THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

NORFOLK VANGUARD OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010079

Secretary of State Additional Information Request

Natural England's advice on the Flamborough and Filey Coast Special Protection Area (FFC SPA) in principle compensation measures

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19 November 2021

Annex 2 - Natural England's advice on the Flamborough and Filey Coast Special Protection Area (FFC SPA) in principle compensation measures

Our comments below are based primarily on the Norfolk Vanguard Applicant's Response to the Secretary of State's (SoS) consultation of 5 July 2021 on 'In Principle Habitats Regulations Derogation, Provision of Evidence Appendix 1 Flamborough and Filey Coast SPA In Principle Compensation (Version 2)' that was submitted on 11 August 2021 (MacArthur Green 2021a).

Since the submission of MacArthur Green (2021a) by the Norfolk Vanguard Applicant, further information has been provided by the Norfolk Boreas Applicant on Flamborough and Filey Coast SPA In Principle Compensation, which is also relevant to our Norfolk Vanguard responses. We have therefore considered the updated information provided by Norfolk Boreas in our comments below (particularly that submitted in Royal Haskoning DHV (2021) – the Norfolk Boreas Applicant's response to interested parties representations).

Our ref. point	Section/Point	Comment
2.1	1.21/13	We note that the specific impact compensation is considered for regarding kittiwake is collision, but for guillemot and razorbill it is displacement and not collision as stated by the Applicant.
2.2	2.1/24	Please see Natural England's published Evidence Statement regarding this matter: Natural England Evidence Statement Regarding Kittiwake Count Data Used to Classify the Flamborough Head & Bempton Cliffs SPA - EIN050
2.3	2.1/25	The Applicant has not provided the population size for the FFC SPA guillemot population at classification here. This is 41,607 pairs or 83,214 breeding adults.
2.4	2.1/26	The Applicant has not provided the population size for the FFC SPA razorbill population at classification here. This is 10,570 pairs or 21,140 breeding adults.

2.5	2.2/28	The targets for population abundance set out in Natural England's Supplementary Advice on Conservation Objectives for FFC SPA are as follows: • Kittiwake - restore the size of the breeding population at a level which is above 83,700 breeding pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent. restore • Guillemot - maintain the size of the breeding population at a level which is above 41,607 breeding pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent. • Razorbill - maintain the size of the breeding population at a level which is above 10,570 breeding pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent. Please note that the target is to maintain the guillemot and razorbill populations, rather than to restore them, as is the case for kittiwake.
2.6	3.1.1/32	Natural England takes a range-based approach to considering collision mortality impacts, given the associated uncertainties. The range of predicted impacts from Norfolk Vanguard for FFC SPA kittiwake is between 1 and 60 – the agreed value of 21 quoted here is the central prediction, based on the avoidance rate of 98.9% advocated in SNCBs (2014). As previously advised, Natural England takes a range-based approach to assessing impacts rather than focussing on a single figure with considerable uncertainty attached to it. Having considered the above range and where within it the impacts are most likely to lie, Natural England's advice is that this level of impact will not result in an adverse effect on integrity (AEoI) from Norfolk Vanguard alone.
2.7	3.1.2/38	Natural England's calculated in-combination totals are 533 for all projects, and 358 when Hornsea 4 and Dudgeon & Sheringham Extensions are excluded (as the Applicant has presented in Table 3.4 of Royal Haskoning DHV 2021)[1]. The minor discrepancy between our totals and the Applicant's presented in this document are likely to relate to difference approaches to rounding.
2.8	3.1.2/42	The Applicant notes that the reduced project alone kittiwake collision predictions are lower than those for several consented offshore wind farms. We note that these are already consented and therefore represent an already

[1] Royal Haskoning DHV (2021) Norfolk Vanguard Offshore Wind Farm Updated Population Viability Analysis: Flamborough and Filey Coast SPA. Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-004399-Updated%20Population%20Viability%20Analysis%20Flamborough%20and%20Filey%20Coast%20SPA.pdf

		increased level of anthropogenic mortality that the Norfolk Vanguard project adds to. The assessment for Norfolk Vanguard therefore needs to be in the context of this existing consented impact, which Natural England considers to result in an Adverse Effect on Integrity (AEoI). The relative contribution of Norfolk Vanguard compared to these consented projects is therefore not relevant.
2.9	3.1.2/43	Regarding headroom, please see our advice at Deadline 9 of the Norfolk Boreas examination[2], and our more recent advice at Deadlines 12 and 13 of the East Anglia 1N and 2 Examination[3, 4].
2.10	3.1.2/44	Natural England's advice is that an AEoI cannot be ruled out for FFC SPA kittiwake from Norfolk Vanguard in-combination with other plans and projects, irrespective of whether Hornsea 4 and Dudgeon & Sheringham Extensions are included or excluded. Natural England considers that the project makes a significant contribution to the FFC SPA kittiwake in-combination total collision total (21 out of 358 annual collision mortalities when Hornsea 4 and Dudgeon & Sheringham Extensions are excluded, or 5.9% of that total). We also advise that this contribution should be appraised in tandem with those of other submitted but not determined projects (Norfolk Boreas, East Anglia One North and East Anglia Two), rather than discretely.
2.11	3.2.1/46	We welcome the presentation of the 95% upper and lower confidence limits from the FFC SPA guillemot displacement assessment. Natural England advises that the mortality values presented will not result in an AEoI alone.

