

From: [Taylor, Jessica](#)
To: beiseip@beis.gov.uk
Cc: [Norfolk Vanguard](#); [Burton, Louise](#)
Subject: FAO: Gareth Leigh: EN010079 - Norfolk Vanguard new environmental information consultation - Natural England's response
Date: 28 April 2020 08:35:09
Attachments: [EN010079 Norfolk Vanguard post examination Natural England letter response to Norfolk Vanguard further information submission v5 FINAL.pdf](#)
[EN010079 NVG Annex 1 post examination Natural England's SIP position statement 20.01.20 FINAL.pdf](#)
[EN010079 NVG Annex 2 post examination D7 NE 07 Comments on Applicant's Position Paper HHW FINAL.pdf](#)
[EN010079 NVG Annex 3 post Examination NE 8. 20 HHW SIP April 2020 FINAL.pdf](#)
[EN010079 NVG Annex 4 post Examination NE 11.D10.2 Appendix 3 Cable protection decommissioning April 2020 FINAL.pdf](#)
[EN010079 NVG Annex 5 post Examination NE 11.D10.2 Additional mitigation April 2020 FINAL.pdf](#)
[EN010079 NVG Annex 6 post Examination NE 11.D10.2 App 2 Assessment of Additional Mitigation April 2020 - FINAL.pdf](#)
[EN010079 NVG Annex 7 post Examination NE 8.25 In Principle Compensation Measures FINAL.pdf](#)
[EN010079 NVG Annex 8 post examination Natural England Ornithology Position Statement - FINAL.pdf](#)
[EN010079 NVG Annex 9 post examination Natural England Ornithology HRA FINAL.pdf](#)
[EN010079 NVG Annex 10 post examination Natural England Additional Mitigation Updated CRM FINAL.pdf](#)
[EN010079 NVG Annex 11 post examination Natural England Kittiwake Compensation FINAL.pdf](#)
[EN010079 NVG Annex 12 post examination Natural England LBBG Compensation FINAL.pdf](#)
[EN010079 NVG Annex 13 post examination Natural England Headroom Calculations FINAL.pdf](#)

Dear Sir/Madam,


Please find attached Natural England's response to further information submitted by Norfolk Vanguard on 28th February 2020 with regard to the Secretary of State's request on 6th December 2019. As revised assessments and documents have been submitted which include significant project design changes from that considered during the examination process Natural England has included a series of Annexes that provide our detailed comments to support the content of this letter and to aid the decision making process.

Please accept my sincerest apologies for not getting this to you yesterday, this was due to home internet issues. Could you please confirm that our submission has been accepted?

Yours faithfully,

Jessica

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Date: 27 April 2020
Our ref: Norfolk Vanguard



Gareth Leigh
Department for Business, Energy & Industrial Strategy
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LS11 9AT

BY EMAIL ONLY

Dear Gareth,

**Norfolk Vanguard – Applicant’s submission to Secretary of State Consultation
Request for further information**

Natural England’s remit is to ensure sustainable stewardship of the land and sea so that people and nature can thrive. We are working to achieve a healthy and biodiverse marine environment which can enable a truly sustainable UK offshore wind sector, to support the achievement of ‘net zero’ and address the climate change emergency. We use our expertise to help facilitate offshore windfarms that are sensitively located and constructed, whilst protecting marine ecosystems from proposals with significant environmental impacts through our statutory advice. This will build the marine environment’s resilience to climate change and its ability to mitigate its effects.

On 6th December 2019 the Secretary of State (SoS) wrote to Vattenfall to request further information ‘in consultation with Natural England’ on matters pertaining to the Habitats Regulations derogations process for their Norfolk Vanguard Offshore windfarm (the ‘Project’). Natural England provided advice to the Project during the consultation period, as detailed in our letter to BEIS on 28th February 2020. This letter included our advice on non-compensatory matters (as per our letter to the Applicant dated 19th December 2019).

Having reviewed the documents submitted by the Project on 28th February 2020, Natural England provides the following statutory advice to the SoS and BEIS for consideration. This advice considers any further mitigation measures proposed by the Project, additional mitigation that could be implemented, and the compensatory measures selected for the features of sandbanks, reefs, lesser black-backed gulls and kittiwake. In providing this advice, Natural England has drawn from the EC Guidance Document on Article 6(4) of the Habitats’ Directive 92/43/EEC.

1. Special Area of Conservation (SAC)

One Special Area of Conservation (SAC) with Annex I Sandbanks (which are slightly covered by sea water all the time) and Annex I Reefs as features were identified in the SoS's request for further information: Haisborough Hammond and Winterton (HHW) SAC. This site is located off the north east coast of Norfolk. Natural England has identified significant concerns at the scale of impact – both temporal and spatial – from export cable installation and the deposition of cable protection.

1.1 Article 6(3) Assessment

The Secretary of State, acting as the relevant competent authority for this project, will need to ensure that it has acted in accordance with Article 6 of the Habitats Directive, as informed by the relevant judgements of the Court of Justice of the European Union (“CJEU”). With regards the interpretation of Article 6(3) of the Habitats Directive, in *Landelijke Vereniging tot Behoud van de Waddenzee v Staatssecretaris van Landbouw* (C-127/02), the CJEU stated that:

59. Therefore, pursuant to Article 6(3) of the Habitats Directive, the competent national authorities, taking account of the conclusions of the appropriate assessment of the implications of [the plan or project], in the light of the site's conservation objectives, are to authorise such activity only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects...

More recently, in the CJEU stated in the *Holohan & Others v An Bord Pleanála* (C-461/17) that:

34 The [appropriate] assessment carried out under that provision may not have lacunae and must contain complete, precise and definitive findings and conclusions capable of dispelling all reasonable scientific doubt as to the effects of the proposed works on the protected area concerned...

37 ... all aspects which might affect [the conservation] objectives must be identified and since the assessment carried out must contain complete, precise and definitive findings in that regard, it must be held that all the habitats and species for which the site is protected must be catalogued. A failure, in that assessment, to identify the entirety of the habitats and species for which the site has been listed would be to disregard the above mentioned requirements and therefore ... would not be sufficient to dispel all reasonable scientific doubt as to the absence of adverse effects on the integrity of the protected site...

In accordance with Article 6(4) of the Habitats Directive, if the Secretary of State, acting as competent authority, is satisfied that, there being no alternative solutions, the plan or project must be carried out for imperative reasons of overriding public interest it may agree to the plan or project notwithstanding a negative assessment of the implications for the European site or the European offshore marine site (as the case may be). If the Secretary of State makes this decision he must secure any necessary compensatory measures in order to ensure that the overall coherence of

Natura 2000 is protected. Natural England can provide ecological advice on the adequacy of those compensatory measures.

1.2 Position at the close of examination

1.2.1 Annex I Sandbanks and Reefs

Upon the close of examination Natural England advised that sufficient baseline evidence had been provided to inform an assessment of the impacts to Annex I Sandbanks and Reefs feature of Haisborough Hammond and Winterton (HHW) SAC, however, disagreed with the conclusions of the Applicants' Report to Inform the Appropriate Assessment.

i) Cable protection

In Natural England's view, even with the proposed reduction in the number of export cables from six to two by using a High Voltage Directional Current (HVDC) the remaining proposed levels of cable protection would constitute a lasting and potentially irreversible impact on both designated site features, thereby hindering the conservation objectives of the site. Annex I Sandbanks and Reefs features within the site are both in unfavourable condition. Consequently Natural England cannot be certain that cable protection will not adversely affect the integrity of the site.

ii) Sandwave levelling

Although sandwave levelling had been proposed as a means of reducing the potential requirement for cable protection, Natural England highlighted that there was insufficient evidence to demonstrate that full recovery of the Sandbank system is achievable and within the affected Annex I Sandbank systems. This is because there is insufficient certainty that there will not be a need for cable protection over the lifetime of the project.

iii) Sediment disposal

Natural England was content that the Applicant had demonstrated that there are suitable disposal locations for sandwave levelling operations, that would both retain the sediment within the Sandbank system to allow for its recovery and avoid impacts to the Annex 1 Reef feature. However, changes to sediment composition at the disposal locations had not been resolved (i.e. the 95% similar sediment grain size condition).

iv) Micro-Siting

Natural England could not be certain that avoidance of Annex I Reef habitats through micro-siting the cable was achievable and therefore that it wouldn't hinder the management measures put in place to restore Annex I Reef from fisheries pressures, particularly if cable protection was needed.

V) Consideration of Adverse Effect on Integrity

Natural England's advice is that adverse effects on site integrity should be addressed at the time of Application.¹ The failure to do so would leave a number of substantial issues to be resolved by the Marine Management Organisation (MMO) prior to construction. It should be noted that if

¹ Please see Annex 1 which sets out Natural England's legal position on this matter submitted into the Boreas offshore windfarm examination at Deadline 4 [REP4-045] (Matthew's first paper)

uncertainties about the impact of the development are not fully resolved at the time of consenting, there is a risk that there will be considerable project delays prior to and during construction whilst proper processes are followed and these are finally resolved.

1.3 Additional Evidence Provided by the Applicant post-examination

The Applicant provided various documents as evidence of further mitigation measures proposed to reduce the risk of adverse effect on integrity. These included an updated Haisborough Hammond and Winterton (HHW) SAC site integrity plan (SIP) and several new documents: Additional Mitigation document including Assessment of the addition mitigation in HHW SAC; HHW SAC Cable Specification, Installation and Monitoring Plan (CSIMP), cable protection decommissioning note, BT cable letter of comfort, HHW SAC position statement, and overview of HRA assessment.

The additional steps taken by the Applicant are welcomed and considerably reduce the risk of an adverse effect on integrity. This is because they provide greater confidence that cable protection will not be needed, and that the potential consequential impacts from sandwave levelling impacts could be minimised or avoided. However, they do not completely remove the need for cable protection over the lifetime of the project and therefore, the additional evidence is not sufficient to remove all reasonable scientific doubt as to the absence of adverse effects on the integrity on the protected Annex I Sandbanks and Reefs as a result of installation of cable protection over the life time of the project.

1.4 Additional Mitigation Proposed by the Applicant post-examination

i) Cable protection

The Applicant has undertaken a further review of data sets to determine where cable protection is most likely to be needed to be placed and thus further reducing the amount of cable protection within the HHW SAC from 10% to 5%. In addition the Applicant has committed to further reduce cable protection required at cable crossings within HHW SAC, with the support of BT, by removing any disused telecom cables that cross the export cable route.

The Applicant has committed to follow a cable burial hierarchy i.e. to always attempt to re-bury a cable before using cable protection, and a requirement to seek a new marine licence for any new areas of cable protection which might be required. In addition, the Applicant has committed to agree the cable route, to continue to explore opportunities to minimise the impacts from cable installation, as well as to agree the location, extent, type and quantity of any cable protection with the MMO in consultation with Natural England prior to deployment. All of these commitments are welcomed and have also been secured in the updated development consent order / deemed marine licence (DCO/DML).

A commitment has also been made by the Applicant to place no cable protection in the areas the Applicant has termed priority areas to be managed as reef i.e. fisheries byelaw/management areas to aid the recovery of Annex I reef.

Natural England welcomes the refinement of the cable installation methodology (including prohibiting the use of jack up vessels in the HHW SAC) and the reduction in cable protection estimates and locations is positive.

ii) Decommissioning

The Applicant has drawn up a decommissioning plan that provides evidence on the feasibility of the removal of cable protection, which it suggests is more likely to be possible for concrete mattresses (or similar type product). Natural England welcomes the potential to successfully remove any cable protection. If removal could be achieved, then whilst the impacts would no longer be permanent, which is welcomed, they will still last for the lifetime of the infrastructure (30 years) and potentially longer as a residual impact. Therefore, because this impact is lasting/long term and site recovery wouldn't be assured, Natural England's view is that reasonable scientific doubt remains regarding the impact of the proposals on the conservation objectives for the site. Accordingly a precautionary approach is required. If it is considered that certain types of cable protection could be modified to enable a greater success of recovery/removal at decommissioning, whilst reducing wider designated site impact, then we advise that this would need to be reflected in the DCO/DML to ensure this mitigation is secured.

Overall, whilst the additional work undertaken to refine the project parameters is welcomed and serves to considerably reduce the impacts of the project on the interest features of HHW SAC and the likelihood thereof, Natural England's overall position remains that an adverse effect on integrity cannot be excluded beyond all reasonable scientific doubt.

1.5 Additional Measures that could Avoid/Reduce/Mitigate impacts

Natural England notes that the EC Guidance² highlights that a proposal put forward under Article 6 (4) should be *'the least damaging for habitats, for species and for the integrity of the Natura 2000 site, regardless of economic considerations, and that no other feasible alternative, exists that would not affect the integrity of the site.'*

To assist the SoS in this regard we are providing advice in this section on potential alternative measures that may help avoid/reduce/mitigate the impacts of the proposed development and we feel therefore warrant consideration.

1.5.1 Avoid

Natural England note that the cable route could be taken to the south avoiding the HHW SAC entirely. However, it was presented in the evidence plan process that the Crown Estate was opposed to this due to potential implications for other industries such as aggregates. We have suggested previously that this alternative warranted consideration.

1.5.2 Reduce

Natural England consider that the Applicant has taken all reasonable steps to reduce the impacts of

² https://ec.europa.eu/environment/nature/natura2000/management/docs/art6/guidance_art6_4_en.pdf

the proposed development on both designated features of HHW SAC and we welcome this effort.

1.5.3 Mitigate

A commitment to surface-laid cables and the use of marker buoys would remove the need for cable protection altogether. This has been achieved for the Lincs Offshore Wind Farm in The Wash and North Norfolk Coast SAC and is currently also being employed by The Wash Harbour Masters to protect the Race Bank offshore windfarm cables. We continue to advise that this alternative should be considered.

