3 (tripod with pin-piles of the same diameter as the quadropod and therefore this will not be the worst-case scenario); • 4 (quadropod with pin-piles or tension leg floating platform with up to 4 anchors); and • 6 legged jacket – offshore electrical platforms and accommodation platforms only <p>As 6 legged jackets are only being considered for offshore electrical platforms and accommodation platforms, we have no further comments. However, Natural England would support this caveat being conditioned in DCO /DML.</p>
Schedule 1, Part 3, 6(1)(b)	In relation to a wind turbine generator, each foundation using piles must not have in the case of single pile structures, a pile diameter which is more than 15 metres	Table 5.10 of Chapter 5 Project Description outlines the maximum wind turbine foundation monopile parameters. This has been assessed in Chapter 12 Marine Mammals, as outlined in Table 12.24.	Natural England notes that maximum single pile structure of 15m, representing the largest 20MW pile is used in Table 5.10 and Table 12.24 and has no further comments.
Schedule 1, Part 3, 6(1)(c)	In relation to a wind turbine generator, each foundation using piles must not have in the case of two or more pile structures, have a pile diameter which is more than five metres	Table 5.9 of Chapter 5 Project Description outlines the maximum wind turbine foundation pin-pile parameters.	Natural England notes that maximum pin-pile diameter of 5m, representing the largest 20MW pile is used in Table 5.9 and Table 12.24 and has no further comments.

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
		This has been assessed in Chapter 12 Marine Mammals, as outlined in Table 12.24.	
Schedule 1, Part 3, 6(2)(a)	In relation to a wind turbine generator, each floating foundation must not have a diameter at the sea surface which is greater than 70 metres	Table 5.14 of Chapter 5 Project Description outlines the maximum parameters for floating wind turbine foundations. This maximum is used in the calculations of the maximum footprint for worst case scenarios in ES Chapters 8 to 18 where relevant.	Natural England notes that maximum sea surface diameter for floating foundations of 70m, representing the largest 20MW pile, is used in Table 5.14 and has no further comments.
Schedule 1, Part 3, 6(2)(b)	In relation to a wind turbine generator, each floating foundation must not have more than 12 anchor lines	Table 5.14 of Chapter 5 Project Description outlines the maximum parameters for floating wind turbine foundations. This has been assessed in Chapter 12 Marine Mammals, as outlined in Table 12.24 and Chapter 14 Commercial Fisheries (Table 14.16)	Natural England notes that maximum number of 12 anchor lines, is used in Table 5.14 and has no further comments.
Schedule 1, Part 3, 6(2)(c)	In relation to a wind turbine generator, each floating foundation must not have more than four anchors	Table 5.14 of Chapter 5 Project Description outlines the maximum parameters for floating wind turbine foundations. This has been assessed in Chapter 12 Marine Mammals in relation to piled anchors, as outlined in Table 12.24.	Natural England notes that maximum number of 4 anchors, is used in Table 5.14 and Table 12.24 and has no further comments.
Schedule 1, Part 3, 6(2)(d)	In relation to a wind turbine generator, each floating foundation must not have draught clearance of less than four metres	Chapter 15 Shipping and Navigation, Section 15.7.1 Embedded Mitigation includes ensuring foundation do not impact on vessels transiting within the array (under keel clearance issues), including a minimum of 4m under keel clearance.	No comments.
Schedule 1, Part 3, 6(2)(e)	In relation to a wind turbine generator, each floating foundation must not have an angle of greater than 30° between the mooring line and the vertical	Table 5.14 of Chapter 5 Project Description outlines the maximum parameters for floating wind turbine foundations.	Natural England notes the 2 options are provided in Table 5.14: <ul style="list-style-type: none"> •Vertical (0°) for gravity base •Up to 30° for piled or caisson anchors,

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
		This has been assessed in Chapter 12 Marine Mammals, Chapter 14 Commercial Fisheries and Chapter 15 Shipping and Navigation.	and has no further comments.
Schedule 1, Part 3, 6(3)	In relation to a wind turbine generator, each foundation must not have a seabed footprint area (excluding scour protection) of greater than 4,900 m ²	<p>Tables 5.9, 5.10, 5.11, 5.12, 5.13 and 5.14 of Chapter 5 Project Description outline the maximum parameters for each type of wind turbine foundation considered in the application. The maximum footprint is based on the floating foundation (ES Chapter 5, Table 5.14).</p> <p>This has been assessed in chapters where the largest (20MW) turbines are considered the worst case scenario, including Chapter 10 Benthic and Intertidal Ecology and Chapter 11 Fish and Shellfish Ecology.</p> <p>It should be noted that the worst case scenario seabed footprints consider the area of foundations and scour protection combined to provide a conservative worst case scenario.</p>	Natural England notes that maximum seabed footprint (excluding scour protection) for gravity base anchor of 4900m ² , is used in Table 5.14 and has no further comments.
Schedule 1, Part 3, 7(1)(a)	In relation to a meteorological mast, each foundation using piles must not have more than four driven piles	Table 5.18 of Chapter 5 Project Description outlines the maximum parameters for meteorological mast foundations. This maximum is used in the calculations of worst case scenarios in ES Chapters 8 to 18 where relevant.	Table 5.18 does not detail the number of piles for each meteorological mast and therefore this should be clarified by the Applicant.

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
Schedule 1, Part 3, 7(1)(b)	In relation to a meteorological mast, each foundation using piles must not have in the case of single pile structures, a pile diameter which is more than 10 metres	<p>This parameter is not explicitly stated in the ES. Reference to the monopile foundation option is included in ES Chapter 5, Table 5.3. Other options include suction caisson monopile; piled tripod or quadropod; suction caisson tripod or quadropod; Gravity Base System (GBS); and Tension leg floating.</p> <p>The maximum seabed footprint based on GBS (as outlined below) is assessed in the relevant ES Chapters. Chapter 12 Marine Mammals includes the piled quadropod as the worst case scenario for the maximum number of piles (as outlined in Table 12.24). While the monopile foundation option is the worst case scenario for underwater noise impacts at any one time, the underwater noise modelling uses 15m diameter monopiles as the overall worst case scenario, based on the maximum diameter of wind turbine generator monopile foundations. This provides a conservative approach which encompasses the worst case scenario for met masts of 10m diameter.</p>	As stated in Appendix 5 of Natural England's Relevant Representation [RR-106 the inclusion of a 10 meter pile for LiDAR buoys and meteorological masts seems significantly in excess of any realistic foundation type for these structures therefore Natural England questions why they are included.
Schedule 1, Part 3, 7(1)(c)	In relation to a meteorological mast, each foundation using piles must not have in the case of two or more pile structures, have a pile diameter which is more than three metres	As outlined above, Chapter 12 Marine Mammals includes the piled quadropod as the worst case scenario for the maximum number of piles (as outlined in Table 12.24). The underwater noise modelling uses 5m diameter pin-piles as the overall worst case scenario, based on the maximum diameter of wind turbine generator pin-pile foundations. This provides a	Natural England notes that options presented in Table 12.24 include: <ul style="list-style-type: none"> • 1 (monopile); • 3 (tripod with pin-piles of the same diameter as the quadropod and therefore this will not be the worst-case scenario); • 4 (quadropod with pin-piles or tension leg floating platform with up to 4 anchors); and

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
		conservative approach which encompasses the worst case scenario for met masts of 3m diameter.	<ul style="list-style-type: none"> • 6 legged jacket – offshore electrical platforms and accommodation platforms only As 6 legged jackets are only being considered for offshore electrical platforms and accommodation platforms, we have no further comments. However, Natural England would support this caveat being conditioned in DCO /DML.
Schedule 1, Part 3, 7(2)	In relation to a meteorological mast, each foundation must not have a seabed footprint area (excluding scour protection) of greater than 314 m ²	Table 5.18 of Chapter 5 Project Description outlines the maximum seabed footprint for meteorological mast foundations based on the gravity base option with a maximum 20m diameter. This maximum is used in the calculations of the maximum footprint including scour protection for worst case scenarios in ES Chapters 8 to 18 where relevant. It should be noted that the worst case scenario seabed footprints consider the area of foundations and scour protection combined to provide a conservative worst case scenario.	Natural England notes that Table 5.18 provides a maximum total footprint of 628m ² Whilst it has been assumed that this figure is a combined figure for the two meteorological masts covered in this application, i.e.314m ² x 2, as the DCO / DML condition is referring to the footprint of a single meteorological mast and the Applicant is yet to determine which type of foundation is to be used the ES does not currently reflect the parameters set out in the DCO / DML.
Schedule 1, Part 3, 8(1)(a)	In relation to an offshore electrical platform, each foundation using piles must not have more than six driven piles	Table 5.15 of Chapter 5 Project Description outlines the maximum parameters for offshore electrical platform foundations. This maximum parameter is used in the calculations of the worst case scenarios in ES Chapters 8 to 18 where relevant. It should be noted that a Change Report (document reference “Pre-ExA_Change Report_9.3”) was submitted to the Planning Inspectorate	Natural England provided comment on the Change Report at Deadline 1 and has no further comments in this regard. Natural England notes that this amendment has been made in the draft DCO submitted by the Applicant at Deadline 2.

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
		on the 12th December 2018 which proposes an increase from six to 18 driven piles per offshore electrical platform and confirms that this change would have no implications on the conclusion of the ES. If the Change Report is accepted, this parameter will be updated in the draft DCO.	
Schedule 1, Part 3, 8(1)(b)	In relation to an offshore electrical platform, each foundation using piles must not have in the case of two or more pile structures, have a pile diameter which is more than three metres	Table 5.15 of Chapter 5 Project Description outlines the maximum parameters for offshore electrical platform foundations. This maximum parameter is used in the calculations of the worst case scenarios in ES Chapters 8 to 18 where relevant. It should be noted that a Change Report (document reference "Pre-ExA_Change Report_9.3") was submitted to the Planning Inspectorate on the 12th December 2018 which proposes an increase from 3m to 5m piles for the offshore electrical platform and confirms that this change would have no implications on the conclusion of the ES. If the Change Report is accepted, this parameter will be updated in the draft DCO.	Natural England provided comment on the Change Report at Deadline 1 and has no further comments in this regard. Natural England notes that this amendment has been made in the draft DCO submitted by the Applicant at Deadline 2.
Schedule 1, Part 3, 8(2)	In relation to an offshore electrical platform, each foundation must not have a seabed footprint area (excluding scour protection) of greater than 7,500 m ²	Table 5.15 of Chapter 5 Project Description outlines the maximum parameters for offshore electrical platform foundations. This maximum parameter is used in the calculations of the worst case scenarios in ES Chapters 8 to 18 where relevant. It should be noted that the worst case scenario seabed footprints consider the area of	Natural England notes that maximum seabed footprint (excluding scour protection) for offshore electrical platform of 7500m ² is used in Table 5.15 and has no further comments.