[2] Natural England (2020) Norfolk Boreas Offshore Wind Farm Deadline 9: Natural England's Updated Ornithology Advice. Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-002099-EN010087_Boreas_D9_13_Updated%20Ornithology%20advice.pdf

[3] Natural England (2021) East Anglia One North/East Anglia Two Offshore Wind Farms Appendix A16c to the Natural England Deadline 12 Submission: Natural England's Comments on Offshore Ornithology Cumulative and In-Combination Collision Risk and Displacement Update [REP11-027]. Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010077/EN010077-005512-Natural%20England%20-%20Appendix%20A16c%20-%20NE%20Comments%20on%20Cumulative%20and%20In-Combination%20Collision%20Risk%20%5bREP11-027%5d%20Deadline%2012.pdf

[4] Natural England (2021) East Anglia One North/East Anglia Two Offshore Wind Farms Appendix A24 to the Natural England Deadline 13 Submission: Natural England's Summary Position and Final Advice to the Applicant's Deadline 12 Submissions Relating to Offshore Ornithology. Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010077/EN010077-005638-EA1N%20Appendix%20A24%20-%20Natural%20England%20Summary%20Position%20and%20Final%20Advice%20to%20the%20Applicant's%20D12%20Submisssions%20Deadline%2013.pdf

2.12	3.2.2/51	Natural England concurs with the in-combination mortality range presented here for FFC SPA guillemot.
2.13	3.2.2/54	Natural England can now rule out an AEoI in-combination for all projects up to and including Hornsea 3 (i.e. all submitted projects) for FFC SPA guillemot. However, we are not in a position to rule out an AEoI in-combination when Hornsea 4 and Dudgeon & Sheringham Extensions are included, due to the uncertainty regarding the impacts for these pre-submission projects, and with respect to the significant numbers of guillemot encountered in the Hornsea 4 array area.
2.14	3.3.1/56	We welcome the presentation of the 95% upper and lower confidence limits from the FFC SPA razorbill displacement assessment. Natural England advises that the mortality values presented will not result in an AEoI alone.
2.15	3.3.2/61	Natural England concurs with the in-combination mortality range presented here for FFC SPA razorbill.
2.16	3.2.2/64	Natural England can now rule out an AEoI in-combination for all projects up to and including Hornsea 3 (i.e. all submitted projects) for FFC SPA razorbill. However, we are not in a position to rule out an AEoI in-combination when Hornsea 4 and Dudgeon & Sheringham Extensions are included, due to the uncertainty regarding the impacts for these pre-submission projects, and with respect to the significant numbers of razorbill encountered in the Hornsea 4 array area.
4. COMPENSATION - KITTIWAKE		
2.17	4.1/68	Whilst it is correct to say that EC guidance provides some flexibility, compensating in a way that benefits the impacted site is a well-established principle in the provision of UK compensatory measures.
2.18	4.3.1.4/95	We agree with the Applicant that improving sandeel availability to kittiwakes has significant value as a long-term, strategic measure. Whilst there is currently no mechanism available for developers to adopt this as a compensatory measure, such a mechanism may appear in future. We also consider that prey availability could form the basis of adaptive management measures for the compensatory measure in the longer term, which we consider should be incorporated into the proposals.

2.19	4.3.1.6/98 and 4.3.2.5/104	We welcome the commitment by the Applicant that if initiatives are developed by the relevant authorities in the future with a view to enabling fishery management to be undertaken as strategic compensation, or to enabling fishery quotas to be purchased as means to deliver strategic compensation, that they would be willing to participate in their delivery, on the basis that these were within acceptable timeframes for the Project.
2.20	4.4 - general	We agree with the Applicant that it is highly doubtful that predator control would significantly increase breeding success of kittiwake colonies to offset the predicted collision mortalities from the FFC SPA.
2.21	4.5.1/110	We note the additional letter from ABP dated 19th October 2021 submitted in response to the Norfolk Boreas additional information request ('Norfolk Boreas Offshore Wind Farm: The Applicant's Response to the Request for Further Information'). This indicates that several potential sites have been identified within the Port of Lowestoft, and that ABP and Vattenfall are negotiating Heads of Terms regarding a lease of one of those sites. This is welcome progress, though noting the references to more than one structure potentially being installed, Natural England queries whether this might mean more than one location may need to be leased. In broad terms, having two structures in separate locations within the Port would significantly increase the confidence in the success of the compensatory measures, although the need for this is hard to judge in the absence of specific information about the preferred locations/designs. Natural England still has reservations regarding the absence of detailed information regarding location and design, which reduces the confidence that compensatory measures have been secured. Natural England notes that the Boreas Applicant (and therefore also the Vanguard Applicant) has also been in discussion regarding potential options at Great Yarmouth. Whilst it is a sensible precaution to consider additional options, Natural England highlights that compared to the long-established Lowestoft kittiwake colony, we are not aware of kittiwakes having bred at Great Yarmouth. Natural England advises that Lowestoft clearly represents a more suitable location for the compensatory measures.
2.22	4.5.3/127	We welcome the Applicant's commitment to adaptive management. As noted above, Natural England considers that adaptive management should potentially extend to prey availability measures in the future.
2.23	4.5.3/130	We note the Applicant's intention to install the artificial nest structure prior to the 2022 breeding season, three breeding seasons in advance of offshore construction. Natural England advises that a similar condition as that used in the Hornsea 3 DCO should be incorporated into any Norfolk Vanguard DCO, to ensure that the structures have produced kittiwakes of adult age by the time the development is operational.