We note that the Applicant hasn't considered, despite the request within the Secretary of States letter dated 6th December 2019, the suggestion of a condition to dispose of Sandwave clearance sediment in habitats of similar particle size. Whilst the Applicant has indicated that it is committed to ensuring disposal of sediment in areas adjacent to the clearance it remains unclear if these areas will have similar grain size and how this will be demonstrated. As per Natural England's letter to the Applicant on 19th December 2019, we do not advise that the condition as written will achieve the desired outcome. However, we remain committed to help resolve this issue going forwards.

1.6 Compensatory measures

As stated above (Section 1.1), under Article 6(4) of the Habitats Directive, the project may be permitted if the Secretary of State is satisfied that, there being no alternative solutions, the plan or project must be carried out for imperative reasons of overriding public interest.

The project discussed a number of compensatory measures with Natural England. Given that the key issue for Annex I Sandbanks and Reefs at HHW SAC, based on our understanding of site condition, is lasting change of habitat, Natural England were keen that measures focussing on ensuring no loss of designated features were taken forward. Ultimately the project decided to propose an extension to the boundary of HHW SAC to incorporate an area where there is suitable confidence, based on best available evidence, in the presence of Annex I Sandbanks and Reefs. The Applicant is proposing a 1:10 compensation ratio to allow for any uncertainties in deliverability.

Natural England agrees that an extension to the HHW SAC site boundary would be the most environmentally beneficial measure to deliver compensation for both Annex 1 Sandbanks and Reefs habitat and ensure coherence of the Natura 2000 network.

Whilst Natural England consider, on ecological grounds, that this measure has the potential to compensate for Annex 1 Sandbanks and Reefs habitat in HHW SAC, more detail is required regarding how this would be delivered. We acknowledge there are likely to be practical challenges and potential policy issues in securing this compensation measure as well as any required additional site management measures. Therefore consultation with Defra, other regulators (such as MMO and Eastern Inshore Fisheries and Conservation Authority) and key stakeholders is required.

2. Special Protection Areas (SPAs)

A number of protected sites and species were identified by Natural England as being at risk of significant impact from this development alone or in-combination, including kittiwake, gannet, razorbill and seabird assemblage from Flamborough and Filey Coast (FFC) Special Protection Area (SPA) and lesser black-backed gull from Alde-Ore Estuary SPA. However, the SoS request specifically focussed on kittiwake at FFC SPA and lesser black-backed gull at Alde-Ore Estuary SPA.

2.1 Position at the close of Examination

2.1.1 Kittiwake at Flamborough and Filey Coast SPA

At the close of the examination, Natural England advised that it could not be certain that there will be no adverse effects on the integrity of FCC SPA through impacts to the features of kittiwake, gannet, razorbill, fulmar and seabird assemblage, in-combination with other plans and/or projects.

Further to this, Natural England highlighted that the in-combination total of collision mortality across consented plans/projects had already exceeded levels which were considered to be of an Adverse Effect on Integrity to Kittiwake at FFC SPA, and that any additional mortality arising from these proposals would therefore be considered adverse.

We also highlighted that the possibilities for mitigation / compensation, and the confidence in any related advice, has been reduced by the (as yet undetermined) Hornsea Project Three application.

2.1.2 Lesser black-backed gull at Alde-Ore Estuary SPA

At the close of the examination, Natural England advised that it could not be certain that there will be no adverse effects on the integrity of Alde-Ore Estuary SPA through impacts to lesser black-backed gull, in-combination with other plans and/or projects.

Further to this, Natural England highlighted that the in-combination total of collision mortality across consented plans/projects had already exceeded levels which were considered to be of an Adverse Effect on Integrity to LBBG at Alde-Ore Estuary SPA, and that any additional mortality arising from these proposals would therefore be considered adverse.

2.2 Additional Evidence Provided by the Applicant post-examination

The project carried out updated Collision Risk Modelling (CRM) to take account of the additional mitigation measures proposed. Natural England agrees with the revised CRM figures calculated by the Applicant for the project for both kittiwakes from the Flamborough and Filey Coast (FFC) SPA and for lesser black-backed gulls (LBBGs) from the Alde-Ore Estuary SPA. We welcome the reductions in the collision risk predictions, and **confirm that we again conclude that adverse effect on integrity can be ruled out for both kittiwake at the FFC SPA and LBBG at the Alde-Ore Estuary SPA from Norfolk Vanguard alone**. Whilst it is recognised that the Projects contributions to the in-combination mortality totals is small, when compared to other projects; Natural England again advises that it is not possible to rule out an adverse effect on integrity for kittiwake at FFC SPA and LBBG at Alde-Ore Estuary SPA from in-combination collision impacts with other plans and projects.

The project also carried out calculations to demonstrate where there is headroom in the in-combination assessment from the as built projects when compared against projects as consented. Natural England acknowledges the work that the Applicant has done to consider potential headroom in the in-combination/cumulative collision risk figures by assessing the 'as built' rather than the worst case scenario (WCS). However, whilst Natural England agrees that there is likely to be some headroom, the extent of any potential headroom is not agreed. In addition, it is important to note that there is not yet an agreed way forward to calculate headroom and the approach undertaken by the Applicant has not been subjected to wider scrutiny and approval.

2.3 Additional Mitigation Proposed by the Applicant post-examination

The Applicant has committed to a number of mitigation measures that Natural England welcome, including further reduction in turbine numbers, and further raising minimum draught height of turbines.

We welcome the Project's engagement with the supply chain for both turbine manufacturers and construction vessels regarding constraints around draught height increases and turbine installation. We consider that the Applicant has made significant efforts to reduce the impacts of their proposal and demonstrated due consideration to ensure that all proposed mitigation measures are feasible. These reductions will result in a proportional reduction in the impact to birds.

Natural England welcomes the further clarity provided on how the proposed additional mitigation will be secured and that the proposed change to project parameters and methodologies have been fully secured within the DCO/dML where appropriate. We also note that a 'Schedule of Mitigation' has been provided and agreed, which clearly sets out all of the mitigation measures.

However, it should be noted that the measures are unlikely to fully exclude collision impact, so in combination considerations remain relevant. Because of this, Natural England's advice on adverse effects on site integrity remain unchanged.

2.4 Additional Measures that could Avoid/Reduce/Mitigate impacts

Natural England consider that the Applicant has taken all reasonable steps to avoid, reduce and mitigate the impacts of the proposed development on both kittiwakes at Flamborough and Filey Coast SPA and lesser black-backed gull at Alde-Ore Estuary SPA

2.5 Compensatory measures

2.5.1 Kittiwake at Flamborough and Filey Coast SPA

Please see section 1.1 for information regarding implementation of Article 6(4) of the Habitats Directive.

The project discussed a number of compensatory measures with Natural England. Given that the key issue for Kittiwake at FFC SPA, based on our understanding of site condition, is decreased productivity, Natural England were keen that measures focussing on increasing productivity, such as prey availability, were taken forward.

However, the project decided that construction of artificial nests in the southern North sea / south-east England, but located outside of the Flamborough and Filey Coast kittiwake population would provide the most confidence in deliverability.

Though this wasn't Natural England's preferred option, we agree that in-principle, the provision of additional nest sites for kittiwakes in the southern North Sea/south-east of England might have the potential to be of benefit to the regional kittiwake population and hence in our view, would ensure coherence of the Natura 2000 network (N2K), particularly if considered as a phased approach that also includes more medium term measures on prey availability. Whilst this measure would not directly benefit the FFC SPA population, we do recognise that it could be considered as a measure to ensure the coherence of the N2K network for kittiwake.

We do advise however, that greater confidence is needed:

- a. That there would be a net benefit to the overall kittiwake population size (not just simply causing a redistribution); and
- b. That there are sufficient food resources within likely foraging range around any new location to support the required level of productivity.

Whilst Natural England consider this measure has the potential to compensate for kittiwake at FFC SPA, more detail is required regarding the size and productivity of any new colony, the location and type of any new structure, the size of new structure, how the project intends to quantify the success of the measure, and the distance of the measure from the FFC SPA population.

It should also be noted that depending on the chosen location there may also be an increased collision risk that would need to be taken account of when determining the productivity of any new colony.

2.5.2 Lesser black-backed gull at Alde-Ore Estuary SPA

Please see section 1.1 for information regarding Article 6(4) of the Habitats Directive.

The Applicant discussed a number of compensatory measures with Natural England. Given that the key issue for lesser black-backed gull at Alde-Ore Estuary SPA, based on our understanding of site condition, is decreased productivity, Natural England were keen that measures focussing on increasing productivity, such as predator control, were taken forward.

Ultimately the project decided that funding a coordinator, whose role would be to facilitate the organisation of a stakeholder working group tasked with overseeing a review of the population's health, factors which have contributed to the decline, and proposals for conservation measures, would be their preferred compensation option. Depending on the outcome of this review, a trial may be undertaken to test options, before a final measure (or suite of measures) is taken forward for implementation, which could include predator control at nesting sites.

Natural England's view is that whilst the funding of a project coordinator and scoping study is helpful, there must be a commitment to delivering measures on the ground that would offset the predicted collision risk mortality.

Site management measures should be already happening within the designated site. The Section 106 agreement which was secured to address the impacts from the Galloper offshore windfarm to the LBBG population by facilitating changes to site management measures for the benefit of LBBG is still in the scoping phase of options which is effectively undertaking the same role as the Applicant's scoping study. Therefore, for the Project's proposals to demonstrate that they would have any added benefit beyond the S106 agreement, the outcomes of the S106 need to be determined first. Any compensation measure proposed by the Applicant would also need to be kept separate to the S106 to clearly demonstrate deliverables from the two projects.

Therefore, whilst we recognise the benefit of the Applicant's proposal in helping to identify possible compensation measures; we do not feel it will achieve the desired outcomes without further specification of how Norfolk Vanguard will compensate for reduced productivity of the LBBG population as a result of their project.

Natural England agrees with the Applicant that mammalian predator control is the most suitable compensation measure and we believe that this could be achieved through partnership working with local land owners in the wider Alde-Ore. Therefore we feel that further detail on this measure needs to be clarified and conformation that delivery of the measure can be assured.

2.6 Additional Considerations

2.6.1 Kittiwake at Flamborough and Filey Coast SPA

The approach and draft conditions are limited to construction of artificial nest sites, as the Applicant considers this to be the most appropriate measure to deliver compensation prior to the construction of Norfolk Vanguard. Natural England welcomed the additional effort the Applicant went to in order to present a broad range of compensation measures and would recommend other measures, for example sandeel fisheries management would be more likely to directly benefit the FFC SPA population.

2.6.2 Lesser black-backed gull at Alde-Ore Estuary SPA

The approach and draft conditions are limited to a providing a 'facilitator' role for site management measures, as the Applicant considers this to be the most appropriate measure to deliver compensation prior to the construction of Norfolk Vanguard. Natural England welcomed the additional effort the Applicant went to in order to present a broad range of compensation measures and would recommend other measures, for example direct delivery of predator control measures, would be more likely to directly benefit the Alde-Ore Estuary SPA population.

3. Overarching Comments

3.1 Consenting considerations

3.1.1 Decommissioning feasibility

One of the key issues for impacts to Haisborough Hammond and Winterton SAC is the impact of cable protection on Annex I Sandbanks and Reefs. The Applicant has determined this to be of a 'long-term temporary impact' due to their commitment to removal of any cable protection at decommissioning. Natural England notes that successful removal of cable protection has not yet been adequately demonstrated, or if removal after 30+ years would assure the recovery of the site to pre-impact levels or indeed result in a greater overall impact to the site due to adaptation of habitats to the cable protection.

3.1.2 Securing mitigations

All mitigations proposed by the Applicant have been secured in the DCO/DMLs, which Natural England welcome as this is necessary to ensure they are carried out sufficiently or alternatives pursued should they not be successful. This mitigation also includes agreeing an In-Principle Monitoring Plan that will clearly define the monitoring requirements and the rationale behind them, for all receptors likely to be impacted by the development.

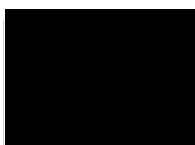
3.1.3 Recording Changes to assessments

During the examination process the Applicant supplied a high volume of additional information and has subsequently made further revisions. Consequently, the information presented in the Environmental Statement no longer reflects the current position of the project. Given that the ES and Habitats Regulations Assessment (HRA) are regularly referred to as part of the post consent/condition discharge phase of a project, there is a need for the final updated version of the assessments to be made clear for future reference.

3.2 Comments on additional information presented

As revised assessments and documents have been submitted which include significant project design changes from that considered during the examination process Natural England has included a series of Annexes that provide our detailed comments to support the content of this letter and to aid the decision making process. These are detailed in Table 1 below.

Yours sincerely



Jessica Taylor
Marine Lead Adviser

E-mail: Jessica.Taylor@naturalengland.org.uk

Table 1: Details of Annexes that provide our detailed comments to support the content of this letter and to aid the decision making process.