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
		foundations and scour protection combined to provide a conservative worst case scenario.	
Schedule 1, Part 3, 9(1)(a)	In relation to any accommodation platform, each foundation using piles must not have more than six driven piles	Table 5.15 of Chapter 5 Project Description outlines the maximum parameters for offshore electrical platform foundations. This maximum parameter is used in the calculations of the worst case scenarios in ES Chapters 8 to 18 where relevant. It should be noted that the worst case scenario seabed footprints consider the area of foundations and scour protection combined to provide a conservative worst case scenario.	Table 5.15 provides maximum parameters for offshore electrical platforms not accommodation platforms. Whilst it is assumed that accommodation platforms will have the same maximum parameters as offshore electrical platforms, following the response to Schedule 1, Part 3, 9(1)(b) below this should be confirmed by the Applicant and then this should be clearly stated in the ES and reflected in DCO / DML.
Schedule 1, Part 3, 9(1)(b)	In relation to any accommodation platform, each foundation using piles must not have in the case of two or more pile structures, have a pile diameter which is more than three metres	Accommodation platforms would require a foundation structure similar to that of the offshore electrical platforms. Table 5.15 of Chapter 5 Project Description outlines the maximum parameters for offshore electrical platform foundations. This maximum parameter is used in the calculations of the worst case scenarios in ES Chapters 8 to 18 where relevant.	Natural England notes the acknowledgment from the Applicant that accommodation platforms would require a foundation structure similar to that of the offshore electrical platforms However, this should be clearly stated in the ES and reflected in DCO / DML.
Schedule 1, Part 3, 9(2)	In relation to an accommodation platform, each foundation must not have a seabed footprint area (excluding scour protection) of greater than 7,500m ²	Table 5.15 of Chapter 5 Project Description outlines the maximum parameters for offshore electrical platform foundations. This maximum parameter is used in the calculations of the worst case scenarios in ES Chapters 8 to 18 where relevant.	Table 5.15 provides maximum parameters for offshore electrical platforms not accommodation platforms. Whilst it is assumed that accommodation platforms will have the same maximum parameters as offshore electrical platforms, following the response to Schedule 1, Part 3, 9(1)(b) above this should be confirmed by the Applicant and then this should

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
			be clearly stated in the ES and reflected in DCO / DML.
Schedule 1, Part 3, 10(1)	In relation to any LIDAR measurement buoys, each foundation using piles must not have a pile diameter of greater than 10 metres	Table 5.6 of Chapter 5 Project Description includes the maximum seabed footprint of 157m ² for 2 Lidar piles. This is based on two LiDAR of 10m diameter. This maximum parameter is used in the calculations of the worst case scenarios in ES Chapters 8 to 18 where relevant. It is acknowledged that Table 5.19 of ES Chapter 5 provides incorrect values. The correct parameters are provided in Table 5.6 of Chapter 5 Project Description and assessed in the relevant ES Chapters.	As stated in Appendix 5 of Natural England's Relevant Representation [RR-106 the inclusion of a 10 meter pile for LiDAR buoys and meteorological masts seems significantly in excess of any realistic foundation type for these structures. Therefore, Natural England questions why they are included.
Schedule 1, Part 3, 10(2)	In relation to any LIDAR measurement buoys, each foundation must not have a seabed footprint area (excluding scour protection) of greater than 157 m ² .	Table 5.6 of Chapter 5 Project Description includes the maximum seabed footprint of LiDAR. This maximum parameter is used in the calculations of the worst case scenarios in ES Chapters 8 to 18 where relevant. It is acknowledged that Table 5.19 of ES Chapter 5 provides incorrect values. The correct parameters are provided in Table 5.6 of Chapter 5 Project Description and assessed in the relevant ES Chapters.	Table 5.6 includes presents WCS for infrastructure seabed footprint. In this table a figure of 157m ² is presented for LiDAR for 2 x monopiles + scour protection. The description of parameter in DCO / DML as currently worded allows for 157m ² per foundation and therefore this should be amended to reflect the figures presented in the ES, i.e. 157m ² in total for both LiDAR measurement buoys.
Schedule 1, Part 3, 10(3)	In relation to any wave measurement buoys, each foundation must not have a seabed footprint area (excluding scour protection) of greater than 300 m ²	Table 5.6 of Chapter 5 Project Description includes the maximum seabed footprint of 150m ² per wave measurement buoy (300m ² in total for two buoys). This maximum parameter is used in the calculations of the worst	Natural England welcome this change and notes that Applicant has amended some sections of the draft DCO submitted at Deadline 2 to reflect this. However, this is not consistent, for example P. 147, Part 4, 7(3) of the Draft Development Consent Order

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
		<p>case scenarios in ES Chapters 8 to 18 where relevant.</p> <p>It is acknowledged that the DCO includes 300m² per wave measurement buoy, this will be revised in the updated DCO submitted at Deadline 2.</p>	<p>(tracked changes) (Document Reference: 3.1) submitted by the Applicant at Deadline 2 still refers to 300m².</p>
Schedule 1, Part 3, 11	<p>The total amount of scour protection for the wind turbine generators, accommodation platform, meteorological masts, offshore electrical platforms and LIDAR measurement buoys forming part of the authorised project must not exceed 53,195,398 m³</p>	<p>The ES considers scour protection and foundation structures combined in order to provide a conservative and meaningful assessment (i.e. scour protection would never be installed in the absence of the foundation structure).</p> <p>The volume of scour protection included within the DCO represents the total area of foundations with scour protection minus the area of foundations excluding scour. The volume is based on a conservative assumption of 5m height of scour protection.</p>	<p>Natural England notes that this figure has been amended in the draft DCO submitted by the Applicant at Deadline 2.</p> <p>However, the DCO and DMLs should further split maximum scour protection areas out for individual structures. A mass total is not appropriate to ensure scour protection is installed within the predicted maximums for each element of the project.</p>
Schedules 9 and 10 (Generation DMLs), Part 4: Conditions			
Schedules 9 and 10, Part 4, 1(1)(a)	<p>Subject to paragraph (2), each wind turbine generator forming part of the authorised scheme must not exceed a height of 350 metres when measured from HAT to the tip of the vertical blade</p>	As per Schedule 1, Part 3, 2(1)(a).	As above.
Schedules 9 and 10, Part 4, 1(1)(b)	<p>Subject to paragraph (2), each wind turbine generator forming part of the authorised scheme must not exceed a height of 200 metres to the height of the centreline of the generator shaft forming part of the hub when measured from HAT</p>	As per Schedule 1, Part 3, 2(1)(b) and, as noted above, this maximum height will be changed to 198.5m in the draft DCO to be submitted at Deadline 2.	<p>Natural England welcomes this change and notes that the Applicant has amended some sections of the draft DCO submitted at Deadline 2 to reflect this. However, this is not consistent, for example P. 146, Part 4 1(1)(b) of the Draft Development Consent Order (tracked changes) (Document Reference: 3.1) submitted</p>

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
			by the Applicant at Deadline 2 still refers to a figure of 200m.
Schedules 9 and 10, Part 4, 1(1)(c)	Subject to paragraph (2), each wind turbine generator forming part of the authorised scheme must not exceed a rotor diameter of 303 metres	As per Schedule 1, Part 3, 2(1)(c).	As above.
Schedules 9 and 10, Part 4, 1(1)(d)	Subject to paragraph (2), each wind turbine generator forming part of the authorised scheme must not be less than 680 metres from the nearest wind turbine generator in either direction perpendicular to the approximate prevailing wind direction (crosswind) or be less than 680 metres from the nearest wind turbine generator in either direction which is in line with the approximate prevailing wind direction (downwind)	As per Schedule 1, Part 3, 2(1)(d)	As above.
Schedules 9 and 10, Part 4, 1(1)(e)	Subject to paragraph (2), each wind turbine generator forming part of the authorised scheme must not have a draught height of less than 22 metres from MHWS	As per Schedule 1, Part 3, 2(1)(e)	As above.
Schedules 9 and 10, Part 4, 2(1)	The dimensions of any accommodation platform forming part of the authorised scheme must not exceed 100 metres in height when measured from HAT, 90 metres in length and 60 metres in width	As per Schedule 1, Part 3, 4(1)	Natural England notes that maximum height of 100m is listed in Table 5.3. However, this table does not include maximum length or width and therefore should be updated accordingly.
Schedules 9 and 10, Part 4, 2(2)	Each meteorological mast must not exceed a height of 200 metres above HAT.	As per Schedule 1, Part 3, 4(3).	As above.
Schedules 9 and 10, Part 4, 2(3)	Each meteorological mast must not have more than one supporting foundation.	As per Schedule 1, Part 3, 4(4)	Section 5.4.5 states ' <i>the foundations used may be jacket, gravity base or monopile</i> '. Table 5.18 describes the number of meteorological masts and then provides maximum dimensions it

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
			does not explicitly state that the mast will only have on supporting foundation. This should be clarified.
Schedules 9 and 10, Part 4, 3	The total length of the cables for Work No 1 (e) (array) and the volume of their cable protection must not exceed 600 kilometres and 209,000m ³	The maximum cable length parameters are outlined in Table 5.3 of Chapter 5 Project Description and assessed in the offshore ES Chapters 8 to 18. Cable protection parameters are given in Table 5.23 of Chapter 5 Project Description and assessed as either volumes or areas (depending on which is the most relevant to the receptor) in the offshore ES chapters (Chapters 8 to 18) where relevant.	<p>Natural England notes that the figures stated correlate with figures for cable length and volume of cable protection provided in Table 5.3 and Table 5.23, however, as noted in our Relevant Representation [RR-106] cable protection permitted should be recorded and limited on the consents using both volume of material and area of impact.</p> <p>Natural England, is pleased to see that this has been included in draft DCO submitted by the Applicant at Deadline 2, however, would seek clarification as to why the ES includes a figure of 222,086m² for the export cable whereas a total figure of 122,086m² has been included in draft DCO.</p> <p>Please note, Natural England strongly 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.</p>
Schedules 9 and 10, Part 4, 4(1)(a)	In relation to a wind turbine generator, each foundation using piles must not have more than four driven piles	As per Schedule 1, Part 3, 6(1)(a)	<p>Natural England notes that options presented in Table 12.24 include:</p> <ul style="list-style-type: none"> • 1 (monopile); • 3 (tripod with pin-piles of the same diameter as the quadropod and therefore this will not be the worst-case scenario);

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
			<ul style="list-style-type: none"> • 4 (quadropod with pin-piles or tension leg floating platform with up to 4 anchors); and • 6 legged jacket – offshore electrical platforms and accommodation platforms only <p>As 6 legged jackets are only being considered for offshore electrical platforms and accommodation platforms, we have no further comments. However, Natural England would support this caveat being conditioned in DCO /DML.</p>
Schedules 9 and 10, Part 4, 4(1)(b)	In relation to a wind turbine generator, each foundation using piles must not have in the case of single pile structures, a pile diameter which is more than 15 metres	As per Schedule 1, Part 3, 6(1)(b)	As above.
Schedules 9 and 10, Part 4, 4(1)(c)	In relation to a wind turbine generator, each foundation using piles must not have in the case of two or more pile structures, have a pile diameter which is more than five metres	As per Schedule 1, Part 3, 6(1)(c)	As above.
Schedules 9 and 10, Part 4, 4(2)(a)	In relation to a wind turbine generator, each floating foundation must not have a diameter at the sea surface which is greater than 70 metres	As per Schedule 1, Part 3, 6(2)(a)	As above.
Schedules 9 and 10, Part 4, 4(2)(b)	In relation to a wind turbine generator, each floating foundation must not have more than 12 anchor lines	As per Schedule 1, Part 3, 6(2)(b)	As above.
Schedules 9 and 10, Part 4, 4(2)(c)	In relation to a wind turbine generator, each floating foundation must not have more than four anchors	As per Schedule 1, Part 3, 6(2)(c)	As above.
Schedules 9 and 10, Part 4, 4(2)(d)	In relation to a wind turbine generator, each floating foundation must not have draught clearance of less than four metres	As per Schedule 1, Part 3, 6(2)(d)	No comments.