2.24	4.5.3/131 and 132; also Figure 1, Table A1, Appendix 1	We welcome the Applicant's efforts to quantify the potential 'mortality debt' and the length of time it will take to 'pay back' that debt. Natural England has given detailed consideration to these calculations and concludes that there are some unduly optimistic assumptions in these calculations as follows: 1. Annual colony growth rate: whilst it is stated in the table heading for Table A1 that various growth rates are considered, it appears that the Applicant has only used an annual colony growth rate of 20% for all of the scenarios. No evidence has been given for the use of a 20% growth rate, other than to state it is very modest. This growth rate may well be achieved or exceeded in the early years of the colony, but it is more doubtful whether this would be maintained in the later years. Furthermore, this growth rate would likely require large scale recruitment from an existing pool of non-breeders (or birds breeding poorly elsewhere already). If the colony were to grow at 20% per year and if as envisaged it were to produce an "excess" of 0.6 chicks per year to replenish the wider population, then as each year passes the colony growth becomes more heavily dependent on immigration rather than its own production. This would be because the difference between the increase per annum in the number of adults at the colony (which is growing by 20% each year) and the number of new adults that growing colony will produce each year will increase year on year. Natural England recognises the limited data available to predict the likely growth of the colony, however we do not consider that assuming a 20% growth rate for the colony for 30 years is precautionary, and would suggest that a 10% per annum growth rate would be more appropriate for the lifetime of the project. The recent submissions by the Norfolk Boreas applicant (21 October 2021-Royal Haskoning DHV 2021) attempt to address these concerns, stating that *'this rate of growth is not in fact required once the mortality payback has been achieved (i.e. around 15 years even under the more precautionary scenarios), because once the break-even point is reached ongoing colony growth is not necessary to maintain the necessary level of annual compensation levels required. Indeed, in all the scenarios the colony actually stops growing (i.e. a growth rate of 1) once the artificial site is full (assumed to be 300 pairs) which is predicted to occur after around 15 years.'* Natural England notes that if achieving this level of growth is required for 15 years, which is half of the lifetime of the project, the calculations presented indicate this requires a starting colony size of 25 prs with 20% GR for those 15 years and 0.6 excess productivity. In our view this is still an overly optimistic scenario for Boreas.

		We observe that in the case of Vanguard, the time required to 'break even' would be longer than that calculated for Boreas, due to Vanguard's greater impact. Natural England also notes that achieving this level of growth to 'break even' will be more of an issue in a scenario where both Vanguard and Boreas are both required to provide compensation. If this were the case, the compensation requirements would relate to mean predictions of 35 annual collisions, and an upper 95% confidence limit of 88 annual collisions. This would mean a considerably longer time to payback mortality debt, and if it is not realistic to assume 20% colony GR for later years, then the scenario is probably still overly optimistic. 2. Initial population size of artificial colony: Whilst we welcome that the Applicant has considered different options for initial population sizes for the artificial colony (50 pairs or 100 pairs) to explore how changing this parameter affects the results, we note that the most precautionary option considered by Norfolk Vanguard is double the most precautionary option considered by Norfolk Boreas (25 pairs). The Applicant has not presented any evidence to justify the use of the starting population sizes they have chosen. We note that Kidlaw et al. (2005) described the growth of colonies in Alaska and recorded that they are typically founded by variable numbers of pioneers (23 pairs on average). Coulson (2011) indicates that new colonies are usually formed by between 3 and 20 nesting pairs. It is also assumed that the 50/100 pairs would utilise the structure in the first breeding season once it is constructed. Given the evidence from these studies, we consider that 50 and 100 pairs may not be realistic unless birds have been displaced from other nest sites, and that 5-10 pairs per structure would be more precautionary values to base calculations on. 3. Excess productivity: the Applicant have used scenarios of 0.6 and 0.8 chicks per pair for 'excess productivity'. The 0.6 value is calculated from the productivity assumed for the artificial colony minus the FFC SPA KI productivity (i.e. 1.2-0.6=0.6 – see Table 4.2). We note that the 0.6 value is similar to the 0.58 value used by the Norfolk Boreas Applicant in their updated FFC PVAs and in-combination assessments updated at the request of Natural England (MacArthur Green 2021b), which is also relevant to Norfolk Vanguard. The assumption that productivity of the artificial colony will be 1.2 is based on the highest productivity rate for the existing artificial colonies reviewed by the Norfolk Boreas Applicant during the project Examination. We advised the Boreas Examination that this 1.2 productivity rate is overly optimistic [Boreas REP17-010] particularly over a 30-year period. Natural England highlights that if this is the case, the calculations of when the population will 'break even' will also be overly optimistic, and therefore the mortality debt will not be paid back within the predicted 15 years (which as noted above is half the lifetime of the project). Please also see our comments above regarding the