	Response Topic	Pages
Annex 1	Natural England's Position Statement regarding the Proposed Site Integrity Plan for the Haisborough, Hammond and Winterton (HHW) Special Area of Conservation (SAC)	13
Annex 2	Natural England's Comments on the Applicant's Haisborough Hammond and Winterton SAC Position Paper of February 2020 as submitted into Norfolk Boreas Examination	10
Annex 3	Natural England Comments on 8.20 Control Documents: Outline Norfolk Vanguard Offshore Wind Farm Haisborough Hammond and Winterton Special Area of Conservation Site Integrity Plan and Cable Specification Installation, Monitoring Plan	5
Annex 4	Natural England's comments on 11.D10.2 Appendix 3 - Cable Protection Decommissioning Evidence	4
Annex 5	Natural England's Comments on ExA: Mit; 11.D10.2 Additional Mitigation	5
Annex 6	Natural England's Comments on ExA; Mit; 11.D10.2 Appendix 2 - Assessment of Additional Mitigation	5
Annex 7	Natural England's Comments on 8.25 In Principle Compensation Measures	3
Annex 8	Natural England's comments on Norfolk Vanguard Ornithology Position Statement, ExA; Pos; 11.D10.2 (MacArthur Green 2020b)	23
Annex 9	Natural England's comments on Norfolk Vanguard Summary Overview on Habitats Regulations Assessment (HRA), ExA; Sum; 11.D10.2.	5
Annex 10	Natural England's comments on Norfolk Vanguard Additional Mitigation, ExA; Mit; 11.D10.2 (Royal HaskoningDHV 2020) and Norfolk Vanguard Additional Mitigation Appendix 1: Updated Collision Risk Modelling, ExA; Mit; 11.D10.2.App1 (MacArthur Green 2020)	8
Annex 11	Natural England's comments on Norfolk Vanguard Habitats Regulations Derogation, Provision of Evidence Appendix 1 Flamborough and Filey Coast	12

	SPA In Principle Compensation Measures for Kittiwakes, ExA; IROPI; 11.D10.3.App1	
Annex 12	Natural England's comments on Norfolk Vanguard Habitats Regulations Derogation, Provision of Evidence Appendix 2 Alde-Ore Estuary SPA In Principle Compensation Measures for Lesser black-backed gull, Document Reference 8.24	5
Annex 13	Natural England's comments on Norfolk Vanguard Ornithology Position Statement Appendix 1 Headroom Calculations, ExA; Pos; 11.D10.2. App1 (MacArthur Green 2020)	4



NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

Deadline: 27th April 2020

Annex 1:

**Natural England's Position Statement regarding the Proposed Site Integrity
Plan for the Haisborough Hammond and Winterton Special Area of
Conservation as Submitted in Norfolk Boreas Examination on 20th January
2020**

Introduction

1. Natural England ('NE') wishes to repeat and further explain its concerns about Norfolk Boreas Limited (the 'Applicant')'s proposed use of a pre-commencement ('Grampian') condition that would have the effect of deferring a full assessment of the impacts of its proposals on the Haisborough, Hammond and Winterton ('HHW') Special Area of Conservation ('SAC') until after the making of a DCO.
2. The crux of the issue is the Applicant's suggestion that cable installation across HHW should not commence until a future 'site integrity plan' ('SIP') establishes sufficient mitigation measures (including cable location) to allow it to be concluded that the works will not have an adverse effect on the integrity of the SAC, having regard to its conservation objectives. On the basis of information currently available there can be no knowing whether this conclusion can be reached.
3. If, on the basis of facts and proposals that are not yet available, it cannot be concluded that the cable works can be carried out in a benign way they can only be granted consent if, there being no alternative solutions, there are shown to be imperative reasons of overriding public interest (IROPI) for the project to go ahead and if measures are put in place to satisfactorily compensate for the harm to the SAC that will be caused. This latter requirement raises complex and novel issues that could take a long time to resolve. NE believes that it is best to bite this bullet now, in examination, rather than leave it to the future.
4. It is important for NE to stress that in taking this stance (which is consistent with its approach in other wind farm cases and with other industries) it is trying to prevent this difficult and (at the moment) essentially un-knowable issue from being pushed into the indefinite future, where (depending on the ultimate resolution of the question) there is a risk of project delay or even of electricity generating infrastructure being stranded without a viable cable route to landfall. Natural England is very appreciative of the Applicant's real desire to ensure that its proposals do not harm HHW and it is with reluctance that NE finds itself in disagreement with the Applicant on this point.

5. The correctness of NE's position can be expressed in both project management and in legal terms, but NE wishes to make it clear that, even if the law were not on its side, its stance is based on sound and helpful common sense and is the opposite of being nit-picking or overly-legalistic.
6. The same issue has recently been raised on behalf of the Secretary of State (S of S) in the Vanguard case (letter dated 6 December 2019, paragraph 6)¹. It appears that the S of S shares NE's concerns that mitigation solutions do not yet, and might not, exist and feels that it is appropriate to tackle the issues of alternatives, IROPI and compensation within the examination.
7. This is a single-issue position statement and should not be taken as affecting or diminishing the status of NE's other representations. Detailed technical issues are outside the scope of this document but can be raised directly with appropriate officers of NE.

The Applicant's proposal

8. Paragraphs 11 and 12 of the Applicant's 'Outline Norfolk Boreas Haisborough Hammond and Winterton Special Area of Conservation Site Integrity Plan version 2' (DCO Document 8.20) ('the outline SIP') explain that **(original emphasis)**:

11. Condition 9(1)(m) of Schedules 11 and 12 (The Transmission Deemed Marine Licences (DMLs)) of the Norfolk Boreas draft Development Consent Order (DCO) state:

"The licensed activities, or any phase of those activities must not commence until a site integrity plan which accords with the principles set out in the outline Norfolk Boreas Haisborough, Hammond and Winterton Special Area of Conservation Site Integrity Plan has been submitted to the MMO and the MMO (in consultation with the relevant statutory nature conservation body) is satisfied that the plan provides such mitigation as is necessary to avoid adversely affecting the integrity (within the meaning of the 2017 Regulations)

¹ Though this letter appears to suggest that NE has agreed that the SIP approach is suitable; for clarity, this is not NE's position.

of a relevant site, to the extent that sandbanks and Sabellaria spinulosa reefs are a protected feature of that site.”

12. Due to the long lead in times for the development of offshore wind farms it is not possible to provide final detailed method statements for construction prior to consent, and as a result, the detail of any required mitigation also cannot be finalised prior to consent. Key outstanding areas of uncertainty that will be addressed post consent through the SIP include:

- **The precise extent and location of the Annex 1 reef feature.** Due to the ephemeral nature of *S. spinulosa* reef which has the potential to vary greatly. This will be informed by pre-construction surveys which must be undertaken no earlier than 12 months prior to cable installation;
- **The detailed installation methodology, cable crossings and requirement for any cable protection.** This will be informed by pre-construction surveys which must be undertaken no earlier than 12 months prior to cable installation; and
- **The design of cable and pipeline crossings.** These will be determined by crossings agreements with cable and pipeline owners or operators which will be progressed post consent.

9. If this condition came into law as part of a DCO it would mean that cable could not be lawfully laid across the SAC until the MMO, in consultation with NE, is ‘satisfied’ that the following things have been resolved in a way that will prevent cables and their associated works and features from harming the protected Annex 1 sandbank and reef features of the SAC:

- *Sabellaria spinulosa* reef has been clearly mapped in the relevant part of the SAC; and
- A technically viable minimum-impact cable route has been found; and
- Minimum-impact methods of laying and protecting cable have been established;
- Site preparation design works have been identified to reduce the impacts on the site.

10. What this fails to mention is that:

- The correct legal test is not '*satisfaction*' but '*certainty*', beyond reasonable scientific doubt²;
- *Sabellaria spinulosa* reef is hard to map and its precise location within the proposed corridor is not yet well understood, though the proposed corridor falls within a fisheries management area within which there is confidence that *Sabellaria spinulosa* has been observed to be present across data sets, and existing survey evidence reveals sediment types favourable for *Sabellaria spinulosa*;
- Fisheries management within the proposed corridor has, as one of its aims, the protection of *Sabellaria spinulosa* and its recovery from damage by fishing gear;
- Without knowledge of where the reef is, and where it might grow or recover, it cannot be known whether it is actually possible to navigate cable around it.

11. And above all, what this fails to mention is any possibility that these unknowns will be resolved in such a way as to allow the MMO, acting in its capacity as competent authority, to ascertain that they will prevent adverse effect on the integrity of the SAC. In the absence of the necessary information it is not logically possible to be sure, at this point in time, that harm can be avoided simply by tweaking the route and the methodologies.

12. As an aside (and without prejudice to NE's main position) if NE's position is not accepted it is submitted that the wording of the proposed condition could helpfully be amended to make clear that the condition may only be satisfied if the MMO (in consultation etc.) is able to '... ascertain on the basis of an appropriate assessment that the plan provides such mitigation as is necessary to avoid an adverse effect on the integrity of the HHW SAC having regard to the conservation objectives for that site and within the meaning of the 2017 Regulations'.

What if harm cannot be avoided?

² See, for instance, *Waddenzee and Cooperatie Mobilisatie for the Environment UA and others v College van gedeputeerde staten van Limburg and others*.

13. The Applicant recognises that it may not be possible to avoid harm by adjusting the route and methods involved. See, for instance, paragraph 77 of the outline SIP, where it is said that (emphasis added):

77. As shown in Plate 5.1, should there not be sufficient space to route cables around reef identified during the interim and pre-construction surveys the route which would result in the least temporary disturbance would be proposed. This route would then be subject to further assessment and a conclusion of no AEoI would have to be reached by the MMO in consultation with Natural England. If such a finding could not be reached, construction could not commence and the onus would be on Norfolk Boreas Limited to consider alternative solutions. For example, this could include: minor amendments to the redline boundary in discrete areas where the cable route interacted with reef to provide space for micrositing; or a variation to the Transmission DML Condition 9(1)(m) to allow a finding of AEoI should the project satisfy the HRA Assessment of Alternatives, Imperative Reasons of Overriding Public Interest (IROPI) and Compensatory Measures tests.

14. Based on the current state of knowledge, it cannot yet be known whether feasible alternative solutions might exist. Thus attention must inevitably turn to the provisions of Regulations 29 and 36 of the Conservation of Offshore Marine Habitats and Species Regulations 2017 ('the 2017 Regs') which provide that a plan or project which will harm an SAC can be allowed to go ahead if:

- There are no alternatives that are not harmful; and
- There are imperative reasons of overriding public interest ('IROPI') in favour of the plan or project; but
- *'The appropriate authority must secure that any necessary compensatory measures are taken to ensure that the overall coherence of Natura 2000 is protected.'*³ and
- The appropriate authority is the Secretary of State.⁴

15. The Applicant rightly recognises that this position could be reached and says (in the red text boxes at Plate 5.1 of the outline SIP):

³ Reg. 36 (2) of the 2017 Regs.

⁴ Reg. 36 (3)(d) of the 2017 Regs.

- *Construction cannot commence.*
- *Norfolk Boreas Limited must consider alternatives.*
- *If no alternatives can be identified that can be agreed with the MMO, in consultation with Natural England, Norfolk Boreas Limited would be required to consider a DCO variation or Marine Licence application.*

16. If the Applicant's proposed DCO/DML condition cannot be satisfied, then a further procedure will be needed to amend that condition to bring it into a form that can be complied with. NE's view at this point is that the correct procedure would be to apply for a DCO variation, rather than a marine licence. The Infrastructure Planning (Changes to, and Revocation of, Development Consent Orders) Regulations 2011 (as amended) ('the 2011 Regulations') provide different procedures for 'material' and 'non-material' changes to DCOs. Natural England believes that any suitable amendment to the proposed DCO/DML condition will be 'material' for these purposes and ought therefore to be made by the S of S pursuant to the 2011 Regulations, with the power for a further examination to be held.

17. As regards materiality, it is clear from Govt. guidance⁵ that a change should be considered material if it would require an updated Environmental Statement or if it would invoke a need for a Habitats Regulations Assessment. In order to allow the Applicant to comply with the proposed condition it might (for instance) be necessary to adjust the red line boundary enclosing the proposed cable corridor within the SAC, inevitably requiring its own Habitats Regulations Assessment and requiring an update to the Environmental Statement. And in the event of a conclusion that adverse effect on the integrity of the SAC cannot be avoided (and that no alternative solutions and IROPI exist) the timing of the damaging works would need to be coordinated with the implementation of the necessary compensatory measures by way of a modified condition (and perhaps other measures involving third parties). The novelty of such a situation places such a modification outside the scope of 'non-material' and its importance for the protection of the Natura 2000 network of sites reinforces this conclusion.

⁵ Planning Act 2008: Guidance on Changes to Development Consent Orders. December 2015.

18. To put this another way, the DCO will be a statutory instrument and its amendment ought to be a highest-level matter. Furthermore, the necessary amendment to the condition might involve either a further appropriate assessment, or the granting of consent to harm the integrity of a SAC, which is a matter requiring judgements about IROPI (which lie better with the S of S) and the securing of compensatory measures (for which the appropriate authority is the S of S). This would bring us back to where we are at the moment, but some years down the line. It would be better to get to the bottom of this now.

What if mitigation measures can be devised?

19. Even if the Applicant, at some time after the making of a DCO, is able to improve the state of knowledge about *Sabellaria spinulosa* in the cable corridor, and is able to develop methods for satisfactorily reducing impacts, the process of formally confirming whether the pre-commencement condition has been satisfied will have to be a rigorous one, involving an ‘appropriate assessment’ within the meaning of the 2017 Regulations and case law. Rolling this up with the making of the DCO would appear to yield economies of scale, as well as keep the decision within a formal procedural framework with access to diverse expertise and a single overarching decision-maker.

The Secretary of State’s appropriate assessment

20. It is, of course, for the S of S to make the final decision on the DCO. That element of the decision that concerns cables laid in the HHW SAC will have to be supported by an ‘appropriate assessment’ that allows him or her to ascertain that the DCO and its DMLs will not lead to an adverse effect on the integrity of the SAC, having regard to its conservation objectives. Where evidence is lacking at the point of decision it is open to the S of S, and entirely reasonable, to ask whether it is yet evidentially and logically possible to reach such a conclusion.

21. The leading domestic case on what constitutes an ‘appropriate assessment’ is *Champion*⁶, a judgment of the Supreme Court. It was observed (para 41 of the judgment) that

“‘Appropriate’ is not a technical term. It indicates no more than that the assessment should be appropriate to the task in hand: that task being to satisfy the responsible authority that the project “will not adversely affect the integrity of the site concerned” taking account of the matters set out in [Article 6.3 of the Habitats Directive]’. As the court itself indicated in *Waddenzee* the context implies a high standard of investigation.”

22. From this it is clear that while there may be an element of flexibility as to whether or not to accept as ‘appropriate’ an assessment that contains elements that have yet to fall into place there is no discretion to accept as ‘appropriate’ an assessment that does not allow a conclusion to be reached because important imponderables have yet to be resolved. The S of S is hardly to be criticised if, as appears to be the case in *Vanguard*, s/he wants to understand the situation rather better before making a judgement that requires certainty.