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
Schedules 9 and 10, Part 4, 4(2)(e)	In relation to a wind turbine generator, each floating foundation must not have an angle of mooring lines greater than 30o between the mooring line and the vertical	As per Schedule 1, Part 3, 6(2)(e)	As above.
Schedules 9 and 10, Part 4, 4(3)	In relation to a wind turbine generator, each foundation must not have a seabed footprint area (excluding scour protection) of greater than 4,900 m2	As per Schedule 1, Part 3, 6(3)	As above.
Schedules 9 and 10, Part 4, 5(1)(a)	In relation to a meteorological mast, each foundation using piles must not have more than four driven piles	As per Schedule 1, Part 3, 7(1)(a)	Table 5.18 does not detail the number of piles for each meteorological mast and therefore this should be clarified by the Applicant.
Schedules 9 and 10, Part 4, 5(1)(b)	In relation to a meteorological mast, each foundation using piles must not have in the case of single pile structures, a pile diameter which is more than 10 metres	As per Schedule 1, Part 3, 7(1)(b)	As stated in Appendix 5 of Natural England's Relevant Representation [RR-106 the inclusion of a 10 meter pile for LiDAR buoys and meteorological masts seems significantly in excess of any realistic foundation type for these structures. Therefore Natural England questions why they are included.
Schedules 9 and 10, Part 4, 5(1)(c)	In relation to a meteorological mast, each foundation using piles must not have in the case of two or more pile structures, have a pile diameter which is more than three metres	As per Schedule 1, Part 3, 7(1)(c)	Natural England notes that options presented in Table 12.24 include: <ul style="list-style-type: none"> • 1 (monopile); • 3 (tripod with pin-piles of the same diameter as the quadropod and therefore this will not be the worst-case scenario); • 4 (quadropod with pin-piles or tension leg floating platform with up to 4 anchors); and • 6 legged jacket – offshore electrical platforms and accommodation platforms only As 6 legged jackets are only being considered for offshore electrical platforms and accommodation

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
			platforms, we have no further comments. However, Natural England would support this caveat being conditioned in DCO /DML.
Schedules 9 and 10, Part 4, 5(2)	In relation to a meteorological mast, each foundation must not have a seabed footprint area (excluding scour protection) of greater than 314 m ²	As per Schedule 1, Part 3, 7(2)	Natural England notes that Table 5.18 provides a maximum total footprint of 628m ² Whilst it has been assumed that this figure is a combined figure for the two meteorological masts covered in this application, i.e.314m ² x 2, as the DCO / DML condition is referring to the footprint of a single meteorological mast and the Applicant is yet to determine which type of foundation is to be used the ES does not currently reflect the parameters set out in the DCO / DML.
Schedules 9 and 10, Part 4, 6(1)(a)	In relation to an accommodation platform, each foundation using piles must not have more than six driven piles	As per Schedule 1, Part 3, 9(1)(a)	Table 5.15 provides maximum parameters for offshore electrical platforms not accommodation platforms. Whilst it is assumed that accommodation platforms will have the same maximum parameters as offshore electrical platforms, following the response to Schedule 1, Part 3, 9(1)(b) below this should be confirmed by the Applicant and then this should be clearly stated in the ES and reflected in DCO / DML.
Schedules 9 and 10, Part 4, 6(1)(b)	In relation to an accommodation platform, each foundation using piles must not have a pile diameter which is more than three metres	As per Schedule 1, Part 3, 9(1)(b)	Natural England notes the acknowledgment from the Applicant that accommodation platforms would require a foundation structure similar to that of the offshore electrical platforms However, this should be clearly stated in the ES and reflected in DCO / DML.

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
Schedules 9 and 10, Part 4, 6(2)	In relation to an accommodation platform, each foundation must not have a seabed footprint area (excluding scour protection) of greater than 7,500 m ² .	As per Schedule 1, Part 3, 9(2)	Table 5.15 provides maximum parameters for offshore electrical platforms not accommodation platforms. Whilst it is assumed that accommodation platforms will have the same maximum parameters as offshore electrical platforms, following the response to Schedule 1, Part 3, 9(1)(b) above this should be confirmed by the Applicant and then this should be clearly stated in the ES and reflected in DCO / DML.
Schedules 9 and 10, Part 4, 7(1)	In relation to any LIDAR measurement buoys, each foundation using piles must not have a pile diameter of greater than 10 metres	As per Schedule 1, Part 3, 10(1)	As stated in Appendix 5 of Natural England's Relevant Representation [RR-106 the inclusion of a 10 meter pile for LiDAR buoys and meteorological masts seems significantly in excess of any realistic foundation type for these structures. Natural England questions why they are included.
Schedules 9 and 10, Part 4, 7(2)	In relation to any LIDAR measurement buoys, each foundation must not have a seabed footprint area (excluding scour protection) of greater than 157 m ²	As per Schedule 1, Part 3, 10(2)	Table 5.6 includes presents WCS for infrastructure seabed footprint. In this table a figure of 157m ² is presented for LiDAR for 2 x monopiles + scour protection. The description of parameter in DCO / DML as currently worded allows for 157m ² per foundation and therefore this should be amended to reflect the figures presented in the ES, i.e. 157m ² in total for both LiDAR measurement buoys.
Schedules 9 and 10, Part 4, 7(3)	In relation to any wave measurement buoys, each foundation must not have a seabed footprint area (excluding scour protection) of greater than 300 m ² .	As per Schedule 1, Part 3, 10(3)	Natural England welcome this change and notes that Applicant has amended some sections of the draft DCO submitted at Deadline 2 to reflect this. However, this is not consistent, for example P. 147, Part 4, 7(3) of the

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
			Draft Development Consent Order (tracked changes) (Document Reference: 3.1) submitted by the Applicant at Deadline 2 still refers to 300m ² .
Schedules 9 and 10, Part 4, 8(1)(b)	Taken together with works authorised and proposed to be constructed pursuant to licence 2 (generation) the total number of wind turbine generators forming part of the authorised scheme must not exceed 200	As per Schedule 1, Part 3, 3(1)	As above.
Schedules 9 and 10, Part 4, 8(1)(c)	Taken together with works authorised and proposed to be constructed pursuant to licence 2 (generation) the total number of accommodation platforms forming part of the authorised scheme must not exceed two	As per Schedule 1, Part 3, 3(3)	As above.
Schedules 9 and 10, Part 4, 8(1)(d)	Taken together with works authorised and proposed to be constructed pursuant to licence 2 (generation) the total number of meteorological masts forming part of the authorised scheme must not exceed two	As per Schedule 1, Part 3, 3(4)	As above.
Schedules 9 and 10, Part 4, 8(1)(e)	Taken together with works authorised and proposed to be constructed pursuant to licence 2 (generation) the total number of LIDAR measurement buoys forming part of the authorised scheme must not exceed two	As per Schedule 1, Part 3, 3(5)	As above.
Schedules 9 and 10, Part 4, 8(1)(f)	Taken together with works authorised and proposed to be constructed pursuant to licence 2 (generation) the total number of wave measurement buoys forming part of the authorised scheme must not exceed two	As per Schedule 1, Part 3, 3(5)	As above.

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
Schedules 9 and 10, Part 4, 8(1)(g)	Taken together with works authorised and proposed to be constructed pursuant to licence 2 (generation) the total amount of scour protection for the wind turbine generators, accommodation platform, meteorological masts and measurement buoys forming part of the authorised scheme must not exceed 53,195,398m ³	<p>The ES considers scour protection and foundation structures combined in order to provide a conservative and meaningful assessment (i.e. scour protection would never be installed in the absence of the foundation structure).</p> <p>The volume of scour protection included within the DCO represents the total area of foundations with scour protection minus the area of foundations excluding scour. The volume is based on a conservative assumption of 5m height of scour protection.</p> <p>The maximum volume of scour protection should be 53,095,398m³ for the generation assets. The draft DCO will be updated and submitted at Deadline 2.</p>	<p>Natural England notes that this figure has been amended in the draft DCO submitted by the Applicant at Deadline 2.</p> <p>However, the DCO and DMLs should further split maximum scour protection areas out for individual structures. A mass total is not appropriate to ensure scour protection is installed within the predicted maximums for each element of the project.</p>
Schedules 9 and 10, Part 4, 8(1)(h)	Taken together with works authorised and proposed to be constructed pursuant to licence 2 (generation) the total amount of inert material of natural origin disposed within the offshore Order limits as part of the authorised scheme must not exceed 39,732,566.37m ³	The total volume of sediment disposal has been assessed in the ES (e.g. ES Chapter 10 Benthic Ecology, Table 10.12). This includes 50,607,566m ³ disposal in the offshore wind farm sites and 600,000m ³ disposal in the offshore cable corridor, totalling 51,207,566m ³ . 39,732,566m ³ reflects the disposal volumes associated with the generation assets.	<p>Natural England notes that this figure has been corrected in the draft DCO submitted by the Applicant at Deadline 2.</p> <p>However, Natural England suggests that the disposal volumes should be split according to type of material, for example drill arisings, boulders, sand and mud. This is important because different materials have different impacts and those impacts have been assessed based on a maximums provided in the ES. Also the maximum volumes taken within the Haisborough, Hammond and Winterton SAC should be detailed separately to ensure the impacts to</p>

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
			the designated site remain within the impacts assessed. The wording should also limit the area of impact from removal of substances for disposal to the area assessed.
Schedules 11 and 12 (Transmission DMLs), Part 4: Conditions			
Schedules 11 and 12, Part 4, 1(1)	The dimensions of any offshore electrical platform forming part of the authorised scheme (excluding towers, helipads, masts and cranes) must not exceed 100 metres in height when measured from HAT, 120 metres in length and 80 metres in width.	As per Schedule 1, Part 3, 4(1)	Natural England notes that maximum height of 100m is listed in Table 5.3. However, this table does not include maximum length or width and therefore should be updated accordingly.
Schedules 11 and 12, Part 4, 1(2)(a)	In relation to an offshore electrical platform, each foundation using piles must not have more than six driven piles	As per Schedule 1, Part 3, 8(1)(a) A Change Report (document reference "Pre-ExA_Change Report_9.3") was submitted to the Planning Inspectorate on the 12th December 2018 which proposes an increase from six to 18 driven piles per offshore electrical platform and confirms that this change would have no implications on the conclusion of the ES. If the Change Report is accepted, this parameter will be updated in the draft DCO.	Natural England provided comment on the Change Report at Deadline 1 and has no further comments in this regard. Natural England notes that this amendment has been made in the draft DCO submitted by the Applicant at Deadline 2.
Schedules 11 and 12, Part 4, 1(2)(b)	In relation to an offshore electrical platform, each foundation using piles must not have a pile diameter which is more than three metres	As per Schedule 1, Part 3, 8(1)(b) A Change Report (document reference "Pre-ExA_Change Report_9.3") was submitted to the Planning Inspectorate on the 12th December 2018 which proposes an increase from 3m to 5m piles for the offshore electrical platform and confirms that this change would have no implications on the conclusion of	Natural England provided comment on the Change Report at Deadline 1 and has no further comments in this regard. Natural England notes that this amendment has been made in the draft DCO submitted by the Applicant at Deadline 2.