		Norfolk Vanguard impacts being larger and therefore taking longer to 'pay back', and the potential scenario where both Norfolk Boreas and Norfolk Vanguard are required to deliver compensatory measures. Therefore Natural England concludes that there is insufficient justification for using an excess productivity rate of 0.6 alone and that it would have been more appropriate to consider a range of rates derived from productivity values from different studies to produce low, medium and high excess productivity values, with 0.6 likely to be at the higher end of the range. <u>4. Overall Conclusions:</u> We therefore advise that the scenarios presented are insufficiently precautionary, and that the predicted 'pay back' of the mortality debt is likely to take place later than has been predicted by the Applicant. This will be particularly the case in locations where other developers intend to erect artificial structures: Hornsea 3, Norfolk Boreas, East Anglia 1N/2 have all considered the general Lowestoft area in their submission. We note that even under these optimistic calculations, the mortality debt for Norfolk Vanguard would only be cancelled in 12-13 years. We note this is a shorter time than the 15 years calculated for Boreas that has a lower predicted impact than Vanguard, as a result of the Vanguard calculations being based on even more optimistic initial colony sizes of 50 or 100 pairs than the Boreas calculations of 25, 50 or 75 pairs. We also note that Norfolk Vanguard propose to collaborate with Norfolk Boreas, East Anglia One North and East Anglia Two if these projects also require compensation, which will increase the level of compensation that this intervention is required to deliver and further increase the timescale by which the mortality debt would be cancelled. This further reinforces the need to secure early installation of the artificial nest site prior to turbine operation, and for the Secretary of State to secure this in the DCO in the same manner as for Hornsea 3. Please see our cover letter and comments on the DCO wording. Provision of more than one structure of different designs in different parts of the proposed location may help improve the likelihood of prompt colonisation, and so we welcome that the latest Boreas submissions incorporate this. The quantification and framing of compensatory measures for species rather than habitat impacts is very much an emerging discipline and engages some complicated issues. In this context, Natural England wishes to highlight to BEIS that the nature of the measure is to reinforce the biogeographic population from which the FFC SPA population draws its recruits. It is not possible to quantify the extent to which the FFC SPA population will receive recruits as a result of these measures, though it is implausible that all the 'surplus' adult kittiwakes beyond those required for the maintenance of the new colony will recruit to FFC SPA. This has implications for

		the scale of compensatory measures. Given the objective of the compensatory measures must be to maintain the coherence of the national site network i.e. the network of sites classified for kittiwake, rather than the biogeographic population more generally, we advise BEIS that the compensatory measures are by no means as precautionary as portrayed by the Applicant. We recommend that the requirement to maintain the coherence of the network will need to be appropriately reflected in the measures of success for the compensatory measures, rather than assuming that 'replacing' the birds lost from FFC SPA with the same number of recruits into the wider population will be sufficient.
2.25	4.5.3/133	The Applicant has provided some indicative measures to mitigate for the impacts of scheduled port redevelopment on the artificial nest structures. Whilst these mitigation measures would need to be location-specific, we are not aware of evidence to indicate that a 50m buffer around all construction activity would be sufficient. In the latest Boreas submissions, reference is made to surveys of piling activities in 2021, where it is stated that the existing kittiwake colonies have not been affected. Natural England have not been provided with the results of these surveys, though highlight that the piling activity was 70m from the nearest colonies, and that the colonies in question are established ones rather than newly-occupied locations such as the proposed compensatory measures. We continue to highlight that particular risks will arise from high or startling noise levels, such as that associated with impact piling. We welcome the reference to acoustic screening but recommend that at source noise reduction methods such as piling shrouds should also be considered, or if these are not feasible, seasonal restrictions for particular activities may be required. The planning application proposed to be submitted in October 2022 will need to demonstrate that appropriate mitigation is in place.
2.26	4.5.3/138	Whilst we welcome the commitment to working collaboratively with Scottish Power Renewables, it is unclear how this will operate in practice.
2.27	4.5.4/Table 4.2	Please see our detailed comments above regarding optimistic predictions regarding the scenarios used. For avoidance of doubt, the values in rows 1 and 2 appear in the column labelled *'Natural England's precautionary mean estimate'* due to formatting, and do not represent Natural England's position.
2.28	4.5.4/143	Please see Natural England's Deadline 4 [REP4-039] submission to the Boreas Examination, where we assess the Applicant's assertions regarding the level of precaution in our advice.