23. Further guidance on the nature and content of an appropriate assessment has been given in *Grace and Sweetman*⁷ and in *Holohan*⁸:

‘[An appropriate assessment] may not have lacunae and must contain complete, precise and definitive findings and conclusions capable of dispelling all reasonable scientific doubt as to the effects of the proposed works on the protected area concerned.’

And

‘Article 6.3 of [the Habitats Directive] must be interpreted as meaning that the competent authority is permitted to grant to a plan or project consent which leaves the developer free to determine subsequently certain parameters relating to the construction phase, such as the location of the construction compound and haul routes, only if that authority is certain that the development consent granted establishes conditions that are strict enough to guarantee that those parameters will not adversely affect the integrity of the site.’

⁶ R (on the application of *Champion*) v North Norfolk District Council and another [2015] UKSC 52.

⁷ *Grace and Sweetman v An Bord Pleanála* CJEU C-164/17.

⁸ *Holohan and others v An Bord Pleanála* CJEU C-883/18.

24. In NE's submission, the omission of the effects of cabling in the HHW SAC from the DCO/DML appropriate assessment is an obvious lacuna, not filled by the proposed pre-commencement condition because there can be, at the date of the DCO/DML appropriate assessment, no certainty that a subsequent appropriate assessment will reach a conclusion of no adverse effect on site integrity.

Grampian conditions

25. Law, policy and guidance relating to pre-commencement conditions is as much applicable to cases arising under the Planning Act 2008 as under the Town and Country Planning Act 1990 (as amended).

26. Paragraph 55 of the National Planning Policy Framework (July 2018) states that:

55. Planning conditions should be kept to a minimum and only imposed where they are necessary, relevant to planning and to the development to be permitted, enforceable, precise and reasonable in all other respects. Agreeing conditions early is beneficial to all parties involved in the process and can speed up decision making. Conditions that are required to be discharged before development commences should be avoided, unless there is a clear justification.

27. These words derive from case law and common sense. Important to note are the requirements for preciseness, reasonableness and the presumption against pre-commencement conditions.

28. The *Grampian* case itself⁹, which established the potential lawfulness of pre-commencement conditions, added the caveat that they have to relate to '*... something which had at least reasonable prospects of being achieved ...*' and makes clear that:

'The test of whether such a condition is reasonable is strict; it amounts to whether there are at least reasonable prospects of the action in question being performed.'

⁹ *Grampian Regional Council v City of Aberdeen District Council* (1984) 47 P&CR 633

29. In *Jones v S of S for Wales and Ogwr Borough Council*¹⁰ Lord Justice Purchas said (emphasis added)

‘The final test, therefore, is whether the condition is a reasonable condition. That is a condition which a reasonable planning authority would impose. In my judgment, unless there is some evidence that there is a reasonable prospect that some crucial condition to the consent may be satisfied, then, to insist that that crucial condition should be satisfied must almost always be an unreasonable imposition of a condition.’

30. Natural England’s view is that since there is insufficient evidence to know whether the pre-condition of certainty of no adverse effect on the integrity of the SAC is capable of being fulfilled at all it is not possible to meet the strict test in Grampian because one cannot yet make a reasoned judgement of the prospect of fulfilment.

31. Natural England reserves the right to expand on this analysis should the question of the legality of the Applicant’s proposed pre-commencement condition come to the fore.

Compensatory measures

32. It is not Natural England’s role to design whatever measures may be needed to compensate for an adverse effect on the integrity of a designated site, but it is willing and able to consider any such proposals that the Applicant may make and very happy to discuss the relevant issues with the Applicant. Ultimately, Natural England’s role in this is as consultee and advisor.

33. It is beyond the scope of this note to consider law and guidance relating to compensatory measures or refer to any potential proposals. However, it is relevant to note that Govt. guidance¹¹ indicates, reasonably, that a relationship of proportionality should exist between the amount of harm caused, and the amount of compensation provided. This provides a yet further reason to get to the bottom of whether harm is or is not going to be caused to HHW, because if harm is to be caused one will need to know

¹⁰ CA (Civ Div) (1991) 61 P&CR 238.

¹¹ Habitats and Wild Birds Directives: guidance on the application of article 6(4). Alternative solutions, imperative reasons of overriding public interest (IROPI) and compensatory measures. December 2012

how much harm before being able to put together measures to compensate for it, and to ensure that those measures are secured.

Natural England's history in relation to this matter

34. Natural England has clearly expressed concerns about the use of a pre-commencement condition in both the Vanguard and Boreas cases. See for instance pages 20 – 22 and Appendix 2 of Natural England's Relevant Representations of 31st August 2019 (Boreas) [RR-099] and NE's Deadline 8 submission (Vanguard) [REP8 – 104].

35. The Applicant's document 'Consideration of the Purpose of the Haisborough Hammond and Winterton Special Area of Conservation Site Integrity Plan', Document reference: EA; AS; 10.D7.19 of May 2019, produced in relation to Vanguard, notes instances in which pre-commencement conditions of this exact sort have been incorporated into offshore windfarm DCOs. By inference it suggests that if NE accepted these conditions in those cases it ought to accept them in this case.

36. If that inference is intended, Natural England wishes to stress that its position is always pragmatic and evidence-based: if the evidence in one windfarm case allows it to understand the effect of the project on protected features it is not going to take an obdurate position and raise unhelpful issues of process and law. However, knowledge and understanding improve with time and Natural England will always be guided by the best and most up-to-date information. The fact that NE takes the stance that it does in the Boreas and Vanguard cases, but not in others, shows (a) its improved understanding of ecological issues raised by wind farms and (b) how strongly NE feels about the difficulties of the Applicant's proposal. Looking at each of the cases mentioned in the Applicant's document (cited in the paragraph above):

37. Hornsea Project Two:

37.1. The SAC in question is the Southern North Sea SAC, and the protected features are marine mammals. The technical issues involved were fundamentally different from the situation at HHW. It is noteworthy that the condition in question is accompanied by a list of 6 potential mitigation measures, indicating the number of tools at the Applicant's disposal when designing future mitigation.

38. East Anglia Three:

38.1. Again, the SAC in question is the Southern North Sea SAC, and the protected features are marine mammals. It appears that the draft SIP already contained a number of potential mitigation measures and that NE took a reasonable and pragmatic approach toward accepting that they would work.

39. Norfolk Vanguard.

39.1. The same issues arise in relation to both Vanguard and Boreas, and NE's position has been consistent.

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20th January 2020



NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

Deadline: 27th April 2020

Annex 2:

Natural England's Comments on the Applicant's Haisborough Hammond and Winterton SAC Position Paper of February 2020 as submitted into Norfolk Boreas Examination

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1 Introduction

- 1.1 Please find below Natural England's comments on the Applicant's document entitled "Norfolk Boreas Limited Haisborough Hammond and Winterton SAC Position Paper" dated February 2020, version 1, submitted by the Applicant at Deadline 5 [REP5 -057].
- 1.2 Please note that all comments included in this response also reflect Natural England advice in relation to the Norfolk Vanguard position statement submitted on 28th February 2020 in response to the Secretary of States letter dated 6th December 2019

2 Summary

- 2.1 Natural England notes that the Applicant's Position Paper is provided in order to support the position that with the proposed mitigation measures it does not consider that its proposals will have an Adverse Effect on Integrity (AEoI) on the Haisborough Hammond and Winterton Special Area of Conservation (HHW SAC), as any residual impacts will be either *de minimis* or inconsequential to the nature conservation of the site.
- 2.2 The Applicant identifies what it believes to be over-precaution in Natural England's evidence and advice. Natural England acknowledges that it has taken a precautionary approach, as the law requires, and notes that the legal standard of proof requires certainty that the Applicants proposals will not have an AEoI on the HHW.
- 2.3 Whilst Natural England remains unable to rule out an AEoI beyond reasonable scientific doubt it is certainly acknowledged that the risk of an AEoI has been considerably lowered by the additional mitigation that has been committed to by the Applicant.
- 2.4 Natural England believes that there are inherent uncertainties in the deliverability of the measures proposed by the Applicant, including those proposed most recently, and agrees with the Applicant that the amount and location of Annex 1 *Sabellaria spinulosa* reef that may be encountered within the proposed cable corridor at the time of cable laying cannot be known now.
- 2.5 Natural England also wishes to stress that the future effects of measures to be taken to control fishing activities capable of harming Annex 1 *Sabellaria spinulosa* reef needs to be monitored and reviewed over time and allowed to be as effective as they can be. These are measures affecting another industry sector and their intended effect (and the understanding of their actual effects) should not be compromised, at least initially, by other anthropogenic impacts.

3 Detailed Comments

Para-graph	Comment
2	<p>Natural England notes that the Applicant appears not to take into account, or wish to address, Natural England’s Position Statement regarding the proposed site integrity plan for the HHW SAC, dated 20th January 2020 [REP4-041]. Natural England wishes to repeat the concerns and legal issues raised in that document.</p>
3	<p>Natural England accepts that SACs are not exclusion zones. However, SACs protect natural habitat types of international conservation interest and benefit from the highest levels of legal protection afforded to conservation sites. The concept of <i>de minimis</i> is not found in the relevant law or guidance and the correct approach is to consider the existence, or not, of adverse effects on the integrity of the site, rather than whether adverse effects are large or small. If it cannot be shown that the proposal will not have an adverse effect on site integrity it should only be allowed if the Article 6.4 derogations route (IROPI, alternatives, compensatory measures) is followed. Small adverse effects or uncertain effects on site integrity can be accommodated by the derogations route, as the scale of compensatory measures should relate to the scale of harm.</p>
8	<p>Please note that the conservation objectives that the Applicant quotes are the higher level objectives for the site, and therefore very briefly stated. More detail can be found in Natural England’s conservation advice package.</p>
10, 14	<p>Please see Natural England’s relevant representation [RR-099] where concerns about the Envision assessment report are set out.</p> <p>It is important to note that all areas of natural <i>Sabellaria spinulosa</i> reef are protected equally. This ought to include areas where it is considered likely that new reef will form. It is in this way that the conservation objective “to restore” is pursued.</p> <p>Further, as Natural England has previously explained, the term “priority areas” has no place in this analysis. No area of reef is more important than any other. This term has arisen in the course of considerations of where the greatest potential for reef recovery exists and does not describe areas of reef that are of special importance.</p> <p>The fisheries management measures in question seek to protect <i>Sabellaria spinulosa</i> reef (both existing and future) from damage by trawled fishing gear. Natural England believes it inappropriate to allow activities that hinder the objectives of these management measures, at least until such time as the effectiveness (or not) of the measures has been monitored and determined.</p> <p>The latter point can be expressed in terms of conservation: it is not sensible to try to prevent harm (albeit of uncertain extent) with one hand while allowing harm (albeit limited) with the other. The same point can be expressed in administrative terms: if it is considered appropriate to affect the</p>

	<p>fishing industry it ought to be inappropriate to permit another industry to undermine any resulting benefit (albeit in a limited way). The purpose of the fisheries management measures is to improve reef condition and not to create headroom to allow small areas of reef to be harmed.</p>
13	<p>Our advice remains unchanged in relation to difficulties in the ability to microsite we set this out in RR-099 and Deadline 5 [REP5-078] and [REP5081].</p>
16	<p>Please note that there is a difference in the approach taken by the EIFCA and MMO/Defra for fisheries management. Natural England agrees that there is a higher level of precaution included in the beyond-6nm fisheries management that is not present within 6nm. However, it should be noted that due to BREXIT the areas to be managed beyond 6nm are likely to change with the EU Common Fisheries Policy (CFP) no longer applying to the UK. However, Natural England would advise that fisheries management areas will still be required beyond 6nm, especially in areas where <i>Sabellaria spinulosa</i> reef has been observed on a more regular basis. Therefore, Natural England's future advice is likely to be similar to that previously provided and could include new areas and/or involve a series of smaller areas including the more heavily fished area to the South East of the site.</p> <p>The Applicant identifies three areas of uncertainty in relation to Natural England's approach to the protection of <i>Sabellaria spinulosa</i> reef, and "areas to be managed as reef" (namely areas where it is appropriate to pursue the "restore" objective). In relation to each of these three topics, Natural England accepts that it has taken a precautionary approach, as the law requires it to. Natural England does not accept that multiple separate "layers" of precautionality necessarily equates to over-precautionality when combined into a single analysis. Each topic must be looked at on its own merits.</p> <p>Regarding the <u>extent and distribution of reef</u>: Natural England has taken a precautionary approach on the basis of the evidence to hand, which is no more than a snap-shot at one point in time, but it can do no more nor less than this. As mentioned, in order to have regard to the objective of restoring the site to favourable condition it is necessary to protect not only existing reef, but also areas where it is likely to return.</p> <p>Regarding the <u>spatial extent and impact of fishing</u>: it is acknowledged that there is a lack of information, and that current fishing activity may be low. However, <i>Sabellaria spinulosa</i> reef is known to attract other biodiversity, including species important to the fishing industry (this being one of the reasons why it is so highly protected), and fishing activity changes over time and space. Moreover, it should be noted that the level of fishing pressure is not necessarily a good measure of the extent of harm caused, since the first pass of a trawl over <i>Sabellaria spinulosa</i> reef does more harm than subsequent passes. Natural England feels that its precautionary approach to this topic, which is based on the best available evidence and which influences the size of the areas it feels should be protected, is entirely appropriate in view of the desired outcomes.</p> <p>Regarding the <u>recover objective</u>: as above, the current (not well understood) level of fishing activity is (in the absence of controls) no guide to future levels. It is known that <i>Sabellaria</i></p>