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
		the ES. If the Change Report is accepted, this parameter will be updated in the draft DCO.	
Schedules 11 and 12, Part 4, 1(2)(c)	In relation to an offshore electrical platform, each foundation must not have a seabed footprint area (excluding scour protection) of greater than 7,500 m2.	As per Schedule 1, Part 3, 9(2)	Natural England notes that maximum seabed footprint (excluding scour protection) for offshore electrical platform of 7500m2 is used in Table 5.15 and has no further comments.
Schedules 11 and 12, Part 4, 2	<p>The total length of the Work No.3 (interconnector link) cables and the volume of their cable protection must not exceed 150 kilometres and 38,000m3</p> <p>The total length of the Work No.4A and 4B (export cable) cables and the volume of their cable protection must not exceed 400 kilometres and 119,836m3</p>	<p>The maximum cable length parameters are outlined in Table 5.3 of Chapter 5 Project Description and used in the calculations of the worst case scenario in the relevant offshore ES Chapters.</p> <p>It should be noted that the Applicant has committed to the use of HVDC export cables which would be laid in pairs, therefore it is the total length of export cable trenches (i.e. 200km) rather than the total cable length (400km) that has been included in the relevant impact assessments. This is based on 4 cables laid in 2 trenches with an average length of 100km each.</p> <p>Cable protection parameters are given in Table 5.23 of Chapter 5 Project Description and assessed as either volumes or areas (depending on which is the most relevant to the receptor) in the relevant offshore ES chapters where relevant. It is acknowledged that there is a typing error in ES Chapter 5 paragraph 225 which includes an incorrect length of unburied export cable as identified in</p>	<p>Natural England notes that the figures stated correlate with figures for cable length and volume of cable protection provided in Table 5.3 and Table 5.23, however, as noted in our Relevant Representation [RR-106] cable protection permitted should be recorded and limited on the consents using both volume of material and area of impact.</p> <p>Natural England, is pleased to see that this has been included in draft DCO submitted by the Applicant at Deadline 2, however, would seek clarification as to why the ES includes a figure of 222,086m² for the export cable whereas a total figure of 122,086m² has been included in draft DCO.</p> <p>Please notes, Natural England strongly 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.</p>

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
		response to Q6.11. The correct parameters are provided in Table 5.23 of Chapter 5 Project Description and assessed in the relevant ES Chapters.	
Schedules 11 and 12, Part 4, 3(1)(a)	Taken together with works authorised and proposed to be constructed pursuant to licence 2 (transmission) the total number of offshore electrical platforms forming part of the authorised scheme must not exceed two	As per Schedule 1, Part 3, 3(2)	As above.
Schedules 11 and 12, Part 4, 3(1)(b)	Taken together with works authorised and proposed to be constructed pursuant to licence 2 (transmission) the total amount of scour protection for the offshore electrical platforms forming part of the authorised scheme must not exceed 100,000 m ³	This has been calculated using the following: <ul style="list-style-type: none"> • Maximum number of offshore electrical platforms (2): Table 5.3 of Chapter 5 Project Description; • Maximum depth of scour protection of 5m; and • Area of scour protection per platform using maximum area of scour protection (including foundation footprint) (17,500m²) minus foundation footprint (7,500m²): Table 5.15 of Chapter 5 Project Description. The maximum total infrastructure numbers are used in the calculations of worst case scenarios in ES Chapters 8 to 18 where relevant. 	Table 5.15 and Table 5.6 describes WCS of 35,000m ³ and therefore it is unclear why the DCO / DML allows for the total amount of scour protection for the offshore electrical platforms forming part of the authorised scheme up to 100,000 m ³ . The DCO / DML should be amended to reflect the lower amount presented in the ES.
Schedules 11 and 12, Part 4, 3(1)(c)	Taken together with works authorised and proposed to be constructed pursuant to licence 2 (transmission) the total amount of inert material of natural origin disposed within the offshore Order limits as part of the authorised scheme must not exceed 11,475,000 m ³ .	The total volume of sediment disposal has been assessed in the ES (e.g. ES Chapter 10 Benthic Ecology, Table 10.12). This includes 50,607,566m ³ disposal in the offshore wind farm sites and 600,000m ³ disposal in the offshore cable corridor, totalling 51,207,566m ³ . 11,475,000m ³ reflects the disposal volumes	Natural England notes that this figure has been corrected in the draft DCO submitted by the Applicant at Deadline 2. However, Natural England suggests that the disposal volumes should be split according to type of material, for example drill arisings, boulders, sand

Reference Draft DCO or Deemed Marine Licence (as submitted)	Description of parameter in draft DCO or Deemed Marine Licence (as submitted)	Reference to the Environmental Statement	Natural England Comments
		associated with the transmission assets.	and mud. This is important because different materials have different impacts and those impacts have been assessed based on a maximums provided in the ES. Also the maximum volumes taken within the Haisborough, Hammond and Winterton SAC should be detailed separately to ensure the impacts to the designated site remain within the impacts assessed. The wording should also limit the area of impact from removal of substances for disposal to the area assessed.



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 Appendix 23.1 – Integrity Matrices (Q23.31) [REP1-010] submitted at Deadline 1 and Appendix to the Comments on Responses to Written Questions Appendix 23.1 – Greater Wash SPA common scoter distribution and Norfolk Vanguard Offshore Windfarm [REP2-030].

14 February 2019

1. Introduction

- 1.1. The Applicant submitted an additional document: Appendix 23.1 Integrity Matrices (Q23.31) [REP1-010] at Deadline 1 and additional supporting document Appendix to the Comments on Responses to Written Questions Appendix 23.1 – Greater Wash SPA common scoter distribution map at Deadline 2 [REP2-030].
- 1.2. These documents were submitted in response to The Examining Authority's first written questions, question 23.31, to provide an update to the Norfolk Vanguard Habitats Regulations Assessment (HRA) Integrity Matrices, previously provided in The Applicant's Response to Section 51 Advice from The Planning Inspectorate [AS-006].
- 1.3. Natural England have provided detailed comments on the Applicant's Habitats Regulations Assessment (HRA) Integrity Matrices and assessment of adverse effect on integrity (AEol) within our Relevant Representations [RR-106], Written Representations [REP1-088] and Statement of Common Ground with the Applicant [REP1-049].
- 1.4. This document aims to summarise our advice in this regard and indicate where we agree and do not agree with the Applicant's assessment for those sites presented in Appendix 23.1 [REP1-010] only.

2. Comments on each assessment presented in Appendix 23.1

2.1. Alde-Ore Estuary SPA / Ramsar

- 2.1.1. Natural England **does not agree** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEoI can be ruled out for the feature lesser black-backed gull (*Larus fuscus*) primarily due to:
- a. Seasonal apportionment of impacts for HRA, primarily with regard to the breeding season;
 - b. Clarification is required as to the seasonal definitions used in the assessment of impacts to this colony;
 - c. Population modelling approaches used;
 - d. Collision risk modelling; and
 - e. In-combination / cumulative assessments.
- 2.1.2. Full details of our concerns have been provided in our Relevant Representations [RR-106], Written Representations [REP1-088], Statement of Common Ground with the Applicant [REP1-049] and Comments on Offshore Ornithological Aspects of Applicant's Response to Section 51 Advice from the Planning Inspectorate provided at Deadline 2.

2.2. Flamborough and Filey Coast SPA

- 2.2.1. Natural England **does not agree** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEoI can be ruled out for the features Black-legged kittiwake (*Rissa tridactyla*) and Northern gannet (*Morus bassanus*), primarily due to:
- a. Seasonal apportionment of impacts for HRA in both the non-breeding season for gannet and the breeding season for kittiwake;
 - b. Seasonal definitions used in the assessment of impacts to gannets from this colony;
 - c. Population modelling approaches used;
 - d. Collision risk modelling;
 - e. Assessment of displacement impacts for gannet; and
 - f. In-combination / cumulative assessments.
- 2.2.2. In addition Natural England **does not agree** with the Applicant's decision to screen out the features: common guillemot (*Uria aalge*); razorbill (*Alca torda*); and seabird assemblage, including Atlantic puffin (*Fratercula artica*).
- 2.2.3. Full details of our concerns have been provided in our Relevant Representations [RR-106], Written Representations [REP1-088], Statement of Common Ground with the Applicant [REP1-049] and Comments on Offshore Ornithological Aspects of

Applicant's Response to Section 51 Advice from the Planning Inspectorate provided at Deadline 2.

2.3. Greater Wash SPA

- 2.3.1. Natural England **does not agree** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEoI can be ruled out for the features red-throated diver (RTD) (*Gavia stellata*); and little gull (*Hydrocoloeus minutus*), this is primarily due to:
- a. Displacement and mortality figures used for assessing displacement effects for RTD's both alone and in-combination; and
 - b. Collision risk modelling for little gull.
- 2.3.2. In addition Natural England **does not agree** with the Applicant's decision to screen out the feature common scoter (*Melanitta nigra*).
- 2.3.3. Natural England notes the additional submission by the Applicant at Deadline 2 [REP2-030] providing common scoter distribution maps. However, as noted in our response to Examining Authority's 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, 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 (as well as RTD) feature of this site. The analysis of whether the cable corridor overlaps spatially with the distributions of this species should then be considered within the Appropriate Assessment.
- 2.3.4. Natural England **agrees** with the Applicant's decision to screen out the features: sandwich tern (*Sterna sandvicensis*), common tern (*Sterna hirundo*) and little tern (*Sternula albifrons*).
- 2.3.5. Full details of our concerns have been provided in our Relevant Representations [RR-106], Written Representations [REP1-088], Statement of Common Ground with the Applicant [REP1-049] and Comments on Offshore Ornithological Aspects of Applicant's Response to Section 51 Advice from the Planning Inspectorate provided at Deadline 2.

2.4. Haisborough, Hammond and Winterton SAC

- 2.4.1. Natural England **does not agree** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEoI can be ruled out for the features: sandbanks which are slightly covered by seawater all the time (Annex I sandbanks); and reefs primarily due to:
- a. The Applicant's use of data sets;
 - b. The over-reliance on the evidence presented;
 - c. Assessment of the impacts against the conservation objectives for the site;
 - d. The ability to effectively implement some of the proposed mitigation measures, i.e. microsite / route around *Sabellaria spinulosa* reef; and

- e. The Applicant's conclusion that establishment of reef on artificial substrate contributes to the favourable condition of the site.
- 2.4.2. Full details of our concerns have been provided in our Relevant Representations [RR-106], Written Representations [REP1-088] and Statement of Common Ground with the Applicant [REP1-049].
- 2.5. **Southern North Sea cSAC/SCI**
- 2.5.1. Natural England **agrees** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEol can be ruled out for the features harbour porpoise (*Phocoena phocoena*) **alone**.
- 2.5.2. Natural England **does not agree** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEol can be ruled out for the feature harbour porpoise (*Phocoena phocoena*) **in-combination**, primarily because of the lack of mechanism to control the number of piling events to ensure that thresholds are not exceeded.
- 2.5.3. Full details of our concerns have been provided in our Relevant Representations [RR-106], Written Representations [REP1-088] and Statement of Common Ground with the Applicant [REP1-049].
- 2.6. **Humber Estuary SAC**
- 2.6.1. Natural England **agrees** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEol can be ruled out for grey seal (*Halichoerus grypus*).
- 2.7. **The Wash and North Norfolk SAC**
- 2.7.1. Natural England **agrees** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEol can be ruled out for harbour seal (*Phoca vitulina*).
- 2.8. **River Wensum SAC**
- 2.8.1. Natural England **does not currently agree** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEol can be ruled out for the features: water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation and Desmoulin's whorl snail (*Vertigo moulinsiana*) **as insufficient evidence has been provided by the Applicant**. This includes:
- a. Works to facilitate the trenchless crossing of the River Wensum within the River Wensum floodplain north of Penny Spot Beck, should be avoided as it is part of a Countryside Stewardship agreement to improve the site integrity of the River Wensum SAC. We are content with the mitigation proposed if this location has to be used, i.e. works will take place outside of the winter period (October – February inclusive) (para 1166). However, restoration of this site should be undertaken sensitively: deep turf stripping and reinstatement is more appropriate than natural regeneration or reseedling;
 - b. Insufficient detail in the Code of Construction Practice (CoCP) for measures 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);

- c. None of the points regarding sediment management and decommissioning of sediment traps post construction are detailed in the current CoCP, therefore, further detail on the ongoing management of silt traps and screens and decommissioning/disposal of retained sediment is required; and
 - d. Further information is required on the hydrological properties of the cement bound sand and long term/permeant disruption to the hydrological regime.
- 2.8.2. Full details of our concerns have been provided in our Relevant Representations [RR-106], Written Representations [REP1-088] and Statement of Common Ground with the Applicant [REP1-049].
- 2.8.3. Natural England has been in consultation with the Applicant and are currently awaiting further information. Natural England will provide an update if this changes our advice once the additional information has been received and reviewed.