2.29	4.5.4/146	This analysis assumes that there are sufficient food supplies close to the colony that would obviate the need for kittiwakes to encounter the windfarms further offshore. We are not aware of any evidence indicating that this is the case.
2.30	4.5.4/147	We note the Applicant's preferred option of construction of two or more wall structures (or similar), sited in appropriate coastal locations, such as Lowestoft Port. As noted above, Natural England is in agreement with the principle of multiple structures/locations, as this would help minimise the risk of one structure failing to be colonised, which would improve confidence in the measures being successful. We consider this should be the case for consideration of compensation for the impacts of Vanguard alone, for collaboration with the sister project Boreas and/or with the Scottish Power Renewables projects.
2.31	4.5.5/149	It is indeed the case that several artificial structures have not successfully attracted kittiwake. We also highlight that none of the structures that have been occupied show evidence of 'full occupancy' i.e. there remain a significant proportion of nest spaces that are unoccupied. Therefore, it should in no way be assumed that because 300 nest sites have been provided, this will result in 300 nesting pairs.
2.32	4.5.5/154	As is noted by the Applicant, there is no evidence for colonisation rates from an artificial structure where there has not been an associated loss of a nesting site. However, this may be less important a factor regarding potential colonisation rates at Lowestoft, where nesting kittiwakes are not infrequently deterred from nesting on residential and business premises. The additionality benefit here would relate to providing additional secure nesting sites that are not subject to this disturbance and are likely to result in increased productivity.
2.33	4.5.6.2/158	We welcome the Applicant's commitment to colour-ringing nestlings from the artificial structures, and to support colour-ring re-sighting efforts at FFC SPA. Given the size and limited visibility of the FFC SPA colony it will not be possible to quantify the extent of recruitment into FFC SPA from the artificial colony, however re-sighting observations could at least provide qualitative evidence of recruitment into FFC SPA.

2.34	4.5.6.2/159	We support ongoing monitoring of the Lowestoft colony, as this will provide important information regarding the extent to which the artificial nesting structures are providing an additional benefit i.e. increasing the overall population in the area, or simply redistributing it.
2.35	4.6.2/170	Natural England highlights that any delays to the proposed installation of the structure in February 2022 risks causing disturbance to kittiwakes returning to the general area during the 2022 breeding season (March onwards) and/or could deter prospecting birds from settling on the new structure. And we would need to provide our statutory advise to the local planning authority on the potential risks once the Application is received. Noting there is now limited time between now and February to get this agreed.
2.36	4.6.2.1/172	Natural England is concerned that the Project's DCO/dML only requires them to submit a compensation plan to the Secretary of State 18 months prior to the operation of any wind turbine. This means that there is no requirement for the compensation to be in place or functional prior to impact. Natural England considers this significantly reduces the confidence that the measures will be implemented to the timescales set out. Please see our cover letter and comments on the DCO wording for more detail.
5. COMPENSATION - GUILLEMOT		
2.37	5.1/180	Whilst it is correct to say that EC guidance provides some flexibility, compensating in a way that benefits the impacted site is a well-established principle in the provision of UK compensatory measures.
2.38	5.1/183 – 187	Natural England can now rule out an AEoI to FFC SPA guillemot from in-combination displacement for all submitted projects. However, we are not able to rule out an AEoI for all projects when Hornsea 4 and Dudgeon & Sheringham Extension projects are included in the in-combination total. This due to the uncertainty regarding the impacts for these pre-submission projects, and with respect to the significant numbers of guillemot encountered in the Hornsea 4 array area. Natural England's advice during the Examination was that for those projects falling within the scope of the in-combination assessment at that time i.e. submitted projects up to and including Hornsea 3, the mortality rate for displaced birds would be unlikely to be at the top of the range advised of 1-10%. This is because the majority of the projects that were scoped into the assessment lie in areas of the North Sea that represent low to medium levels of guillemot density during both the breeding (where relevant) and non-breeding seasons (Seabird Sensitivity Mapping Tool). It is therefore assumed that areas of low/medium density will be less

		important/desirable feeding areas and therefore mortality impacts of displacement from lower quality areas would be lower than displacement from optimal/important areas. Therefore, we do not anticipate that mortality rates to be at the top of the range considered for projects such as Norfolk Vanguard with low/medium densities. However, this advice is specific to those projects and should not be taken as Natural England's standard advice for all proposals, as some projects will lie in areas of higher guillemot density. Neither should this be interpreted as Natural England resting exclusively on specific values when coming to integrity judgements. The Applicant has sought several times to misrepresent Natural England's advice on this matter. It is not the case, as the Applicant implies, that our assessment of in-combination impacts is based on values of 60-70% displacement and 1-2% mortality. It is also inaccurate to state that *'Natural England has stressed to the Applicant that these estimates should not be applied to future projects'*, which implies a shift or update in our advice. We are not providing different advice for future projects, but continue to provide advice on the basis that different projects will have different levels of sensitivity depending on densities of birds present.
2.39	5.1/188	Natural England did not agree with the conclusions of 50% displacement and 1% mortality from the MacArthur Green (2019) auk displacement review. Our detailed advice regarding this can be found in our Deadline 3 response to the Norfolk Vanguard Examination[5]
2.40	5.1/190	Please see comment 2.1/25 above.
2.41	5.3.1.3/208	As has been done with FFC SPA kittiwake above, Natural England considers that compensatory measures should target the 95% upper confidence limit value in order to provide confidence that impacts will be offset. In this instance, that would mean 29 rather than 15 guillemot mortalities per annum.
2.42	5.3.1.4/212	We agree with the Applicant that improving sandeel availability to guillemot has significant value as a long-term, strategic measure. Whilst there is currently no mechanism available for developers to adopt this as a compensatory measure, such a mechanism may appear in future.