	<p><i>spinulosa</i> reef has been and can be impacted by anthropogenic activities that are occurring within the site, therefore it is probable that this habitat is being suppressed by those activities and that the “restore” objective is compromised by those activities.</p> <p>Natural England wishes to stress that the approach that it takes in this case is consistent with its approach in all other plans or projects affecting this SAC.</p>
17	<p>As set out in RR-099 Natural England is advising that fisheries management areas are required to exclude fisheries pressures to aid <i>Sabellaria spinulosa</i> reef recovery in particular areas and we need to be consistent across industries. Whilst it is recognised that the impacts are different in scale both spatially and temporarily between fisheries and cable installation; we advise that the competent authorities BEIS and EIFCA undertake an Appropriate Assessment to consider the impacts <u>in-combination</u>. This would allow consideration to be given to means of avoiding interactions in byelaw areas.</p> <p>Please see advice provided at Deadline 4 [REP4-041], where Natural England discussed recoverability after disturbance. Even if/where the conservation objective is to “maintain” rather than “restore” there would still need to be mitigation measures to fully avoid AEoI and Natural England does not accept that the areas of reef involved are <i>de minimis</i>. Yes, they are small when expressed as a percentage of site area and actual or potential areas of reef within the site, but HHW is a large site and any loss of protected habitat is a matter of significance. The expression “death by a thousand cuts” is sometimes used in the context of conservation and is relevant here. Natural England fully accepts that the Applicant’s proposals will not have a large (or medium sized) effect on the integrity of the HHW, but if they occur without compensatory measures they will amount to a cut.</p>
18	<p>With regards the potential to microsite export cables to avoid Reef, Natural England draws attention the words “If this is possible”.</p>
19, 20	<p>The fact that the fisheries management measures are not yet in place doesn’t remove the need to protect Annex I reef or hinder its recovery in those areas where it has been found to most regularly occur i.e. areas likely to be included in the fisheries management.</p> <p>The draft DCO allows a long window for construction and it cannot be said that both fisheries management measures will not be in place before the relevant works start. It cannot be said that, in the timescales realistically involved, <i>Sabellaria spinulosa</i> reef will not have formed to an extent that makes micrositing impossible.</p>
21, 22, 23	<p>As recognised by the Applicant, Natural England doesn’t believe that disturbance and recovery of Annex I reef following cable installation has been demonstrated. The evidence presented by <i>Peace et al.</i> related to the establishment of <i>Sabellaria spinulosa</i> reef on areas of disturbed ground, but not where it was previously.</p> <p>The Applicant asserts that, if the whole cable corridor were to be blocked by <i>Sabellaria spinulosa</i> reef, it would take the shortest possible line through that blockage. It is too soon to make this</p>

	<p>assertion, as ground conditions and other features that are still poorly understood and could prevent this. It is therefore too early to say that whatever route is found through the cable corridor will be essentially neutral in effect, because that route has not yet been mapped.</p> <p>And, as mentioned above, and in Natural England’s Position Statement of 20th January 2020 [REP4-041], <i>de minimis</i> adverse effect on integrity is not a recognised concept. Any adverse effects on the integrity of the SAC, having regard to the conservation objectives for the SAC, should be dealt with via the Article 6.4 derogations route, even if small.</p>
24	The aggregates dredging industry seeks to avoid areas of Annex I reef, so the evidence base for the Applicant’s assertion is not large. See also the comment on <i>Pearce et al</i> , above.
29.	Natural England repeats its views about the concept of <i>de minimis</i> [REP4-041],
32.	Natural England welcomes the reduction in the quantity of cable protection estimated to be required and appreciates the work and thinking that has gone into this. However, it is noted that the amount of cable protection that will actually be required can only be known once, or shortly before, cable laying starts.
34	Please see Natural England’s position on impacts on <i>Sabellaria spinulosa</i> reef from the placement of rock armouring [RR-099].
37	<p>The fact that SACs are not exclusion-zones has been commented on above. Those comments are repeated here.</p> <p>HHW SAC is not in favourable condition – it has lost Annex I <i>Sabellaria spinulosa</i> reef from areas where, in a less damaged site, Natural England would expect to find it. Sites of this sort are subject to natural change, which includes recovery from damage. The Applicant’s cable routing proposals are based on the current snap-shot data and (much as those proposals have been made in absolute good faith and in a very positive spirit) they may not hold good by the time the work starts. Natural England would find it helpful to see how the cable routing proposals were actually devised to take into account the presence of Annex I reef.</p> <p>In relation to possible areas where cable protection might be required, please see Natural England’s deadline 4 and 5 responses [REP4-038, REP4-041, REP4-043, REP5-078, REP5-081] concerning the importance of areas in-between protected features for the functioning of those features.</p> <p>In relation to the <i>de minimus</i> assertion made at para. 37 d., please see Natural England’s small-scale loss position RR-099.</p>
40 and Appen dix 1	<p>The Applicant’s new commitment to the use of no cable protection in the area “to be managed as <i>Sabellaria spinulosa</i> Annex I reef” further demonstrates the Applicant’s helpful approach.</p> <p>However this commitment must necessarily be qualified by observing that until closer to the date of the work it cannot be known how much cable protection will actually be required for operational and safety reasons, and by noting that the agreement of the MMO to allow this commitment to be reduced will, as a matter of law, require a fresh Appropriate Assessment and</p>

	the application of the law requiring certainty of no AEoI.
44	<p>Whilst Natural England agrees with the Applicant that <i>Sabellaria spinulosa</i> is a widespread species within the North Sea and that it is only when it forms a cohesive ‘reef’ structure does it become of conservation importance, we do not agree that <i>Sabellaria spinulosa</i> (even in potential reef form) is Annex I reef when located on artificial substrate. As set out in Natural England Relevant Representations [RR-099] the SNCBs consider the establishment of <i>Sabellaria spinulosa</i> reef on artificial substrate as not "counting" towards favourable condition of the feature and/or site. This is because it is not a replacement for Annex I <i>Sabellaria spinulosa</i> reef on natural site sediment as set out at the time of designation and within the conservation advice package for the site.</p>
46	<p>Natural England agrees that we can’t currently determine if and when recovery has occurred. This will need to be reviewed over the following years, considering best available evidence.</p> <p>Natural England queries the assertion that, if <i>Sabellaria spinulosa</i> reef were to recover to the extent of making up 6% of the HHW SAC, it could be said to have exceeded the “restore” objective. In the absence of factors promoting unnaturally enhanced Annex I reef recovery all <i>Sabellaria spinulosa</i> reef recovery is to be welcomed as a natural phenomenon affecting a protected habitat.</p>
49, 50, 52	Natural England repeats its previous comments in relation to an interim survey in 2020 to map the extent of <i>Sabellaria spinulosa</i> , AEoI on Annex I Sandbanks, and cable protection [RR-099, REP1-057, REP3-023, REP4-038, REP4-041, REP5-081].
58	Please note that whilst Natural England recognises the commitment by the Applicant to reduce the impacts from sediment disposal, there is still a requirement to ensure that disposal is within areas of similar particle size.
Section 6	<p>Natural England has concerns about (a) the practical suitability of the proposed Grampian condition and (b) the legality of the use of this condition. Please see Natural England’s Position Statement dated 20th January 2020 [REP4-041]. These concerns remain and are repeated. It is for the Secretary of State to determine, on the basis of an Appropriate Assessment, whether the information provided by the Applicant actually supports the conclusion of no AEoI. In making this judgement the decision maker will have to bear in mind that the evidence to hand is essentially snap-shot and that things are likely to have changed during a realistic timescale.</p> <p>The Applicant points out that the purpose of the Grampian condition is to “verify previous assessments”. Natural England responds to this by noting that there is a possibility that the condition’s mechanism will not verify previous assessments, because previous assessments may be superseded by events. There is not “every prospect that the Grampian condition can be discharged in the timescales ...” – because there is <i>some</i> prospect that it can’t.</p> <p>It is not appropriate to equate the use of the SIP process in this case to its use in the SNS SAC, in relation to the disturbance of marine mammals. In that case Natural England is sure that if works etc are suitably timetabled and carried out in the right way there will be no AEoI. That certainty is</p>

	<p>based on confidence in existing technologies and mechanisms for ensuring sensitive timetabling. In this case the contingencies are greatly less knowable at this range.</p> <p>The proposal to use a Cable Specification, Installation and Monitoring Plan (CSIMP), which has to be submitted to and approved by the MMO, does not cure the problems of uncertainty. For legal purposes a future CSIMP will represent a plan or project that will have to be subjected to Appropriate Assessment during the process of approval by the MMO. Depending on circumstances existing at the time of submission of a CSIMP to the MMO the Appropriate Assessment is capable of concluding that AEoI will be caused, exactly as with the SIP process.</p> <p>To amplify this point: the proposed wording at para. 78 describes a process by which cable laying cannot commence until a plan for it has been submitted to and approved in writing by the MMO. This is a situation contemplated for by reg. 28 (1) of the Conservation of Offshore Habitats and Species Regulations 2017, which provides that <i>“Before deciding to undertake, or given any consent, permission or other authorisation for, a relevant plan or project, a competent authority must make an appropriate assessment of the implications of the plan or project for the [SAC] in view of that [SAC’s] conservation objectives”</i>. By reason of reg. 5 of the 2017 Regulations the MMO is plainly a (or the) competent authority in this situation and the subject matter of a CSIMP is plainly a “relevant plan or project” for the purposes of reg. 28 (2) as all three of reg. 28 (2) (a), (b) and (c) are fulfilled. It therefore follows that on receipt of a CSIMP, and before it can approve it, the MMO will have to carry out its own appropriate assessment of the Applicant’s plan for specifying, installing and monitoring cables within the HHW SAC. It cannot be said that these things have received appropriate assessment at the time of the making of the DCO, because at that time the necessary details had not been specified.</p> <p>It may be that at the point of submission of a CSIMP it will indeed be possible to micro-site the cable in a manner that is neutral as to protected features, but the significant effect on the site cannot be ruled out, meaning that a full appropriate assessment will be unavoidable.</p> <p>If this mechanism for dealing with the uncertainties of future cable laying and protection is to be employed it is suggested that it be called a Cable Specification, Installation, <u>Mitigation</u> and Monitoring Plan, as mitigation measures will be a key part of it.</p>
Appendix 1	<p>Natural England notes that the contents of the Appendix 1 ‘Assessment of Additional Mitigation of HHW SAC’ are the same as was submitted (28th February 2020) in response to the Secretary of State’s request for further information letter for Norfolk Vanguard dated 6th December 2019.</p> <p>At the request of the Secretary of State all interested parties including Natural England are to provide our comments on the submitted documents by no later than 27th April 2020. Therefore, we are currently in the process of reviewing the documents and drafting our formal advice to Secretary of State. However, until that process has concluded we are unable to advise on whether or not that mitigation is sufficient for both projects. We will therefore provide our advice on Appendix 1 for Deadline 9 on 29th April 2020</p>
Appendix	<p>Natural England believes that the document submitted at REP5 – 058 as Appendix 2 is the joint</p>

dix 2	<p>recommendation for North Norfolk Sandbanks and Saturn Reef Special Area of Conservation (NNSSR SAC) and Haisborough Hammond and Winterton (HHW) SAC for fisheries proposals under the Common Fisheries Policies (CFP) beyond 6nm, which is a co-ordinated DEFRA document drafted by Natural England, Marine Management Organisation, Joint Nature Conservation Committee and DEFRA. However, with the current cover page and no attribution to the authors this could be misconstrued as a Norfolk Boreas Ltd. document.</p> <p>Please note that all information relevant to the Norfolk Boreas project in relation to the CFP proposals has been provided by Natural England's in our relevant representation [RR-099]</p>
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NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

Deadline: 27th April 2020

Annex 3:

Natural England's Comments on 8.20 Control Documents: Outline Norfolk Vanguard Offshore Wind Farm Haisborough Hammond and Winterton Special Area of Conservation Site Integrity Plan and Cable Specification, Installation and Monitoring Plan

Contents

1	Introduction	3
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1 Introduction

1.1 Please find below Natural England’s comments on the 8.20 Control Documents: Outline Norfolk Vanguard Haisborough Hammond and Winterton Special Area of Conservation Site Integrity Plan (‘HHW SIP’) – clean and tracked changed and the Cable Specification, Installation and Monitoring Plan as submitted by the Applicant on 28th February 2020 in response to the Secretary of States letter dated 6 December 2019.

1.2 List of Acronyms

- NVG – Norfolk Vanguard (the ‘Project’)
- HHW – Haisborough Hammond and Winterton
- SAC – Special Area of Conservation
- SIP – Site integrity Plan
- SoS – Secretary of State
- CSIMP – Cable Specification, Installation and Monitoring Plan

2 Summary

2.1 Overall Natural England’s (NE) view on the use of a SIP to defer the required consideration of adverse effects on integrity to post consent remains unchanged as set out in Natural England’s position paper submitted at Deadline for the Boreas examination [REP4 – 041] and for ease of reference provided at Annex 1 of this response.

2.2 However, Natural England does consider the document to be useful in collating all of the relevant information provided to address potential impacts to HHW SAC and securing the commitments made by the applicant to reduce the impacts to designated site features. We also note that this is mirrored in the Boreas HHW SIP submitted at Deadline 6 [REP6 – 012]

2.3 In relation to the above point in relation to securing mitigation measures we note that the CSIMP would also have this requirement therefore we propose that the CSIMP should in fact be the ‘Cable Specification, Installation, Mitigation and Monitoring Plan’

2.4 Please find below Natural England’s detail comments

3 Detailed Comments

Para.	Page	Comment	RAG
General Comments relevant to SIP and CSIMP		How will the monitoring for NVG and Boreas take into account potential skewing of data from works happening for either project	

General Comment relevant to SIP and CSIMP		Also all of the points raised in relation to the In principle Monitoring Plan for Boreas need to be acknowledge in the Control Documents	
Section 3		In a previous version paragraph 36 had detailed information on what would be provided pre construction to inform cable installation – we would welcome its retention.	
41.	13	<p>Please note that within Annex 4 which discusses the possible decommissioning of cable protection NE highlights that whilst the impacts from cable protection are no longer considered to be permanent; the placement of cable protection is considered to be having a lasting change on the habitat over a period of 30 years (life time of project) and beyond, as recovery will not be immediate. There is no evidence presented that demonstrates what the impacts are likely to be on Annex I habitats and site conversation objectives from such a temporally long time and that habitat recovery is achievable to its pre-impacted state. Therefore, it is our view that a 30 years change in habitat can't be considered to be a small scale loss/change. In addition there is no evidence presented on the potential for any wider surrounding area impacts from the presence of the cable protection and its removal. Therefore, due to the uncertainties any assessment needs to include precaution. For decommissioning to be considered as mitigation then this would need to be restricted to concrete mattresses (or similar type product) in the DCO/DML.</p> <p>The same is true for CSIMP paragraph 66.</p>	
Table 3.1 and Section 4.4 of the CSIMP	15	<p>We note that in the disposal principles the need to dispose of sediment in areas of similar grain size i.e. the SoS 95% similar DCO condition has not been addressed.</p> <p>In addition the above comment on decommissioning is also relevant to the text included within the table</p>	
	30	We believe there is a typo in the flow chart where 'Boreas' is named rather than Norfolk Vanguard.	
	34	It is unclear if the pre-construction Sandwave levelling report is secured in the DCO?	
89	29	NE welcomes the commitment to not use jack up vessels in HHW SAC to further minimise impacts to benthic habitats.	