2.9. Paston Great Barn SAC

- 2.9.1. Natural England **does not currently agree** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEol can be ruled out for the feature Barbastelle bats (*Barbastella barbastellus*) **as insufficient evidence has been provided by the Applicant**. This includes:
- a. The availability of Barbestelle bat habitat within their range; and
 - b. The effects that loss of connectivity of habitat by hedgerow removal may have on Barbestelle bats.
- 2.9.2. Full details of our concerns have been provided in our Relevant Representations [RR-106], Written Representations [REP1-088] and Statement of Common Ground with the Applicant [REP1-049].
- 2.9.3. Natural England has been in consultation with the Applicant and are currently awaiting further information. Natural England will provide an update if this changes our advice once the additional information has been received and reviewed.

2.10. Norfolk Valley Fens SAC

- 2.10.1. Natural England **does not currently agree** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEol can be ruled out for the features: alkaline fens; alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*; calcareous fens *Cladium mariscus* and species of the *Caricion davallianae*; European dry heaths; *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils and Northern Atlantic wet heaths with *Erica tetralix* **as insufficient evidence has been provided by the Applicant**. This includes:
- a. Insufficient detail in the Code of Construction Practice (CoCP) for measures to safeguard the designated site in relation to sediment control and reinstatement of all work areas; and

- b. 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 is needed.
- 2.10.2. Full details of our concerns have been provided in our Relevant Representations [RR-106], Written Representations [REP1-088] and Statement of Common Ground with the Applicant [REP1-049].
- 2.10.3. Natural England has been in consultation with the Applicant and are currently awaiting further information. Natural England will provide an update if this changes our advice once the additional information has been received and reviewed.

2.11. The Broads SAC

- 2.11.1. Natural England **does not currently agree** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEol can be ruled out for the features: alkaline fens. (Calcium-rich springwater-fed fens); alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*). (Alder woodland on floodplains); calcareous fens with *Cladium mariscus* and species of the *Caricion davalliana*. (Calcium-rich fen dominated by great fen sedge (saw sedge); hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. (Calcium-rich nutrient-poor lakes, lochs and pools); *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (Purple moor-grass meadows); natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation. (Naturally nutrient-rich lakes or lochs which are often dominated by pondweed); transition mires and quaking bogs. (Very wet mires often identified by an unstable 'quaking' surface; Desmoulin's whorl snail (*Vertigo moulinsiana*); little whirlpool ram's-horn snail (*Anisus vorticulus*); and fen orchid (*Liparis loeselii*) **as insufficient evidence has been provided by the Applicant**. This includes:
- a. Insufficient detail in the Code of Construction Practice (CoCP) for measures to safeguard the designated site in relation to sediment control and reinstatement of all work areas.
- 2.11.2. Full details of our concerns have been provided in our Relevant Representations [RR-106], Written Representations [REP1-088] and Statement of Common Ground with the Applicant [REP1-049].
- 2.11.3. Natural England has been in consultation with the Applicant and are currently awaiting further information. Natural England will provide an update if this changes our advice once the additional information has been received and reviewed.
- 2.11.4. Natural England **agrees** with the conclusions presented in the integrity matrices and the Applicant's assessment that AEol can be ruled out for Otter (*Lutra lutra*).



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 changes made to draft
Development Consent Order and Explanatory Memorandum as
submitted by the Applicant at Deadline 2 [REP2-017, REP2-018,
REP2-019, REP2-020 and REP2-021].**

14 February 2019

Norfolk Vanguard Offshore Wind Farm – Comments on changes made to draft Development Consent Order and Explanatory Memorandum as submitted by the Applicant at Deadline 2 [REP2-017, REP2-018, REP2-019, REP2-020 and REP2-021].

Following submission of revised draft Development Consent Order and Explanatory Memorandum by the Applicant at Deadline 2 [REP2-017, REP2-018, REP2-019, REP2-020 and REP2-021] 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

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 comments

Table 1: Natural England Comments on changes made to draft Development Consent Order and Explanatory Memorandum as submitted by the Applicant at Deadline 2 [REP2-017, REP2-018, REP2-019, REP2-020 and REP2-021].

Ref	DCO Ref.	Consultee / Stakeholder	Comments from stakeholder (rationale for the change)	Change made by the Applicant	Natural England Comments
1.	Schedule 6	PINS (s51)	The following plots identified in the Land Plans, sheets 40 – 42 (Doc 2.02); 40/13, 40/15, 40/17, 40/18, 40/19, 40/21, 40/22, 40/24, 40/25, 40/29, 40/30, 41/02, 41/04, 41/06, 41/19, 41/20, 41/21, 41/26, 41/29, 41/31, 41/34, 41/35, 41/36, 41/37, 41/38 and 42/01) are also listed on page 24 of the Explanatory Memorandum (doc 3.2) as ‘freehold plots’. Aside from plot 41/26 which is identified as being required for Work No. 10b, none of these plots appear in the draft DCO in relation to a work number. Please can the Applicant provide clarification on this?	The Applicant responded to this question in the Response to Section 51 Advice (document reference: PB4476-008-001). Schedule 6 of the draft DCO has been updated to remove Plot 41/26 as this was included in Schedule 6 in error.	No comments.

Ref	DCO Ref.	Consultee / Stakeholder	Comments from stakeholder (rationale for the change)	Change made by the Applicant	Natural England Comments
2.	Schedule 3	PINS (s51)	Schedule 3 of the draft DCO does not identify the corresponding sheet (there are 42) that illustrates the location of the stopped up PRow, it just refers to 'the public rights of way to be temporarily stopped up plan'	Sheet numbers have been added to Schedule 3 of the draft DCO to account for this.	No comments.
3.	Schedule 3	PINS (s51)	Schedule 3 of the draft DCO identifies that all bridleways and long distance trails, subject to be temporarily stopped up, are shown in orange on the corresponding plan. However on the plans they are shown in either green or brown.	Schedule 3 of the draft DCO has been amended in accordance with the Response to Section 51 Advice (document reference: PB4476-008-001).	No comments.
4.	Schedule 3	PINS (s51)	There appears to be a discrepancy between information on Sheet 22 of 42 of the PRow plan (Doc 2.6) and what appears in Schedule 3 of the draft DCO with regard to the stopping up points on footpath 24 - Reephams FP8.	There are two listings for footpath 24 in Schedule 3 of the draft DCO. The first description of footpath 24 is incorrect and has been amended in Schedule 3 to read 'AX & AU' instead of 'AU to AV'. The second description of footpath 24 has been relabelled 24a and has been amended in Schedule 3 of the draft DCO to read 'approximately 6m' instead of 'approximately 50m', and 'AV & AW' instead of 'AW to AX'.	No comments.
5.	Schedule 4	PINS (s51)	Sheet 20 of 42 of the plan showing streets to be temporarily stopped up (Doc 2.07) illustrates the stopping up of an unidentified private road 59.52m in length between '20a and 20b'. However, Schedule 4 of the draft DCO	Schedule 4 of the draft DCO has been amended to refer to 'Approximately 60 meters of Private track as is within Work No.6 as shown on sheet 21a and 21b on sheet 21 of the streets to be	No comments.

Ref	DCO Ref.	Consultee / Stakeholder	Comments from stakeholder (rationale for the change)	Change made by the Applicant	Natural England Comments
			does not have a listing for this description.	stopped up plan' within the District of Broadland.	
6.	Schedule 2 & 4	PINS (s51)	There is a duplicate listing for the stopping up of Oulton Street for approximately 70m between "20a and 20b", which is not illustrated on sheet 20 of 42 of the plan (Doc 2.07).	Schedules 2 & 4 of the draft DCO have been updated to remove the duplicate entry of 'approximately 70m of Oulton Street between points 20a and 20a' from Schedule 2 & 4 of the draft DCO.	No comments.
7.	Schedule 4	PINS (s51)	Schedule 4 of the draft DCO lists the stopping up of 'Dereham Road' on page 71 as being between "31c and 31c". However, on the corresponding plan, sheet 31 of 42, (Doc 2.07) the stopping up is illustrated as being between '31c and 31d'.	Schedule 4 of the draft DCO has been amended to read as shown between ' points 31c and 31d' instead of '31c and 31c'.	No comments.
8.	Schedule 4	PINS (s51)	Schedule 4 of the DCO also lists an additional stopping up for 'Dereham Road' between "31d and 31d" which is not illustrated on the corresponding plan.	Schedule 4 of the DCO has been updated to delete duplicate listing of 'Dereham Road' between '31d and 31d' from Schedule 4 of the draft DCO.	No comments.
9.	Schedule 4	PINS (s51)	Schedule 4 of the draft DCO lists the stopping up of 'Dereham Road' as being between "37d and 37e". However, on the corresponding plan – sheet 37 of 42 (Doc 2.7) it is illustrated as being between '37g and 37d'.	Schedule 4 of the draft DCO has been amended to state as shown on ' points 37c to 37d' for Dereham Road.	No comments.
10.	Schedule 4	PINS (s51)	Schedule 4 of the draft DCO lists the stopping up of 'Dale Road' as being between "37f and 37g". On the corresponding plan - sheet 37 of 42	Schedule 4 of the draft DCO has been amended to state between ' points 37e and 37f' instead of '37f and 37g'.	No comments.

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			(Doc 2.07) it is illustrated as being between '37e and 37f'.		
11.	Schedule 4	PINS (s51)	Sheet 41 of 42 of the Plan (Doc 2.07) illustrates three areas of the A47 that are to be stopped up. The third, an area 124.33m long between '41q and 41r' appears to be not listed in Schedule 4 of the DCO.	A new entry to Schedule 4 of the draft DCO has been added to reflect this as follows: 'Approximately 125 meters of the A47 (located within National Grid overhead line temporary works area and overhead line modification corridor (Work No 11 and Work No 11A) between point 41q and 41r as shown on sheet 41 of the streets to be stopped up plan.'	No comments.
12.	Schedules 2, 4, 5, 13	PINS and Landowners	As part of updates from the PINS Section 51 Advice and the Change Report (document reference: Pre-ExA; Change Report; 9.3) the Applicant has updated the associated DCO schedules (Schedule 2 (Streets subject to Street Works), Schedule 4 (Streets to be Stopped Up), Schedule 5 (Access to Works) and Schedule 13 (Hedgerows)).	The schedules have been updated. Where the entry is no longer required the Applicant has inserted " NOT USED " in the schedule to the draft DCO. This is to avoid any confusion around the reference points on the plans now not being sequentially numbered.	No comments.
13.	Article 35 and Schedule 13	N/A	As part of ongoing review the Applicant has noticed that some of the hedgerows on the Important Hedgerows Plan (document reference 2.11) and Schedule 13 of the dDCO were incorrectly marked as 'important hedgerows' and should, instead, have been classed as potentially important hedgerows given that the assessments for these hedgerows will take place prior to commencement of	Article 35 and Schedule 13 of the draft DCO has been updated to include 3 categories of hedgerow: (1) potentially important hedgerows; (2) important hedgerows; and (3) hedgerows.	Due to the quantity of documents and the limited time between upload of documents to PINS website and Deadline 3 Natural England has not had the opportunity to review the Important Hedgerow Plans document. Natural England will therefore provide comment on this submission at Deadline 4.