[5] Natural England (2019) Norfolk Vanguard Offshore Wind Farm: Natural England's comments on Appendix 3.3 – Operational Auk and Gannet Displacement: update and clarification [REP1-008]. Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-002568-DL3%20-%20Natural%20England%20-%20Deadline%203%20Submission.pdf (see pages 20-26/90).

2.43	5.3.1.6/215	We welcome the commitment by the Applicant that if initiatives are developed by the relevant authorities in the future with a view to enabling fishery management to be undertaken as strategic compensation they would be willing to participate in their delivery, on the basis that these were within acceptable timeframes for the Project.
2.44	5.4.1/216	We agree that rat eradication is not a relevant option at the FFC SPA. Furthermore, if any sites can be identified where rats are affecting guillemot productivity, we note that these are likely to be remote to FFC SPA, because other English North Sea auk colonies are not known to be experiencing significant predation issues either. In all likelihood therefore this compensatory measure would not directly benefit the impacted SPA, but instead would provide benefits to the wider biogeographic or UK populations.
2.45	5.4.1/217	Predation by rats is not likely to be the key population driver for guillemot or razorbill colonies. We acknowledge there is some evidence from Lundy that in certain locations rat eradication may lead to increased productivity, increases in the numbers of occupied nest sites and/or recolonisation of areas. However, given other potentially more important population drivers such as prey availability and climate change, the results will be highly specific to the location chosen, and therefore potential locations where meaningful increases in productivity could be achieve need to be identified.
2.46	5.4.3/220	Natural England is concerned that it has not been demonstrated that there are any islands where invasive mammal eradications would benefit guillemot, as opposed to seabirds in general. Whilst potential candidate sites have been identified where invasive mammal eradication could benefit some seabird species, these have not been appraised for their suitability to deliver benefits for guillemot. The vast majority of guillemot nest on sheer cliffs where rat predation is very unlikely to be an issue; however in some locations guillemot also nest in boulder fields. A potentially suitable site would be in an area where guillemot are known to nest in boulder fields and where rats are likely to be affecting guillemot productivity, either by direct predation of eggs/chicks or by deterring guillemot from nesting in locations where they might otherwise have nested. Without this core requirement being demonstrated, it is difficult to provide any confidence to the Secretary of State that an island eradication could be a viable compensatory measure for this species.
2.47	5.4.3/221	Natural England does not consider it appropriate to leave matters that have profound implications for the effectiveness of compensatory measures to the post-consent period and reiterates its concern regarding the lack of demonstration that a suitable island exists.

		We note that Rathlin Island has recently received funding for predator eradication (brown rat and ferret) programme [redacted] Therefore, this site will not be an option for such a project as compensation from Norfolk Vanguard (or Boreas).
2.48	5.5.1/226	Successful invasive mammal eradication projects have carried out significant amounts of community consultation prior to delivery, sometimes over several years. However, this important aspect does not seem to have been factored into the Applicant's timescales.
2.49	5.5.2.1/227	We support the ongoing use of traps/baits to determine whether the island in question remains rat-free. It is unclear though what action would be taken if rats have been found to recolonise the island; Natural England anticipates that a further eradication attempt would be made, but this would need clarifying in the compensation plan.
2.50	5.6/234	We agree that there are potential synergies, should a suitable island be identified where rats were thought to be impacting on the productivity of both guillemot and razorbill. We note that razorbill are more inclined to nest in boulder fields, and therefore more likely to benefit from rat eradication than guillemot.
2.51	5.7/235	Natural England highlights that the proposed DCO wording only requires a strategy to be submitted to the SoS 18 months in advance of first operation, meaning that the compensation might not be implemented until after the displacement mortality starts to occur. Natural England considers that wherever possible, compensatory measures should be in place prior to the impacts arising.
2.52	5.8/236	Again, we are pleased that the Applicant will use the list of key matters given here, but please see our comments on 4.6.3/173 above.
6. COMPENSATION - RAZORBILL		
2.53	6.1/242	Whilst it is correct to say that EC guidance provides some flexibility, compensating in a way that benefits the impacted site is a well-established principle in the provision of UK compensatory measures.