110	36	Natural England notes that Norfolk Vanguard and Boreas highlight only the designated Sandbank feature and buffer zone as areas of Annex I Sandbanks that are to be managed for conservation as Sandbanks. However, the sediment between Sandbanks is also important for the functioning of the Sandbanks, as well as for Annex I Reef formation, and therefore impacts occurring between features may still be detrimental to the Annex I feature(s). A 2016 SNCB survey identified that the species composition in these areas was similar to that of the species composition within the Annex I features. Put simplistically, if these areas are sandy and dynamic they are considered important to / part of the Sandbank features and if stable and mixed sediment have the potential to support Reef habitat. The only areas thought not to be providing this important 'functionality' role is where exposed oil and gas pipelines transect the site. Therefore it cannot be determined that the impacts are small scale and inconsequential	
Appendix 1	47- 48	NE notes that micrositing in both the SIP and the CSIMP doesn't take into account potential archaeological finds. Please see Bores REP5 – 081 Natural England's advice on Applicants Clarification Note on optimising cable routing through the HHW SAC [REP4 – 022] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-001747-DL5%20-%20Natural%20England%20-%20Advice%20on%20Applicant's%20Clarification%20Note.pdf	
Appendix 2	49	Interim cable burial study: Whilst Natural England welcomes the further consideration of the data sets; we note that there is currently limited scientific evidence to base the conclusions of this report with any certainty. In particular the recovery of reef	
Appendix 3	81	Locations of cable protection: Natural England notes that the area(s) most likely to require cable protection is within mixed sediment areas between Sandbanks which are most likely to support Annex I reef.	



NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

Deadline 27th April 2020

Annex 4:

**Natural England's comments on 11.D10.2 Appendix 3 - Cable Protection
Decommissioning Evidence**

Contents

1	Introduction	3
2	Summary.....	3
3	Detailed Comments	3

1 Introduction

- 1.1 Please find below Natural England’s comments on 11.D10.2 Appendix 3 - Cable Protection Decommissioning Evidence as submitted by the Applicant on 28th February 2020 in response to the Secretary of States letter dated 6 December 2019.

2 Summary

- 2.1 Natural England welcomes the comprehensive consideration of possible cable protection decommissioning options. Whilst a commitment to decommissioning is welcomed as best practice and may mean no permanent habitat loss; it does not mean there won’t be a ‘lasting’ effect on the habitat for the lifetime of the project i.e. 30 years. There is limited assessment and understanding of what the implications of this enduring temporal impact will have on the conservation objectives of the site and recovery of the Annex I habitats.
- 2.2 Therefore, there remains a sufficient degree of uncertainty that an Adverse Effect on Integrity cannot be ruled out beyond all scientific doubt.
- 2.3 In addition, based on the information presented in this document, for decommissioning to be considered as a mitigation measure then there would need to be a DCO/dML condition that restricts the type of cable protection to concrete mattresses (or similar protection).
- 2.4 Please find below Natural England’s detail comments

3 Detailed Comments

Para.	Page	Comment	RAG
		General Comment: Natural England recognises that the proposed cable protection not only increases the probability of removal at the time of decommissioning, but also reduces the footprint of the impact.	Green
8	2	NE highlights that whilst the impacts from cable protection are no longer considered to be permanent; the placement of cable protection is considered to be having a lasting change on the habitat over a period of 30 years (life time of project) and beyond, as recovery will not be immediate. There is no evidence presented that demonstrates what the impacts are likely to be on Annex I habitats and site conversation objectives from such a temporally long time and that habitat recovery is achievable to its pre-impacted state. Therefore, it is our view that a 30 years change in habitat can’t be considered to be a small scale loss/change. In addition there is no evidence presented on the potential for any wider surrounding area impacts from the presence of the cable protection and its removal. Therefore, due to the uncertainties any assessment needs to include precaution. For decommissioning to be considered as mitigation then this would need to be restricted to concrete mattresses (or similar type product).	Red

1.3.2	3	Based on the information presented the Applicant is accepting the industry concerns in relation to laying concrete mattresses and potential for them to be moved. Therefore, for decommissioning of cable protection to be considered as mitigation there would need to be a DCO/dML condition specifying concrete mattress (or similar type product) for cable protection. Noting that If restricted to concrete mattress or similar product, modifications to achieve removal at time of decommissioning would be required and should inform any in principle decommissioning plan	
4.2.1 (35)	8	Natural England has limited experience of Duramat's being used in the marine environment. But we note that it is effectively made of plastic with a glass coating. Therefore, before this cable protection could be agreed there would need to be confidence that the mats would not degrade along with a guarantee of recovery. However, we do note the advantages of the low profile which is likely to allow natural processes to function.	
4.2.2	9	Can the CSUB (Duramat) system be used alone? It is mentioned that it can be held in place by ballast, how likely is that to be rock armouring?	



NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

Deadline: 27th April 2020

Annex 5:

Natural England's Comments on ExA: Mit; 11.D10.2 Additional Mitigation

Contents

1	Introduction	3
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3	Detailed Comments	4

1 Introduction

1.1 Please find below Natural England’s comments on ExA: Mit; 11.D10.2 Additional Mitigation - Benthic Page 13 onwards as submitted by the Applicant on 28th February 2020 in response to the Secretary of States letter dated 6 December 2019.

2 Summary

2.1 Natural England welcomes the comprehensive consideration and commitment by the Applicant of the additional mitigation measures. However, Natural England continues to have concerns in relation to the deliverables of the proposed mitigation as set out below and in more detail in the table below

Are the proposed measures likely to successfully reduce the impacts?	Yes to an acceptable level	Yes to an acceptable level, but with caveat	Yes, but still concern over residual impact
	<ul style="list-style-type: none"> - Demonstrated that Permanent Habitat loss is avoided by keeping sediment within site 	<ul style="list-style-type: none"> - If Sandwave levelling achieves as set out to do i.e. reduces requirement for cable protection and not hindering recovery. However, note limited evidence over longer timeframe of success, ability to deploy at significantly greater scale and applicability to more different site to the one where it has currently been used 	<ul style="list-style-type: none"> - Reduction in Cable protection within site crossings and within ‘priority’ areas
	<ul style="list-style-type: none"> - Additional impacts associated infrastructure is reduced such as no jack up barge in SAC 	<ul style="list-style-type: none"> - Yes if Micro siting is possible 	<ul style="list-style-type: none"> - Reduction in the number of cables
		<ul style="list-style-type: none"> - Yes if reburial is outside of Annex I areas 	<ul style="list-style-type: none"> - Agreement of location etc. of CP so have further opportunity to reduce impacts
			<ul style="list-style-type: none"> - If restricted to concrete mattress or similar product that can be successfully modified to achieve removal at time of decommissioning then impacts will no longer be permanent, but will remain lasting for 30 yrs. Also would need to limit the type of cable protection in DCO/DML

3 Detailed Comments

Para.	Page	Comment	RAG
	39 and 72	Please note that the Haisborough Hammond Winterton Special Area of Conservation (HHW SAC) restore objective for Annex I reef is not just in relation to the fisheries impacts. Therefore the placement of cable protection outside of the Applicant’s identified ‘priority’ areas for fisheries management may still have an effect on the restore objective. For example if Annex I reef is impacted through cable installation outside of priority areas then there will be a further area that needs to recover in addition to those being managed to restore the impacts from fisheries	Yellow
3.2.2		Please see Annex 4 which discusses the decommissioning proposals	Yellow
3.2.3		Natural England welcomes the removal of disused cable to further reduce the need for cable protection at crossing locations within the HHW SAC	Green
3.2.5		Please see Natural England comments on the HHW Site Integrity Plan (SIP) and Cable Specification, Installation, and Monitoring Plan (CSIMP) at Annex 3	Red
57		<p>Natural England has concerns about (a) the practical suitability of the proposed Grampian condition and (b) the legality of the use of this condition. Please see Natural England’s Position Statement (Attached at Annex 1). These concerns remain and are repeated. It is for the Secretary of State to determine, on the basis of an Appropriate Assessment, whether the information provided by the Applicant actually supports the conclusion of no AEoI. In making this judgement the decision maker will have to bear in mind that the evidence to hand is essentially snap-shot and that things are likely to have changed during a realistic timescale.</p> <p>The Applicant points out that the purpose of the Grampian condition is to “verify previous assessments”. Natural England responds to this by noting that there is a possibility that the condition’s mechanism will not verify previous assessments, because previous assessments may be superseded by events. There is not “every prospect that the Grampian condition can be discharged in the timescales ...” – because there is some prospect that it can’t.</p> <p>It is not appropriate to equate the use of the SIP process in this case to its use in the SNS SAC, in relation to the disturbance of marine mammals. In that case NE is sure that if works etc are suitably timetabled and carried out in the right way there will be no AEoI. That certainty is based on confidence in existing technologies and mechanisms for ensuring sensitive timetabling. In this case the contingencies are greatly less knowable at this range.</p>	Red

57 (cont).	<p>The proposal to use a Cable Specification, Installation and Monitoring Plan (CSIMP), which has to be submitted to and approved by the MMO, does not cure the problems of uncertainty. For legal purposes a future CSIMP will represent a plan or project that will have to be subjected to Appropriate Assessment during the process of approval by the MMO. Depending on circumstances existing at the time of submission of a CSIMP to the MMO the Appropriate Assessment is capable of concluding that AEoI will be caused, exactly as with the SIP process.</p> <p>To amplify this point: the proposed wording at para. 78 describes a process by which cable laying cannot commence until a plan for it has been submitted to and approved in writing by the MMO. This is a situation contemplated for by reg. 28 (1) of the Conservation of Offshore Habitats and Species Regulations 2017, which provides that “Before deciding to undertake, or given any consent, permission or other authorisation for, a relevant plan or project, a competent authority must make an appropriate assessment of the implications of the plan or project for the [SAC] in view of that [SAC’s] conservation objectives”. By reason of reg. 5 of the 2017 Regulations the MMO is plainly a (or the) competent authority in this situation and the subject matter of a CSIMP is plainly a “relevant plan or project” for the purposes of reg. 28 (2) as all three of reg. 28 (2) (a), (b) and (c) are fulfilled. It therefore follows that on receipt of a CSIMP, and before that it can approve it, the MMO will have to carry out its own appropriate assessment of the Applicant’s plan for specifying, installing and monitoring cables within the HHW SAC. It cannot be said that these things have received appropriate assessment at the time of the making of the DCO, because at that time the necessary details had not been specified.</p> <p>It may be that at the point of submission of a CSIMP it will indeed be possible to micro-site the cable in a manner that is neutral as to protected features, but the significant effect on the site cannot be ruled out</p>	
58	Natural England doesn’t agree with the Applicant’s conclusions of no adverse effect on integrity as set out by the attached documents	
60	The only time that the CSIMP condition is considered to be appropriate is if no adverse effect on integrity is determined by the competent Authority and/or AEoI is removed by the securing of compensation measures. Please see Annex 1 relating to our views on the use of a SIP	
73.	Whilst yes we can agree that decommissioning cable protection would change the impact to temporary there is still a further consideration of significant temporal impacts from a lasting impact for >30 years. There is no evidence presented of what the impacts area likely to be on Annex I habitats and site conservation objectives from such a temporally long time and that habitat recovery is achievable to its pre-impacted state. It therefore can’t be considered with certainty to be a temporary impact. In addition, it is our view that 30 years of change in habitat can’t be considered to be a small scale loss/change.	



NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

Deadline: 27th April 2020

Annex 6:

**Natural England's Comments on ExA; Mit; 11.D10.2 Appendix 2 Assessment of
Additional Mitigation**

Contents

1	Introduction.....	3
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3	Detailed Comments	3

1 Introduction

- 1.1 Please find below Natural England’s comments on ExA; Mit; 11.D10.2 Appendix 2 Assessment of Additional Mitigation as submitted by the Applicant on 28th February 2020 in response to the Secretary of States letter dated 6 December 2019.

2 Summary

- 2.1 Natural England welcomes the further assessment undertaken by the Applicant to support their case that the project impacts have been sufficiently mitigated. Whilst the extensive mitigation measures significantly reduce the impacts and the likelihood of there being an adverse effect on integrity; Natural England fundamentally disagrees with the Applicant in relation to scale of the residual impacts and has identified remaining uncertainties i.e. reasonable scientific doubt on the likely success of the proposed mitigation measures such that it an adverse effect on integrity can’t be ruled out.

3 Detailed Comments

Para.	Page	Comment	RAG
2.2.1 3.2		We reiterate that we can agree that decommissioning cable protection would change the impact to temporary, however, there is still a further consideration of significant temporal impacts from a lasting impact for >30 years. There is no evidence presented of what the impacts are likely to be on Annex I habitats and site conservation objectives from such a temporally long time and that habitat recovery is achievable to its pre-impacted state. It therefore can’t be considered with certainty to be a temporary impact. In addition, it is our view that 30 years of change in habitat can’t be considered to be a small scale loss/change	
18.		As set out above whilst the removal of cable protection would potentially change the impact to temporary the longevity of the impact and uncertainty in relation to recoverability means that Natural England is unable to say beyond reasonable scientific doubt no adverse effect on integrity. In addition we would have expected impacts to Annex I sandbank to have also been taken into consideration	
25		Reference is made to cable protection, but it is not clear if that relates solely to concrete mattresses (or similar type product) as set out in the additional mitigation measures. We advise that it is clearly indicated whether the assessment is in relation to ideally only concrete mattress or if still required the WCS for cable protection. However, if it is worst case scenario Natural England advises that decommissioning is not considered as a mitigation measure in which to be reliant on in the decision making process.	