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			development. It is therefore not yet clear whether these hedgerows will be "important hedgerows".		
14.	Schedule 1, Part 1	MMO & NE	MMO relevant representation comment 1.11; NE relevant representation, Appendix 5, comment 6.	This figure has been updated to include the total offshore disposal volume ('51,207,566m ³ '), which combines the transmission and generation DML values.	Natural England welcomes this amendment. However, we would suggest that the disposal volumes should be split according to type of material, for example drill arisings, boulders, sand and mud. This is important because different materials have different impacts and those impacts have been assessed based on a maximums provided in the ES. Also the maximum volumes taken within the Haisborough, Hammond and Winterton SAC should be detailed separately to ensure the impacts to the designated site remain within the impacts assessed. The wording should also limit the area of impact from removal of substances for disposal to the area assessed.
15.	Schedule 1, Part 1 & Schedules 9-12 Part 3 1(f)	MMO & NE	MMO RR comment 1.11 NE RR, Appendix 5, comment 6	The DCO has been updated to include a total volume for drill arisings as follows: Generation (Schedules 9-10) DML Total: 400,624m ³ Transmission (Schedules 11-12) DML Total: 14,137m ³ DCO Schedule 1 Total: 414,761m ³	Natural England welcomes this amendment and assume that the increase in volume when compared with that provided in original application is because this figure includes the revised figure proposed as part of the Change Report. However, would seek clarification as to why a

Ref	DCO Ref.	Consultee / Stakeholder	Comments from stakeholder (rationale for the change)	Change made by the Applicant	Natural England Comments
					total of 414,762m ³ was included in the Change Report but a value of 414,761m ³ is listed in the draft DCO /DML.
16.	Schedule 9 and 10 Part 4 condition 14(c)(iii)	N/A	The wording relates to the Haisborough, Hammond and Winterton Special Area of Conservation (HH&W SAC); only the transmission cables go through this area and so the wording is not required in the Generation DMLs.	The draft DCO has been updated to remove the HH&W SAC text in relation to the Construction Method Statement in the Generation DMLs (Schedules 9 and 10): <i>'cable (including fibre optic cable) installation, in particular, proposals for the Haisborough, Hammond and Winterton Special Area of Conservation;'</i>	No comments.
17.	Schedule 11 and 12 Part 4 condition 9(c)(iv) and 9(1)(g)(ii)	N/A	The wording has been amended to incorporate the previous text from Schedule 9 and 10 in relation to the Haisborough, Hammond and Winterton Special Area of Conservation (entry 14. above). The Applicant considers that the revised wording is better placed beneath the Cable Specification, Installation and Monitoring Plan (hence its removal from the Construction Method Statement condition).	The following text has been inserted into the Condition on the Cable Specification, Installation and Monitoring Plan in Schedule 11 and 12, Part 4, 9(1)(g): <i>'(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 laying techniques, including cable landfall and cable protection measures and, in particular, proposals for the Haisborough, Hammond and Winterton Special Area of Conservation;'</i>	Natural England would support this amendment. However, our concerns in relation to cable protection is still under discussion and these amendments will not allay our concerns
18.	Schedule 9 and 10 Part 4 condition 14(1)(n); Schedule 11 and 12 Part 4 condition 9(1)(m).	MMO (RR)	The MMO recommends that a condition is included to restrict the maximum hammer energy to the worst case scenario (5,000kJ) assessed in the ES. The MMO recommends the following condition wording: <i>In the</i>	The draft DCO has been updated to include this wording within the DMLs.	Natural England would support this amendment. Natural England note that this amendment has also been

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			<i>event that driven or part-driven pile foundations are proposed to be used, the hammer energy used to drive or part-drive the pile foundations must not exceed 5,000kJ.</i>		made to the Explanatory Memorandum.
19.	Schedules 9 and 10 Part 4, Condition 12(4) Schedules 11 and 12 Part 4, Condition 7(4)	MMO (RR)	It is problematic to provide a disposal return by 31 January for a period August to January inclusive. The deadline should be amended to the 15th of the month following the disposal period. Please see the correct wording below: <i>The undertaker must inform the MMO of the location and quantities of material disposed of each month under this licence. This information must be submitted to the MMO by 15 February each year for the months August to January inclusive, and by 15 August each year for the months February to July inclusive.</i>	The draft DCO has been updated to include this wording within the DMLs.	Natural England would support this amendment.
20.	Schedule 1, Part 3, Requirement 2(b) Schedules 9 and 10, Part 4, Condition2(1)(b)	MMO & NE (RRs)	As a result of continuing engagement with the MMO and Natural England and as highlighted through relevant representations.	The maximum height of a wind turbine generator to the centreline of the generator shaft (when measured from HAT) has been revised in the draft DCO from 200m to 198.5m, in accordance with the parameter assessed in the ES.	Natural England welcomes this change and note that the Applicant has amended some sections of the draft DCO submitted at Deadline 2 to reflect this. However, this is not consistent, for example P. 146, Part 4 1(1)(b) of the Draft Development Consent Order (tracked changes) (Document Reference: 3.1) submitted by the Applicant at Deadline 2 still refers to a figure of 200m.

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					Natural England note that this amendment has also been made to the Explanatory Memorandum.
21.	Schedule 1, Part 3, Requirement 5; Schedule 9 & 10, Part 4, condition 3; and Schedule 11 & 12, Part 4, condition 2.	MMO (RR)	With regard to cable protection, the area of impact should be stated within the draft DCO/DML as well as the volume. At present this section only refers to the volumes. This also applies for scour protection.	The draft DCO has been updated to include the total area (in m2) of cable protection.	<p>Natural England, is pleased to see that this has been included in draft DCO submitted by the Applicant at Deadline 2, however, would seek clarification as to why the ES includes a figure of 222,086m² for the export cable whereas a total figure of 122,086m² has been included in draft DCO.</p> <p>Natural England note that this amendment has also been made to the Explanatory Memorandum.</p> <p>Please note, Natural England strongly 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.</p>
22.	Schedule 1, Part 3, 11; Schedule 9 & 10, Part 4, 8(1)(g);	MMO (RR)	With regard to cable protection, the area of impact should be stated within the DCO/DML as well as the volume. At present this section only refers to	The draft DCO has been updated to include the total area (in m2) of scour protection.	Natural England welcomes the amendment to the draft DCO, to include total area and volume of scour protection.

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	and Schedule 11 & 12, Part 4, 3(1)(b).		the volumes. This also applies for scour protection.		<p>Natural England note that this amendment has also been made to the Explanatory Memorandum.</p> <p>However, the DCO and DMLs should further split maximum scour protection areas out for individual structures. A mass total is not appropriate to ensure scour protection is installed within the predicted maximums for each element of the project.</p> <p>In addition Natural England note that whilst a figure of 53,095,038m³ is included in the updated draft DCO a figure of 53,195,398m³ is included in the Explanatory Memorandum. This difference should be clarified by the Applicant.</p>
23.	Schedule 9 & 10, Part 4, condition 8; and Schedule 11 & 12, Part 4, condition 3.	N/A	Linked to the updates to scour protection and cable protection areas (in m2) as well as the area (in m2) for drill arisings, the Applicant has updated the DMLs to include these maximum figures. The figure is the same for both Generation DMLs (Schedule 9-10), and a separate figure is also included and replicated across both Transmission DMLs (Schedule 11- 12). However, the Applicant has included these maximum parameters	The draft DCO has been updated accordingly.	See detailed comments above.

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			within the list of figures that must be read together with the other licence for that respective class of asset. This is to make clear that the other licence does not have a new maximum parameter (i.e. the amount will have been reduced by the other phase for that class of asset).		
24.	Schedule 1, Part 3, 8(2); Schedule 11-12, Part 4 1(2)(c)	N/A	As a result of continuing updates to the draft DCO the Applicant has noticed that the maximum parameter for the foundations connected to the offshore electrical platform is incorrectly stated compared to the maximum parameter assessed in the ES.	The maximum combined parameter for the foundations connected to the offshore electrical platform(s) has been updated from referring to a maximum for each foundation to a maximum for the overall offshore electrical platform(s) as follows: " <i>In relation to an the offshore electrical platform(s), each the foundations must not have a combined seabed footprint area (excluding scour protection) of greater than 15,000 7,500 m2.</i> "	No comments.
25.	Schedule 15, 2.4	ExA Written Questions (WQs) 20.111	There appears to be a typographical error in the wording "is not thereafter be entitled". Please clarify.	The wording has been amended to read as follows: "...(4) If the discharging authority does not give such notification as specified in subparagraph (2) or (3) it is deemed to have sufficient information to consider the application and is not thereafter be entitled to request further information without the prior agreement of the undertaker."	No comments.
26.	Article 2, Interpretation; Part 1 Interpretation'	ExA WQs 20.116		A definition has been included which reads as follows: "'scour protection" means measures to prevent loss of	No comments.

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	section of each of the DMLs (Schedules 9-12).		Please explain why a definition of 'scour protection' has not been provided within the 'Part 1 Interpretation' section of each of the DMLs?	<i>seabed sediment around any marine structure placed in or on the seabed by use of protective aprons, mattresses with or without frond devices, or rock and gravel placement".</i>	
27.	Article 2, Interpretation	ExA WQs 20.7	There appears to be no definition of "onshore transmission works". Please comment. Is it intended that they comprise those onshore transmission works identified in Works Nos 5, 6, 7, 7A, 7B, 7C, and 7D?	Article 2 of the draft DCO defines "transmission works" as "Work Nos. 4C to 12 and any related further associated development in connection with those works. In the interests of clarity, the definition (and relevant cross-reference) in the draft DCO has been changed to " <i>onshore transmission works</i> ".	No comments.
28.	Article 2, Interpretation	ExA WQs 20.8	In the Interpretations section (p7) there is a different definition of 'maintain' than in the Model Order. Explain and justify the different text.	The Applicant responded to this question to explain the approach and the Applicant has also updated the definition in the draft DCO which now reads in the Order, as follows: " <i>maintain</i> " includes inspect, upkeep, repair, adjust, and alter and further includes remove, reconstruct and replace (but only in relation to any of the ancillary works in Part 2 of Schedule 1 (ancillary works), any cable, any component part of any wind turbine generator, offshore electrical substation, accommodation platform, meteorological mast, and the onshore transmission works described in Part 1 of Schedule 1 (authorised development) not including the removal, reconstruction or replacement of foundations and buildings	No comments.

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				<i>associated with the onshore project substation), to the extent assessed in the environmental statement; and "maintenance" is construed accordingly." in the DMLs, as follows: "maintain" includes inspect, upkeep, repair, adjust, and alter and further includes remove, reconstruct and replace (but only in relation to any of the ancillary works in Part 2 of Schedule 1 (ancillary works), any cable, and any component part of any wind turbine generator, offshore electrical substation, accommodation platform or meteorological mast described in Part 1 of Schedule 1 (authorised development) not including the alteration, removal or replacement of foundations), to the extent assessed in the environmental statement; and "maintenance" is construed accordingly;" This drafting is explained further in the Explanatory Memorandum (document 3.2 (version 2)) submitted at Deadline 2.</i>	
29.	Article 7 (2)	ExA WQs 20.15	Article 7(2) refers to the temporary use of land for carrying out the authorised project and for maintaining the authorised project: should the articles referred to read, respectively, Article 26 and Article 27?	Article 7(2) of the draft DCO has been updated to refer to 'Article 26' and 'Article 27' respectively.	No comments.
30.	Articles 11(2) and 11(5)	ExA WQs 20.18	Are Articles 11(2) and 11(5) effective to secure that sufficient notice will be given and consultation will take place	The references in Article 11(2) and 11(5) have been amended from	No comments.