2.54	6.1/245 – 249	Natural England can now rule out an AEoI to FFC SPA razorbill from in-combination displacement for all submitted projects. However, we are not able to rule out an AEoI for all projects when Hornsea 4 and Dudgeon & Sheringham Extension projects are included in the in-combination total. This due to the uncertainty regarding the impacts for these pre-submission projects, and with respect to the significant numbers of razorbill encountered in the Hornsea 4 array area. Natural England's advice during the Examination was that for those projects falling within the scope of the in-combination assessment at that time i.e. submitted projects up to and including Hornsea 3, the mortality rate for displaced birds would be unlikely to be at the top of the range advised of 1-10%. This is because the majority of the projects that were scoped into the assessment lie in areas of the North Sea that represent low to medium levels of razorbill density during both the breeding (where relevant) and non-breeding seasons (Seabird Sensitivity Mapping Tool). It is therefore assumed that areas of low/medium density will be less important/desirable feeding areas and therefore mortality impacts of displacement from lower quality areas would be lower than displacement from optimal/important areas. Therefore, we do not anticipate that mortality rates to be at the top of the range considered for projects such as Norfolk Vanguard with low/medium densities. However, this advice is specific to those projects and should not be taken as Natural England's standard advice for all proposals, as some projects will lie in areas of higher razorbill density. Neither should this be interpreted as Natural England resting exclusively on specific values when coming to integrity judgements. The Applicant has sought several times to misrepresent Natural England's advice on this matter. It is not the case, as the Applicant implies, that our assessment of in-combination impacts is based on values of 60-70% displacement and 1-2% mortality. It is also inaccurate to state that *'Natural England has stressed to the Applicant that these estimates should not be applied to future projects'*, which implies a shift or update in our advice. We are not providing different advice for future projects, but continue to provide advice on the basis that different projects will have different levels of sensitivity depending on densities of birds present.
2.55	6.1/250	Natural England did not agree with the conclusions of 50% displacement and 1% mortality from the MacArthur Green (2019) auk displacement review. Our detailed advice regarding this can be found in our Deadline 3 response to the Norfolk Vanguard Examination[6]

[6] Natural England (2019) Norfolk Vanguard Offshore Wind Farm: Natural England's comments on Appendix 3.3 – Operational Auk and Gannet Displacement: update and clarification [REP1-008]. Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-002568-DL3%20-%20Natural%20England%20-%20Deadline%203%20Submission.pdf (see pages 20-26/90).

2.56	6.1/252	Please see comment 2.1/26 above.
2.57	6.3.1.3/266	Natural England considers that compensatory measures should target the 95% upper confidence limit value in order to provide confidence that impacts will be offset. In this instance, that would mean compensation is needed for 11 rather than 6 razorbill mortalities per annum.
2.58	6.3.1.3/267	We agree with the Applicant that improving sandeel availability to razorbill has significant value as a long-term, strategic measure. Whilst there is currently no mechanism available for developers to adopt this as a compensatory measure, such a mechanism may appear in future.
2.59	6.3.1.6/273	We welcome the commitment by the Applicant that if initiatives are developed by the relevant authorities in the future with a view to enabling fishery management to be undertaken as strategic compensation they would be willing to participate in their delivery, on the basis that these were within acceptable timeframes for the Project.
2.60	6.4.1/274	We agree that rat eradication is not a relevant option at the FFC SPA. Furthermore, if any sites can be identified where rats are affecting razorbill productivity, we note that these are likely to be remote to FFC SPA, because other English North Sea auk colonies are not known to be experiencing significant predation issues either. In all likelihood therefore this compensatory measure would not directly benefit the impacted SPA, but instead would provide benefits to the wider biogeographic population.
2.61	6.4.1/275	Predation by rats is not likely to be the key population driver for guillemot or razorbill colonies. We acknowledge there is some evidence from Lundy that in certain locations rat eradication may lead to increased productivity, increases in the numbers of occupied nest sites and/or recolonisation of areas. However, given other potentially more important population drivers such as prey availability and climate change, the results will be highly specific to the location chosen, and therefore potential locations where meaningful increases in productivity could be achieve need to be identified.
2.62	6.4.3/278	Natural England is concerned that it has not been demonstrated that there are any islands where invasive mammal eradications would benefit razorbill, as opposed to seabirds in general. Whilst potential candidate sites have been identified where invasive mammal eradication could benefit some seabird species, these have not been appraised for their suitability to deliver benefits for razorbill. A potentially suitable site would be in an area