4.2		<p>Please see NE's Boreas response at Deadline 5 [REP5 – 078] in relation to the favourable condition status of the site</p> <p>https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010087/EN010087-001745-DL5%20-%20natural%20England%20-%20Response%20to%20the%20Applicant's%20Summary%20of%20Oral%20Representations%20at%20ISH%204%20-%20Agenda%20Item%206a(i).pdf</p>	
34, Section 5.2		<p>Natural England notes that Norfolk Vanguard and Boreas consider only the designated Sandbank feature and buffer zone as areas of Annex I Sandbanks that are to be managed for conservation as Sandbanks. However, the sediment between Sandbanks is also important for the functioning of the Sandbanks, as well as for Annex I Reef formation, and therefore impacts occurring between features may still be detrimental to the Annex I feature(s). A 2016 SNCB survey identified that the species composition in these areas was similar to that of the species composition within the Annex I features. Put simplistically, if these areas are sandy and dynamic they are considered important to / part of the Sandbank features and if stable and mixed sediment have the potential to support Reef habitat. The only areas thought not to be providing this important 'functionality' role is where exposed oil and gas pipelines transect the site. Therefore it cannot be determined that the impacts are small scale and inconsequential. However, acknowledge that if mitigation measures were to fully deliver the desired outcome then the impacts to Annex I reef could potentially be minimised to an acceptable level/avoided</p>	
38		<p>How the impacts to Annex I Sandbanks are described in this section may mean that the conservation objective for the site is not delivered</p>	
41		<p>Please note that this doesn't take into account any required mitigation for Archaeological finds. Please see Natural England REP5 - 081 for the Boreas examination</p> <p>https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010087/EN010087-001747-DL5%20-%20Natural%20England%20-%20Advice%20on%20Applicant's%20Clarification%20Note.pdf</p>	
42, 62		<p>Please be advised that Natural England doesn't consider that small impacts to Annex I reef to be De minimis (Please see Annex 1) especially if cable installation bisect the centre of a reef feature</p>	
Section 5.1.6		<p>We note that this section only considers the impacts from cable protection and not the other elements of the work.</p>	

5.2.3		Natural England notes that the references are prior to the Sweetman Ruling and are for different Annex I habitats therefore there is limited relevance for this Project.	
55		Whilst we recognise that the Sweetman rulings focus on loss of priority habitats, the rulings are still applicable to assessing permanent losses to Annex I habitats such that the conservation objectives for the site are hindered.	
Section 5.2.4 (56)		Whilst we agree with the applicant that the impacts to Annex I sandbanks are persistent i.e. at any one point in time it may be exposed or buried we have to be precautionary in our assessment of the Worst case scenario i.e. that the cable protection is exposed more than it is buried	
57		Natural England agrees that is cable protection is limited to concrete mattresses (or similar type products) then the likely elevation of the protection ~ 50cm is likely to have the additive benefit of enabling natural processes to occur	



NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

Deadline: 27th April 2020

Annex 7:

8.25 In principle compensation measures

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1 Introduction

- 1.1 Please find below Natural England’s comments on 8.25 In principle compensation measures as submitted by the Applicant on 28th February 2020 in response to the Secretary of States letter dated 6 December 2019.

2 Summary

- 2.1 Natural England welcomes the thorough consideration of the potential compensation measures and believes that the proposed extension to Haisborough Hammond and Winterton Special Area of Conservation (HHW SAC) would provide suitable compensation, from an environmental perspective, if considered necessary.
- 2.2 Please find below Natural England’s detail comments.

3 Detailed Comments

Para.	Page	Comment	RAG
17.		<p>Natural England notes that this document is reliant on information from the time of designation and does not fully take into account current condition assessments and proposed site management measures</p> <p>Please see Natural England’s comments at Deadline 5 for the Boreas examination for further advice on this [REP5 – 078].</p> <p>https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-001745-DL5%20-%20natural%20England%20-%20Response%20to%20the%20Applicant's%20Summary%20of%20Oral%20Representations%20at%20ISH%204%20-%20Agenda%20Item%206a(i).pdf</p>	
General comment		Up to Page 11 there is information found on the conservation objectives for the site which is taken from Natural England’s designated site view, which is welcomed by Natural England.	

45-57		<p>Consideration of planting Native oyster: Natural England confirms that native oyster is not an Annex I habitat so therefore would not be beneficial to the N2K network. Should this be an agreed measure then we agree with the Applicant that fisheries would need to be limited in the chosen area. Please note that if native oyster were to be planted around turbine outside of HHW SAC there would be no direct compensation for lasting changes to the habitat features of the SAC.</p> <p>In addition around turbines native oysters are likely to be impacted by operation and maintenance activities.</p>	
4.2.2		<p>Consideration of extension to the HHW SAC: Natural England considers that an extension to the HHW SAC would be the most environmentally beneficial measure of those considered to deliver compensation for both Annex 1 Reef and Annex 1 Sandbank. We believe that the proposed measure has the potential to provide functions comparable to those that had justified the selection of the original site.</p> <p>We believe that whilst the designation process for the extension could be started immediately, (if resourced appropriately); it is unlikely to be in place prior to the start of construction. But NE acknowledges that the Applicant has accepted to take into account the delayed delivery time by proposing a higher ratio of 1:10.</p> <p>It is also recognised by the Applicant that consultation with regulators such as EIFCA and Defra, SNCBs, and key stakeholders including other industries would be required. In addition management measures for other industries operating within the proposed extension area would need to be implemented if not already occurring.</p>	
4.2.3		<p>Fisheries management: Natural England agrees with the Applicant that it would be difficult to determine appropriate methodologies for and the level thereof of intrusive fisheries practices that would need to be removed to offset the impacts and demonstrate the additive benefit. It is also reliant on buy-in from fishermen.</p> <p>Natural England notes that there is currently no authority with jurisdiction to deliver fisheries management areas as compensation. Therefore going forwards there would need to be greater engagement with the IFCA's and regulatory bodies.</p>	

4.2.4		Removal of disused Anthropogenic structures and litter: Natural England believes that this option has the potential to deliver compensation for an environmental perspective so shouldn't be discounted going forwards. However, at this time we agree with the Applicant that it is not clear how other industries such as oil and gas will decommission infrastructure and pipelines within the site and whether there are likely to be options to provide additive measures that could be considered as compensation by other industries.	
Table 4.3		Natural England welcomes the inclusion of the table summarising the proposed compensation measures	



NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

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Annex 8:
**Natural England's comments on Norfolk Vanguard Ornithology Position
Statement, ExA; Pos; 11.D10.2 (MacArthur Green 2020b)**

1. Introduction

- 1.1. The Applicant's Position Statement contains information on a number of topics that are also the subject of several separate submissions. In such instances, Natural England's advice is provided in summary form only, with our detailed advice given in our responses to those other submissions. Accordingly the Examining Authority is requested to base its analysis of the issues on these more detailed representations, rather than the overview of our position provided here.

2. Additional Mitigation

- 2.1. Natural England welcomes the additional mitigation measures presented by Norfolk Vanguard to reduce seabird collisions by:
- Reducing the maximum number of turbines from 180 to 158 by increasing the minimum turbine size from 10MW to 11.55MW; and
 - Increasing in the draught height:
 - Minimum draught height increased from 27m to 35m (above Mean High Water Springs, MHWS) for turbine models up to and including 14.6MW capacity
 - Minimum draught height increased from 27m to 30m (above MHWS) for turbine of 14.7MW capacity and above
- 2.2. We acknowledge that the worst case scenario (WCS) is now based on the 14.7MW turbines as the predicted collisions are greater for this turbine layout than for the 11.55MW. Although these are larger turbines, we note that this greater number of collisions is largely due to the larger turbines having a lower minimum draught height.
- 2.3. We welcome that Norfolk Vanguard has engaged with the supply chain for both turbine manufacturers and construction vessels regarding constraints around draught height increases and turbine installation. We consider that Norfolk Vanguard has demonstrated due consideration and significant efforts to reduce the impacts of their proposal, which we welcome.
- 2.4. Please see our separate comments on the 'Additional mitigation' document (Royal HaskoningDHV 2020a) submitted by Norfolk Vanguard for detailed comments regarding the additional mitigation.

3. Updated Collision Risk Modelling (CRM)

Vanguard alone

- 3.1. We agree with the revised CRM figures calculated by Norfolk Vanguard for the project alone presented for kittiwakes from the Flamborough and Filey Coast (FFC) SPA and for lesser black-backed gulls (LBBGs) from the Alde-Ore Estuary SPA. We welcome the reductions in the collision risk predictions, and confirm that we again conclude that

adverse effect AEOI can be ruled out for both kittiwake at the FFC SPA and LBBG at the Alde-Ore Estuary SPA from Norfolk Vanguard alone.

In-combination: kittiwake at Flamborough and Filey Coast SPA

- 3.2. It should be noted that the Norfolk Vanguard alone figure of 21 (range taking account of uncertainty in the input parameters: 1-60) collisions per annum is an estimation which is underpinned by a number of assumptions, several of which have considerable uncertainty associated with them. Accordingly, Natural England takes a range-based approach to considering impacts.
- 3.3. We note that paragraph 27 of the Vanguard 'Ornithology Position Statement' document (MacArthur Green 2020b) states that the kittiwake FFC SPA in-combination collision total using the Natural England preferred figure of 21 kittiwakes for Norfolk Vanguard equals 355 when Hornsea projects 3 and 4 are excluded from the total and equals 693 when Hornsea 3 and 4 are included in the total. However, we note that in Table 3.5 of the Vanguard 'Additional Mitigation, Appendix 1 updated CRM' document (MacArthur Green 2020a) presents the total in-combination kittiwake collision from the FFC SPA as equalling 363 when Hornsea projects 3 and 4 are excluded from the total and 701 when Hornsea 3 and 4 are included in the total. Natural England has verified the figures in Table 3.5 of 'Additional Mitigation, Appendix 1 Updated CRM' (MacArthur Green 2020a) and agrees with these totals, rather than those of the 'Ornithology Position Statement' (MacArthur Green 2020b).
- 3.4. If the Norfolk Vanguard and Norfolk Boreas Applicant's preferred breeding season apportionment rates of 26.1% are applied for both projects (as opposed to 86%) then the in-combination collision total equals 338 when Hornsea projects 3 and 4 are excluded from the total and equals 677 when Hornsea 3 and 4 are included in the total.
- 3.5. **We again note that due to the high levels of uncertainty regarding the Hornsea project 3 and 4 data, we are unable to reach any firm conclusions on the in-combination assessments when these projects are included in these assessments.**
- 3.6. However, irrespective of whether Hornsea 3 and 4 projects are included in the in-combination totals, these predicted in-combination collision impacts equate to more than 1% of baseline mortality of the colony (see Table 1).

Table 1 Percentage of baseline mortality for annual in-combination collision impacts for excluding and including Hornsea 3 (H3) and Hornsea 4 (H4) for kittiwake for FFC SPA. Baseline mortality calculated using adult only colony size and adult mortality rate (14.6% from Horswill & Robinson 2015).

KITTIWAKE PREDICTED IN-COMBINATION CRM MORTALITY, HRA: FFC SPA			
	Mortality prediction	% of baseline mortality of FFC SPA designated population* (used by Applicant)	% of baseline mortality of FFC SPA mean 2016-17 census data**
In-combination CRM, based on figures from Table 3.5 of Vanguard 'Additional Mitigation, Appendix 1 updated CRM' document, with 86% breeding season apportionment applied for Vanguard & Boreas	363 excl. H3 & H4 (701 incl. H3 & H4)	2.79 excl. H3 & H4 (5.39 incl. H3 & H4)	2.42 excl. H3 & H4 (4.68 incl. H3 & H4)
In-combination CRM, with 26.1% breeding season apportionment applied for Vanguard & Boreas	338 excl. H3 & H4 (677 incl. H3 & H4)	2.60 excl. H3 & H4 (5.20 incl. H3 & H4)	2.26 excl. H3 & H4 (4.52 incl. H3 & H4)

* 89,040 adults, 1% baseline mortality = 130 birds

** 102,536 adults, 1% baseline mortality = 150 birds

- 3.7. We welcome that Section 2.1.2.1 of the Vanguard 'Ornithology Position Statement' document (MacArthur Green 2020b) makes reference to the PVA undertaken for Hornsea 3, but we again note that Natural England had outstanding concerns with the Hornsea 3 PVAs relating to the number of simulations and the demographic data not being updated, which were not resolved by the close of the Examination. Therefore, whilst we have considered the outputs from this model, as it currently represents the best available evidence on which to base an assessment, this should not be taken as a Natural England endorsement or 'acceptance' of the model outputs and we reserve the right to revise the advice provided here, which is based on the best available evidence.
- 3.8. There is no clear evidence to support application of any particular form or magnitude of density dependence in the modelling, therefore Natural England has based our advice on the outputs of the density independent models (as these make no assumptions about the form of strength of any density dependent effects). Therefore, Natural England has focused our conclusions on the PVA outputs from the density independent model for demographic rate set 2 using a matched runs approach (see Table 2).