Ref	DCO Ref.	Consultee / Stakeholder	Comments from stakeholder (rationale for the change)	Change made by the Applicant	Natural England Comments
			with the relevant street works authority of any area proposed to be used as a mobilisation area not already identified within the Order? In relation to all mobilisation areas, please explain how the order would ensure that adequate details of the plant and equipment proposed to be installed in that location and the activities undertaken and duration of use would be controlled.	'mobilisation area' to 'temporary working site'	
31.	Article 29(a)	ExA WQs 20.31	Should Article 29(a) read "limits of the land" instead of "limits to the land"?	The draft DCO has been amended to state "limits to of the land".	No comments.
32.	Schedule 1, Part 1 (Work No.5)	ExA WQs 20.38	Please clarify the discrepancy in the number of ducts stated between Work No.5 and the other onshore transmission works	Updated to refer to: " two four additional cable ducts for the Norfolk Boreas offshore wind farm..."	No comments.
33.	Schedule 1, Part 3, 20(1)	Environment Agency RR WQs 20.50	Please comment on how the CoCP should be structured and managed and whether Requirement 20 should provide that, for each phase a CoCP and associated pollution control plans are submitted to and approved by the Environment Agency prior to works on that phase commencing?	The wording within the Code of Construction Practice requirement (20) in the draft DCO has been updated as follows: ' (1) No stage of the onshore transmission works may commence until for that stage a code of construction practice has been submitted to and approved by the relevant local planning authority, in consultation with the Environment Agency. '	Natural England would defer to Environment Agency in this regard. However, Natural England note that this amendment has also been made to the Explanatory Memorandum.
34.	Article 2, Interpretations	National Grid	As a result of changes to the overhead line search area and connected to the	The definition of overhead line modification has been changed as follows: " " overhead line modification " means alteration and repositioning of	No comments.

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			changes to the National Grid overhead line search area in the Change Report	<i>the overhead line, including removal of part of the overhead line, and replacement of existing structures and installation of new structures in respect of the existing Walpole to Norwich Main 400kV overhead line between pylons 4VV123 and 4VV127 on land south east of Necton, Norfolk to allow connection into the National Grid substation extension including connecting into the National Grid sealing end compound; "</i>	
35.	Article 4	National Grid & WQs 20.11	National Grid require lateral limits of deviation for overhead lines	Article 4 has been amended to read as follows: " 4.—(1) <i>In carrying out the overhead line modification replacement of circuits as part of Work No. 11 and Work No.11A for which it is granted development consent by article 3(1) (development consent etc. granted by the Order) the undertaker may— (a) deviate vertically from the levels of the existing 400kV overhead line from Walpole to Norwich Main to be modified as part of Work No.11A— (i) to any extent not exceeding 4 metres upwards; or (ii) to any extent downwards as may be found to be necessary or convenient. (b) deviate laterally from the lines or situations of the existing 400kV overhead line from Walpole to Norwich Main to be modified as part of Work No.11A - (i) to any extent not exceeding 25 metres either side of the existing overhead line as shown by the limits of deviation</i>	No comments.

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				<i>relating to that work on the works plan.</i> "	
36.	Article 6	National Grid	National Grid require comfort that any assignee that takes the benefit of the order must have financial covenant strength and have requested that the Secretary of State consults with them prior to transfer of the benefit of any of the onshore infrastructure	Article 6(5) has been updated to include the following new sub-paragraph: " <i>(5) The Secretary of State must consult National Grid before giving consent to the transfer or grant to a person of any or all of the benefit of the provisions of this Order (excluding the deemed marine licences referred to in paragraph (2) above).</i> "	No comments.
37.	Article 28	National Grid	Previously, Article 28 provided that, if the Applicant took possession of land under temporary powers and removed redundant apparatus owned by National Grid, the private rights and restrictive covenants supporting that apparatus would be automatically extinguished, unless the Applicant served a notice before vacating the land stating otherwise. The Article also excluded the Applicant's liability to remove foundations from the land below 1.5m in depth. The purpose of the changes to Article 28 is to make the extinguishment of any private rights and restrictive covenants supporting apparatus that is removed from the land dependent on a positive exercise of a power – namely, serving notice in agreement with National Grid that such rights will be extinguished before giving up possession of the land. In addition, the provision for	Article 28 of has been updated to read as follows: " <i>28.—(1) This article applies to any Order land specified in Article 286(1)(a)(i) and any other Order land of which the undertaker takes temporary possession under article 26 (Temporary use of land for carrying out the authorised project). (2) Subject to paragraph (3), all private rights or restrictive covenants in relation to apparatus belonging to National Grid removed from any land to which this article applies are extinguished will remain intact from the date on which the undertaker gives up temporary possession of that land, . . . under article 28(3). (3) The extinguishment of rights by paragraph (2) does not give rise to any cause of action relating to the presence on or in the land of any foundations (save for those which lie less than 1.5 metres underground) and the undertaker is not required to</i>	No comments.

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			liability in respect of foundations within 1.5m in depth has been amended, so that there is no liability or requirement to remove any foundations, whether within 1.5m of the surface of the land or otherwise.	<i>remove foundations when giving up temporary possession). (2) Paragraphs (21) to (3) have effect subject except that to (4) — (3) any If the undertaker, in notice agreement between with National Grid, given by and the gives notice undertaker before the date that the undertaker gives up temporary possession of the land that any or the undertaker may extinguish all of the private rights or restrictive covenants in relation to apparatus belonging to National Grid removed from the land to which this article applies will be extinguished, such rights will be extinguished any or all of those paragraphs do not apply to any right specified in the notice.; or (4) Any extinguishment of rights by paragraph (3) does not give rise to any cause of action relating to the presence on or in the land of any foundations and the undertaker is not required to remove foundations when giving up temporary possession). "</i>	
38.	Schedule 1 (Work No. 11 and Work No. 11A)	National Grid	As a result of continuing engagement and liaison with National Grid, the Applicant has updated the works descriptions to more clearly distinguish the pylon works (Work No. 11) and the overhead line modification works (Work No. 11A) – as reflected on the revised Works Plans (document reference 2.4).	Work No.11 has been updated as follows: " <i>Work No. 11 – the overhead line modification including the removal of one existing pylon and construction of two new permanent pylons, as shown marked by (W) and (E) on the works plans, and the installation of conductors, insulators and fittings on to the pylons; "</i> And a Work No. 11A has	No comments.

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				been introduced as follows: " <i>Work No. 11A – the overhead line modification</i> "	
39.	Schedule 1 (Associated Development)	ExA WQ 20.11	Please provide a definition of "circuit" in Article (1) and include it within the dDCO.	The Applicant (as per the response to the Examining Authority's Written Questions (ExA; WQ; 10.D1.3) has amended Schedule 1, Part 1, to describe the works which can be carried out in connection with Work No. 11 as follows: " <i>... (b) the temporary diversion of the overhead line circuits onto the temporary pylons.</i> "	No comments
40.	Schedule 1, Requirement 8(1)(a)(b) Schedule 11 & 12, Part 4, 1(2).	N/A	Change Report and parameters – updates from six to twelve driven piles per offshore electrical platform; and updates from three to five metres for pile diameters in the case of two or more pile structures. This change is also explained in The Applicant's Responses to First Written Questions Appendix 6.1 - Relationship Between Design Parameters in Draft Development Consent Order and Environmental Statement (ExA; WQApp6.1; 10.D1.3).	These parameters have been updated in the draft DCO.	No comments.
41.	Schedule 1, Part 1 (Work No. 7A – 7D) Part 2, Requirement 15.	Various Landowners	Change Report – as a result of discussions with landowners, a single route has been chosen in relation to the previous Work No. 7A – Work No. 7D. Accordingly, the route bifurcation (as previously described by Work No.7A – 7D) is no longer relevant.	Work No.7A – Work No.7D has been deleted. Requirement 15 has been updated as follows: " <i>... (3) The written scheme referred to in sub-paragraph 2 must include notification of whether the undertaker will proceed with Work No. 7A or Work No. 7B.(4) The written scheme referred to in subparagraph 2</i> "	No comments.

Ref	DCO Ref.	Consultee / Stakeholder	Comments from stakeholder (rationale for the change)	Change made by the Applicant	Natural England Comments
				<i>must include notification of whether the undertaker will proceed with Work No. 7C or Work No. 7D. (5)(3) The written scheme must be implemented as approved notified under paragraph 2. "</i>	
42.	Schedule 14 (paragraph 7(2))	MMO (RR)	The arbitration schedule describes a private process requiring the agreement that all discussions and documentation will be confidential and not disclosed to third parties without written consent. The MMO would like to highlight that the regulatory decisions should be publically available and open to scrutiny. In many cases, members of the public and Non- Governmental Organisations may make representations in relation to post- consent matters. Ordinarily, their views would be considered by the MMO and would be able to follow and challenge the decision making. A private arbitration to resolve post consent disputes would reduce transparency and accountability.	The Applicant has amended the confidentiality provisions at paragraph 7(2) of Schedule 14 to make it expressly clear that a party can disclose information in accordance with an obligation required by legislation, as follows: "(2) The parties and Arbitrator agree that any matters, materials, documents, awards, expert reports and the like are confidential and must not be disclosed to any third party without prior written consent of the other party, save for any application to the Courts <i>and/or save for compliance with legislative rules, functions or obligations on either party.</i> "	With regard to the arbitration provision in the DCO, arbitration conditions in the DML and the arbitration rules schedule, Natural England does not believe the provision made for arbitration within this DCO is appropriate. As an SNCB appointed by the government through the NERC Act, Natural England cannot be bound by the findings of another organisation or individual such as is proposed within this provision. It is Natural England's responsibility to ensure that the natural environment is conserved, enhanced and managed. Within this role it is Natural England's duty to provide regulatory bodies with advice on plans or proposals with regard to their impact and nature conservation. Natural England is, therefore, unable to agree to a mechanism whereby its advice may be compromised or its ability to meet its

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					<p>responsibilities fettered by a third party.</p> <p>It is also noted that, within this provision, an award of costs may be made against Natural England. While it is acknowledged that the wording used is reasonably standard for arbitration agreements, Natural England considers that it is inappropriate for a Statutory Body to be subject to additional outside costs while performing the function government and legislation requires of it.</p> <p>In relation to the confidentiality clause of the arbitration schedule: Natural England is subject to the requirements of the Code of Practice on Access to Government Information ("Code"), Freedom of Information Act 2000 ("FOIA") and the Environmental Information Regulations 2004 ("EIR"). Therefore Natural England may be obliged to release documents in response to an FOIA or EIR request including any file notes. In respect of any FOIA or EIR request, Natural England is responsible for determining at its absolute discretion whether any information it holds, whether</p>

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					commercially sensitive information or otherwise, is exempt from disclosure in accordance with the provisions of the Code, FOIA or the EIR or is to be disclosed in response to a request for information. Natural England cannot therefore guarantee confidentiality or agree to be bound by such a requirement.
43.	Schedule 6	Landowners	Change Report - the Applicant has made a number of minor amendments to the plots in Schedule 6 to reflect the updated land plans (in particular, those changes reflecting the removal of plots that represented different options within the cable route where a single route has now been selected along Work No 7). A small number of plots have also been added to correct their unintentional omission in the application draft DCO.	The plots in Schedule 6 of the draft DCO have been amended accordingly.	No comments.
44.	Schedule 6	National Grid	The wording comprising a new right, with associated restrictive covenant, at the end of Schedule 6 (named "Overhead line alterations") has been inserted at the request of National Grid. This wording closely follows National Grid's own standard wording for overhead line easements and will assist National Grid in maintaining consistent property interests across its apparatus in the area.	A new row titled "overhead line alterations" has been added to Schedule 6 of the draft DCO.	No comments.