		where razorbill are known to nest in boulder fields and where rats are likely to be affecting razorbill productivity, either by direct predation of eggs/chicks or by deterring razorbill from nesting in locations where they might otherwise have nested. Without this core requirement being demonstrated, it is difficult to provide any confidence to the Secretary of State that an island eradication could be a viable compensatory measure for this species.
2.63	6.4.3/279	Natural England does not consider it appropriate to leave matters that have profound implications for the effectiveness of compensatory measures to the post-consent period and reiterates its concern regarding the lack of demonstration that a suitable island exists. As highlighted for guillemot, we again note that Rathlin Island has recently received funding for predator eradication (brown rat and ferret) programme [redacted] Therefore, this site will not be an option for such a project as compensation from Norfolk Vanguard (or Boreas).
2.64	6.5.1/284	Successful invasive mammal eradication projects have carried out significant amounts of community consultation prior to delivery, sometimes over several years. However, this important aspect does not seem to have been factored into the Applicant's timescales.
2.65	6.5.2.1/285	We support the ongoing use of traps/baits to determine whether the island in question remains rat-free. It is unclear though what action would be taken if rats have been found to recolonise the island; Natural England anticipates that a further eradication attempt would be made, but this would need clarifying in the compensation plan.
2.66	6.6/292	We agree that there are potential synergies, should a suitable island be identified where rats were thought to be impacting on the productivity of both guillemot and razorbill. We note that razorbill are more inclined to nest in boulder fields, and therefore more likely to benefit from rat eradication than guillemot.
2.67	6.7/294	Natural England highlights that the proposed DCO wording only requires a strategy to be submitted to the SoS 18 months in advance of first operation, meaning that the compensation might not be implemented until after the

<table>
<tr><td></td><td></td><td>displacement mortality starts to occur. Natural England considers that wherever possible, compensatory measures should be in place prior to the impacts arising.</td></tr>
<tr><td>2.68</td><td>6.8/295</td><td>Again, we are pleased that the Applicant will use the list of key matters given here, but please see our comments on 4.6.3/173 above.</td></tr>
<tr><td colspan="3">10 FFC SPA UPDATED CUMULATIVE AND IN-COMBINATION COLLISION AND DISPLACEMENT ESTIMATES</td></tr>
<tr><td>2.69</td><td>Table 10.1 – gannet collision</td><td>Natural England agrees with all the totals presented here.</td></tr>
<tr><td>2.70</td><td>Table 10.2 – kittiwake collision</td><td>See comment 3.1.2/38 above.</td></tr>
<tr><td>2.71</td><td>Table 10.3 – gannet displacement</td><td>Natural England highlights some minor differences between the Applicant’s EIA cumulative annual totals for gannet and ours:

<table><tr><th></th><th>Applicant</th><th>Natural England</th></tr><tr><td>Hornsea 3 – total</td><td>2843</td><td>2841</td></tr><tr><td>Hornsea 4 and Dudgeon and Sheringham Extension excluded - total</td><td>45925</td><td>45922</td></tr></table>
These do not affect Natural England’s advice.</td></tr>
<tr><td>2.72</td><td>Table 10.4 – guillemot displacement</td><td>Natural England highlights a minor difference between the Applicant’s in-combination totals for guillemot and ours:

<table><tr><th></th><th>Applicant</th><th>Natural England</th></tr><tr><td>All projects – FFC SPA</td><td>43663</td><td>43662</td></tr></table>
This does not affect Natural England’s advice.</td></tr>
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<table>
<tr><td>2.73</td><td>Table 10.5 – razorbill displacement</td><td>Natural England highlights some minor differences between the Applicant's cumulative annual totals for razorbill and ours:

<table><tr><th></th><th>Applicant</th><th>Natural England</th></tr><tr><td>All projects – total</td><td>139523</td><td>139527</td></tr><tr><td>Hornsea 4 and Dudgeon and Sheringham Extension excluded - total</td><td>123848</td><td>123852</td></tr></table>
These do not affect Natural England's advice.</td></tr>
<tr><td colspan="3">Appendix 1 – Modelled colony production of adults against accumulated collision mortality</td></tr>
<tr><td>2.74</td><td>Table A.1</td><td>Natural England considers that the scenarios presented are likely to be unduly optimistic. Please see our detailed comments above at 4.5.3/131 and 132 for more information.</td></tr>
</table>

REFERENCES

MacArthur Green (2021a) Norfolk Vanguard Offshore Wind Farm: In Principle Habitats Regulations Derogation Provision of Evidence – Appendix 1: Flamborough and Filey Coast SPA In Principle Compensation. Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-004380-8.26%20In%20Principle%20Habitats%20Regulations%20Derogation,%20Provision%20of%20Evidence%20Appendix%201%20Flamborough%20and%20Filey%20Coast%20SPA%20In%20Principle%20Compensation%20Measures%20(Version%202).pdf

MacArthur Green (2021b) *Norfolk Boreas Offshore Wind Farm Updated Population Viability Analysis: Flamborough and Filey Coast SPA – updated at the request of Natural England*. Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-002896-SoS%20Deadline%20-%20Applicant%20-%20Updated%20Population%20Viability%20Analysis%20Flamborough%20and%20Filey%20Coast%20SPA%20-%20Updated%20at%20the%20request%20of%20Natural%20England.pdf

Royal Haskoning DHV (2021) Norfolk Boreas Offshore Wind Farm: The Applicant's Comments on Interested Parties Representations. Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-002893-SoS%20Deadline%20-%20Applicant%20-%20The%20Applicant's%20Comments%20on%20Interested%20Parties%20Representations.pdf