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45.	Schedule 8	Landowners	The Applicant has made a number of minor amendments to the plots in Schedule 8 to reflect the updated land plans (in particular, those changes reflecting the removal of plots that represented different options within the cable route where a single route has now been selected along Work No 7). A small number of plots have also been added to correct their unintentional omission in the application draft DCO.	The plots in Schedule 8 of the draft DCO have been amended accordingly.	No comments.
46.	Article 2; Article 37; Schedules 9-10 (Condition 14(1)(d)) and Schedules 11-12 (Condition 9(1)(d)).	MMO and fisheries stakeholders	As a result of continued liaison and consultation with the MMO and fisheries stakeholders, the Applicant has produced an outline Fisheries Liaison and Co-Existence plan.	The Applicant has included this as an outline plan to be certified by the Secretary of State under Article 37. The plan is also referenced in the Interpretation section and is included beneath the Project Environmental Management Plan condition in the DMLs.	Natural England would defer to MMO and Eastern IFCA in this regard.
47.	Article 2 Schedule 1 (Work No.1 (a)), Part 3, Requirement 6(2); Schedule 9-10, Part 1, paragraph 1 and Part 4, condition 4(2).	N/A	Following the submission of the ES in June 2018, the design options for this Project have been further refined and the Applicant has advanced its foundations procurement process. Following this process, floating foundations have now been removed from the Project Design Envelope.	The Applicant has removed reference to floating foundation (and its associated parameters) in the draft DCO, together with the definition of "pin pile anchor point" "gravity anchor point" and "tension leg" as this was only required in the event that floating foundations were used.	No comments.
48.	Article 2, Article 37, Schedule 9&10, Part 1	N/A	The Applicant noticed that the wording in the draft DCO did not match the wording of the associated plan.	"outline navigation monitoring strategy" has been changed to <i>"outline marine traffic monitoring strategy"</i> to reflect	No comments.

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	(Interpretations), and Condition 19(4) and 20(2)(d);			the name of the plan (document reference: 8.18).	
49.	Schedules 9-12, Part 1 (Interpretations);	Historic England (WR, paragraph 2.3)	Historic England notified the Applicant of a change of address for service, and that "statutory historic body" should be defined as "Historic Buildings and Monuments Commission for England (Historic England)" (rather than 'Historic England').	The Applicant has updated the draft DCO accordingly.	No comments.



THE PLANNING ACT 2008
THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE)
RULES 2010

NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

**Natural England summary table detailing main concerns in relation to
Offshore Ornithology and our current position at Deadline 3**

14 February 2019

Topic	Natural England Position at Deadline 1	Additional Information provided	Summary of Information provided	Position at Deadline 3
Seasonal definitions for lesser black-backed gull (LBBG)	Applicant should use full breeding season. If this results in overlap of month with non-breeding season the non-breeding season should be adjusted accordingly	No	N/A	Not agreed. No further information has been supplied by the Applicant and therefore our position remains the same as in our Relevant and Written Representations [RR-106; REP1-088]
Seasonal definitions for gannet	Applicant should use full breeding season. If this results in overlap of month with non-breeding season the non-breeding season should be adjusted accordingly	No	N/A	Not agreed. No further information has been supplied by the Applicant and therefore our position remains the same as in our Relevant and Written Representations [RR-106; REP1-088]
Seasonal apportionment of impacts for HRA for LBBG at Alde-Ore Estuary SPA - non-breeding	Applicant has used a non-standard approach, however, this does not result in significant differences to the apportionment figures in the non-breeding season that result from taking the NE advised approach	No	N/A	Partly agreed. Whilst we <u>agree</u> that the apportionment figures the Applicant has calculated for LBBG from Alde-Ore Estuary SPA for the non-breeding periods are reasonable/precautionary; we still <u>do not agree</u> with the methods the Applicant has used to calculate them. No further information has been supplied by the Applicant and therefore our position remains the same as in our Relevant and Written Representations [RR-106; REP1-088]
Seasonal apportionment of impacts for HRA for Gannet at Flamborough and Filey Coast SPA - non-breeding	It is unclear what BDMPS figure has been used.	Response to Qu 23.44 of Examining Authority's first written questions	The gannet BDMPS populations used to apportion impacts occurring in the nonbreeding season to the Flamborough and Filey Coast SPA population were those presented for the UK North Sea and Channel in Furness (2015): during autumn migration 456,298 and during spring migration 248,365.	Not agreed. Natural England provided a full response in this regard at Deadline 2 in Natural England's comments on responses by all other parties to the Examining Authority's first written questions [REP2-036]. In summary the apportionment figures calculated by NE are slightly higher than those used by the Applicant for autumn and spring. If the Applicant wishes to use their preferred values, Natural England seeks

Topic	Natural England Position at Deadline 1	Additional Information provided	Summary of Information provided	Position at Deadline 3
				clarification regarding how they have been calculated.
Seasonal apportionment of impacts for HRA for kittiwake at FFC SPA - non-breeding	The approach taken is consistent with our standard advice	N/A	N/A	<u>Agreed.</u>
Seasonal apportionment of impacts for HRA for LBBG at Alde-Ore Estuary SPA - breeding	Natural England remains concerned with the 25% apportionment figure used.	Response to Qu 23.35 of Examining Authority's first written questions.	<p>Information on tracking data used, suggesting very low connectivity between breeding LBBG at Orfordness and Norfolk Vanguard (3.5%).</p> <p>The Applicant has apportioned 25% of breeding LBBG to Alde-Ore Estuary SPA, and suggests this is highly precautionary given tracking data.</p> <p>A substantial proportion of the birds present at Norfolk Vanguard is likely to comprise immature birds which originate from a variety of populations. The birds present may also include breeding adults from non-SPA colonies</p>	<p><u>Not agreed.</u> Natural England provided a full response in this regard at Deadline 2 in Natural England's comments on responses by all other parties to the Examining Authority's first written questions [REP2-036]. In summary 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 they hadn't previously been included, and 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 and therefore this issue still requires consideration.</p> <p>As noted in our response to ExA Q23.34 provided in Annex A of our Written Representations [REP1-088], we concluded that whilst the Applicant's apportioning for the non-breeding season periods (i.e.</p>

Topic	Natural England Position at Deadline 1	Additional Information provided	Summary of Information provided	Position at Deadline 3
				migration and winter) did not follow our standard recommended approach, the apportionment percentages they have arrived at for the non-breeding seasons for this species and colony was reasonable / precautionary.
Seasonal apportionment of impacts for HRA for kittiwake at FFC SPA - breeding	Natural England remains concerned with the 16.8% apportionment figure used.	No	N/A	Not agreed. No further information has been supplied by the Applicant and therefore our position remains the same as in our Relevant and Written Representations [RR-106; REP1-088]
Lack of consideration of confidence intervals for EIA construction displacement for all species (excluding RTD)	Whilst the Applicant has not considered the variability in the underlying population estimates, as the confidence limits have been provided, NE have considered these as well and can confirm that they do not alter the conclusions.	No	N/A	Agreed. Whilst Natural England note that an incorrect methodology has been used, it does not alter the outcome in this instance and therefore no further work is required.
Lack of consideration of confidence intervals for EIA operation displacement for gannet and auks (excluding RTD)	Whilst the Applicant has not considered the variability in the underlying population estimates, as the confidence limits have been provided, NE have considered these as well and can confirm that they do not alter the conclusions.	Appendix 3.3 - Operational Auk and Gannet Displacement: update and clarification	A review of evidence for displacement effects for guillemot and razorbill. An assessment is also presented using the upper and lower 95% confidence intervals on population abundance for puffin, razorbill, guillemot and gannet for project alone impacts. Cumulative assessments for puffin, razorbill and guillemot are provided which include the figures presented in the Environmental Statements (ESs) for Hornsea Project 3 and Thanet	Not agreed. Natural England has reviewed Appendix 3.3 and a full response has been provided at Deadline 3 (Natural England's comments on Appendix 3.3 – Operational Auk and Gannet Displacement: update and clarification).

Topic	Natural England Position at Deadline 1	Additional Information provided	Summary of Information provided	Position at Deadline 3
			Extension, and also include figures for the Hywind and Kincardine projects. <u>A cumulative displacement assessment for gannet will be provided in a subsequent clarification note.</u>	
Red-throated diver (RTD) displacement assessments	Data for Vanguard West only included birds on the water (exc. Birds in flight). NE also disagree with the use of 80% displacement and 5% mortality (we advise 100% displacement and up to 10% mortality).	Appendix 3.1 - Red-throated diver displacement	Updated assessment of potential displacement impacts on RTDs.	<u>Not agreed.</u> Natural England has reviewed Appendix 3.3 and a full response has been provided at Deadline 3 (Natural England's comments on Appendix 3.1: Red-throated diver (RTD) displacement)
Collision Risk Modelling	Natural England have significant concerns with the Applicant's CRM including: methodology used; use of median rather than mean densities; nocturnal activity factors; lack of full assessment for herring gull (alone); lack of any specific CRM assessment for non-seabird migrants (alone and in-combination), exclusion of Bewick's swan and avocet.	1) Appendix 3.2 - Collision Risk Modelling: update and clarification 2) S51 Advice note	1) Derivation of seabird densities used an input to the CRM, complete tables of input, comparison of the CRM estimate for Norfolk Vanguard with those obtained using the Band (2012) spreadsheet and the MSS commissioned stochastic version of the Band model, assessment of potential effects of collisions at Norfolk Vanguard on herring gull and presentation of the annual outputs calculated using alternative summary metrics. <u>The note only provides collision estimates for the Norfolk Vanguard project alone; cumulative and in-combination estimates will be provided in separate notes.</u>	1) <u>Not agreed.</u> Natural England has reviewed Appendix 3.3 and a full response has been provided at Deadline 3 (see Natural England's comments on Appendix 3.2: Collision Risk Modelling (CRM) update and clarification) 2) <u>Not agreed.</u> Natural England has reviewed this document as part of our Deadline 2 response [REP2-038] and remain concerned with the data that has been input for this modelling. Full details can be found in paragraphs 2.2 – 2.4 of our Deadline 2 response: Comments on Offshore Ornithological Aspects of Applicant's Response to Section 51 Advice from the Planning Inspectorate [AS-006].

Topic	Natural England Position at Deadline 1	Additional Information provided	Summary of Information provided	Position at Deadline 3
			2) Changes to consented configurations of projects and implications for cumulative/in-combination CRM.	In addition, Natural England remain concerned with the nocturnal activity rates used by the Applicant.
Cumulative and In-combination Assessments	Natural England has concerns not only with Vanguard alone figures but also with Hornsea 3 and Thanet Extension figures and other OWFs not included in the assessment, for example e.g. Kincardine, Hywind, Moray West and therefore could not reach any conclusions at present regarding the scale of any cumulative and in-combination	S51 advice note	Includes updated figures for Hornsea 3 and Thanet Extension; changes to consented configurations of projects and implications of this; and further information regarding nocturnal activity factors.	Not agreed. Natural England notes the additional document provided by the Applicant, however our concerns remain outstanding. This means that Natural England are still not in a position to provide formal advice on the accuracy of the predicted impacts at either the biogeographic/BDMPS or SPA scale. For more information, please see our Relevant Representations [RR_106], Written Representations [REP1-088] and our Deadline 2 response: Comments on Offshore Ornithological Aspects of Applicant's Response to Section 51 Advice from the Planning Inspectorate [AS-006].
Population Modelling Approaches (EIA and HRA)	Natural England have a number of concerns including: use of PBR outputs in assessments; suitability of existing PVA models for various birds due to a range of issues; use of matched pairs; use of counterfactuals; use of 25 year projection models when the maximum life of the project is 30 years.	No	N/A	Not agreed. No further information has been supplied by the Applicant and therefore our position remains the same as in our Relevant and Written Representations [RR-106; REP1-088]