Table 2 Predicted population impacts on the kittiwake population of FFC SPA for the range of annual mortality impacts predicted for Norfolk Vanguard in-combination with other plans and projects. PVA impact metrics are as provided in Hornsea Project Three Offshore Wind Farm (2019). The range of predicted in-combination figures are indicated in purple. The darker shaded cells represent the level of impact closest to the in-combination predictions in Table 1, either in full or when Hornsea 3 and 4 are excluded; the values for in-combination totals including Hornsea 3 and 4 are marked red to reflect the high level of uncertainty

KITTIWAKE	FFC SPA			
Additional mortality	% Baseline Mortality using designation population size (89,040 adults)	% Baseline Mortality using mean 2016-17 census data (102,536 adults)	Counterfactual of Final Population Size (CPS)*	Counterfactual of Growth rate (CGR)**
350	2.69	2.34	0.892 (0.891-0.893)	0.996
400	3.08	2.67	0.878 (0.877-0.879)	0.996
450	3.46	3.01	0.863 (0.862-0.865)	0.995
500	3.85	3.34	0.849 (0.848-0.851)	0.994
550	4.23	3.67	0.835 (0.834-0.837)	0.994
600	4.62	4.01	0.822 (0.820-0.823)	0.993
650	5.00	4.34	0.808 (0.807-0.810)	0.993
700	5.38	4.68	0.795 (0.794-0.797)	0.992
750	5.77	5.01	0.782 (0.781-0.784)	0.992

* Kittiwake, demographic rate set 2, counterfactuals of population size after 30 years, estimated using a matched runs method, from 1000 density independent simulations. See Table A2_7.1 in Hornsea Project Three Offshore Wind Farm (2019)

** Kittiwake, demographic rate set 2, counterfactuals of population growth rate after 35 years, estimated using a matched runs method, from 1000 density independent simulations. See Table A2_7.3 in Hornsea Project Three Offshore Wind Farm (2019). Whilst Vanguard’s lifespan is 30 years, data on counterfactuals of growth rate are only available in Hornsea Project Three Offshore Wind Farm (2019) for after 35 years. No CLs given as they are the same as the median values.

- 3.9. If the additional mortality from the windfarm is 350-400 adults per annum (closest PVA outputs available in Hornsea Project Three Offshore Wind Farm 2019 to predicted 338 mortalities for in-combination total excluding Hornsea 3 and Hornsea 4 using the Applicant’s preferred 26.1% breeding season apportionment rate for Norfolk Vanguard and Boreas, and to the 363 in-combination total calculated using 86% breeding season apportionment rate for both Norfolk Vanguard and Boreas for excluding Hornsea 3 and Hornsea 4) then the population of FFC SPA after 30 years will be 10.8-12.2% lower than it would have been in the absence of the additional mortality. The population growth rate would be reduced by 0.4% (Table 2). If it is assumed that the population is stable then this would mean that the population would be 10.8-12.2% lower than the current population size. This would be counter to the restore conservation objective for this feature at the site and would result in an adverse effect on the integrity of the site. This conclusion would be even stronger were there to be greater certainty in the Hornsea 3 and 4 totals and they were included into the in-combination totals.
- 3.10. It is not known what the growth rate of the colony will be over the next 30 years and this should be considered when judging the significance of predicted impacts against

the conservation objectives for the feature. There has been a 2.2% per annum decline in numbers for Flamborough Head and Bempton Cliffs colony¹ between 1987 and 2017 (a growth rate of 0.979 per annum). Over the period 2000 to 2017 the population has shown a 0.37% per annum increase in numbers (a growth rate of 1.0037 per annum) based on census counts in SMP (JNCC 2016).

- 3.11. Across colonies in the UK the kittiwake population declined by 44% between 1998/2000 and 2015. Between the SCR Census (1985–88) and Seabird 2000 (1998–2002) for major colonies in Britain, no sites showed a per annum increase that exceeded 4.5% (see Section B of Natural England’s Deadline 4 submission for Hornsea Project 2²). The growth rate of the colony at Bempton/Flamborough between 2000 and 2017 was 0.37% per annum, following declines from 1987. So, it seems reasonable to assume that the FFC SPA colony growth rate is <1% per annum. Therefore Natural England has considered the counterfactuals of final population size for the predicted levels of in-combination additional mortality for a range of plausible future growth rate scenarios for FFC of stable, 0.37, 1, and 3% per annum, though it is likely that the latter rate is optimistic for the lifetime of the project. It is entirely plausible that the population might also decline over the project lifetime, although a particular negative growth rate is hard to identify with any confidence.
- 3.12. The Conservation Objective for the kittiwake population of the FFC SPA is to 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. We note that in Section 2.1.2.1 of the Vanguard ‘Ornithology Position Statement’ document (MacArthur Green 2020b), whilst Norfolk Vanguard has noted that the Conservation Objective is to restore the size of the breeding population, they consider that *‘there is robust scientific evidence that the target objective for this population is in fact erroneous’*. As has been noted in our Deadline 4 and 7 responses during the Boreas examination^{3 4}, Natural England notes that the topic of the 1987 estimate has been discussed in detail previously during the Hornsea 2 Examination in our Deadline 4⁵ and Deadline 6⁶ submissions for this examination. During the examination for Hornsea 2, JNCC and Natural England

¹ It should be noted that the new Flamborough and Filey Coast SPA includes additional cliff areas at Filey which support kittiwake but were not previously monitored as part of the SPA, hence the reference to Flamborough Head and Bempton Cliffs.

² Natural England (2015) Hornsea Project Two Offshore Wind Farm – Written Submission for Deadline 4. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010053/EN010053-001163-Natural%20England.pdf>

³ Natural England (2020) Norfolk Boreas Offshore Wind Farm Updated ornithology Advice: Deadline 4 – Natural England’s comments in relation to the Norfolk Boreas updated offshore ornithological assessment, submitted at Deadline 2 [REP2-035]. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010087/EN010087-001629-DL4%20-%20Natural%20England%20-%20Updated%20Ornithology%20Advice.pdf>

⁴ Natural England (2020) Norfolk Boreas Offshore Wind Farm: Deadline 7 – Natural England’s response to Applicant’s comments on Deadline 4 submissions. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010087/EN010087-001974-DL7%20-%20NE%20-%20Comments%20on%20Applicants%20Comments%20on%20Deadline%204%20Responses.pdf>

⁵ Natural England (2015) Hornsea Offshore Wind Farm - Project Two Application: Written Submission for Deadline 4. Planning Inspectorate Reference: EN010053.

⁶ Natural England (2015) Hornsea Offshore Wind Farm Project Two Application: Written Submission for Deadline 6. Planning Inspectorate Reference: EN010053.

reviewed in detail the actual count forms from 1987 and as a result JNCC are happy for this count to be included in the Seabird Monitoring Programme (SMP) database as a legitimate count. Natural England has accepted this and this count has been used for all statistical analysis and reporting for the colony, and hence was used in setting the conservation objective target. **The target for the 'breeding population: abundance' attribute for this species is to restore the population to 83,700 breeding pairs at this site and therefore the conservation objective for the SPA should be to restore the kittiwake population. It is this target that should be considered in the assessment when judging the significance of predicted impacts against the conservation objectives for this feature.** For more information see Supplementary Advice on Conservation Objectives in the formal Conservation Advice package for the site, available from: <https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK9006101&SiteName=flamb&SiteNameDisplay=Flamborough+and+Filey+Coast+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=4>.

- 3.13. If we assume a stable population or a 0.37% per annum growth rate then 350-400 additional mortalities per annum would result in the population declining below its current level, let alone be able to reach the target population of the conservation objective, even without the uncertain mortality levels of Hornsea 3 and 4 being added.
- 3.14. If we assume a 1% per annum growth rate then 350-400 additional mortalities per annum would result in the population being approximately 15,000-16,000 birds lower than without the additional mortality after 30 years and it would take over an additional 30 years to reach the target population compared to the no windfarm mortality scenario, even without the uncertain mortality levels of Hornsea 3 and 4 being added.
- 3.15. It is not possible to rule out adverse effect on integrity (AEOI) for these scenarios.
- 3.16. If the kittiwake population were to grow at the probably optimistic rate of 3% per annum over the next 30 years, then 350-400 additional mortalities per annum would result in the population being approximately 25,000-30,000 birds lower than without the additional mortality after 30 years and it would take over an additional 2 years to reach the target population compared to the no windfarm mortality scenario.
- 3.17. In the context of a population trajectory that is currently stable or increasing at <1% per annum an additional mortality of 350-400 adults per annum causing a reduction in growth rate of 0.4% (Table 2) would further harm the population and make it more difficult to restore the population to a favourable condition. Natural England is therefore unable to advise beyond reasonable scientific doubt that this level of impact would not be an AEOI, and therefore advises an in-combination AEOI.
- 3.18. There is no evidence to suggest that the future population trend will be significantly different from the current trend of 0.37% per annum (2000-2017), for example productivity at the colony has not been increasing in recent years (see Figure 1)

(Aitken et al. 2017). So, based on the review of growth rates above, it seems reasonable to assume that the FFC SPA colony growth rate will be <1% per annum.

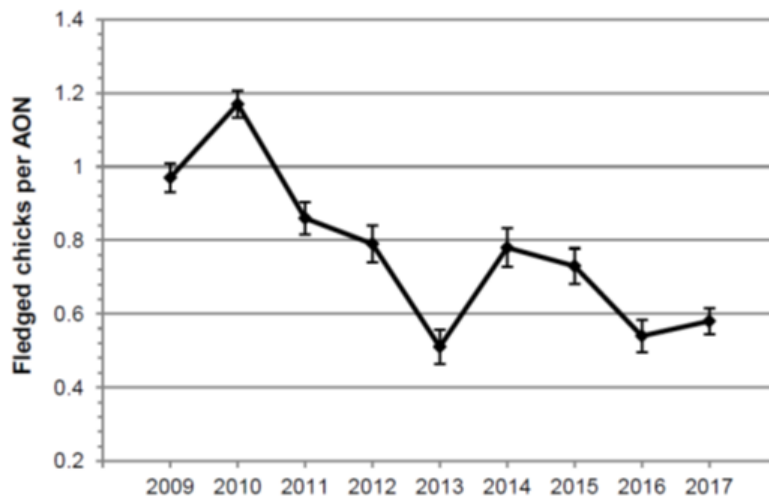


Figure 1 Flamborough/Bempton Black-legged kittiwake productivity 2009-2017, mean of plot results +/- SE. From Aitken et al. (2017). Note this does not include productivity data for Filey, where productivity is lower (e.g. in 2017 mean productivity for kittiwake at Filey was 0.39 (SE ± 0.0742) chicks per AON).

- 3.19. Therefore, as this feature has a restore conservation objective, and because there are indications that the predicted level of mortality would mean the population could decline from current levels should it currently be stable, **it is not possible to rule out AEOI of the kittiwake feature of the FFC SPA for collision impacts from in-combination with other plans and projects.**
- 3.20. Natural England notes that based on the revised WCS for Norfolk Vanguard (i.e. 14.7MW turbines with a 30m draught height), the predicted number of kittiwake collisions from the FFC SPA of 21 (range: 1-60, based on Natural England's apportionment rates) contributes 5.8% of the in-combination total annual collision mortality of 363 kittiwakes from the FFC SPA (excl. Hornsea 3 and Hornsea 4). Natural England also notes that we have already advised (at Hornsea 2 and East Anglia 3 examinations onwards) that it was not possible to rule out an adverse effect on integrity (AEOI) on the FFC SPA from operational and consented projects due to the level of annual in-combo collision mortality predicted for kittiwake. There is the potential for Flamborough kittiwakes to be impacted by the Norfolk Vanguard proposal during the breeding and non-breeding seasons, and there is therefore the potential for the proposal to make a contribution (WCS prediction of 21 birds per annum, range: 1-60) to the overall in-combination annual kittiwake collision mortality total. We note Natural England's advice during the Thanet Extension examination was that whilst this project made a small contribution to the in-combination collision

mortality, Natural England advised that it could not be concluded that there would be no AEOI of the site by the project, when considered in-combination.

In-combination: Lesser black-backed gull at Alde-Ore Estuary SPA

- 3.21. It should be noted that the Norfolk Vanguard alone figure of 2.6 (range taking account of uncertainty in the input parameters: 0.1-7) collisions per annum is an estimation which is underpinned by a number of assumptions, several of which have considerable uncertainty associated with them. Accordingly, Natural England takes a range-based approach to considering impacts.
- 3.22. We note that paragraph 39 of the Vanguard ‘Ornithology Position Statement’ document (MacArthur Green 2020b) states that the LBBG Alde-Ore SPA in-combination collision total using the Natural England preferred figure of 2.6 LBBGs for Norfolk Vanguard equals 53.7 (irrespective of whether Hornsea 3 and 4 are included in the total, as no bird are apportioned to this colony from these projects). However, we note that in Table 3.6 of the Vanguard ‘Additional Mitigation, Appendix 1 Updated CRM’ document (MacArthur Green 2020a) presents the total in-combination LBBG collision from the Alde-Ore Estuary SPA as equalling 54.2. Natural England has verified the figures in Table 3.6 of ‘Additional Mitigation, Appendix 1 Updated CRM’ (MacArthur Green 2020a) and agrees with these totals.
- 3.23. These predicted in-combination collision impacts equate to more than 1% of baseline mortality of the colony (see Table 3).

Table 3 Percentage of baseline mortality for annual in-combination collision impacts for LBBG for the Alde-Ore Estuary SPA. Baseline mortality calculated using adult only colony size and adult mortality rate (11.5% from Horswill & Robinson 2015). Note no collisions apportioned to Hornsea 3 or Hornsea 4 in the in-combination assessment

LBBG PREDICTED IN-COMBINATION CRM MORTALITY, HRA: ALDE-ORE ESTUARY SPA		
	Mortality prediction	% of baseline mortality of Alde-Ore SPA* (2,000 pairs 2007-14, as used by Applicant)
In-combination CRM, based on figures from Table 2.3 of REP6-024 (using 30% breeding season apportionment for Norfolk Boreas & Norfolk Vanguard)	54.4	11.83
In-combination CRM, based on figures from Table 2.3 of REP6-024 (using Applicant’s preferred breeding season apportionment of 21% for Norfolk Boreas & 17% for Norfolk Vanguard)	52.8	11.47

* 4,000 adults, 1% baseline mortality = 5 birds

- 3.24. We welcome that Section 2.1.2.2 of the Vanguard ‘Ornithology Position Statement’ document (MacArthur Green 2020b) makes reference to the PVA undertaken during the Vanguard Examination (MacArthur Green 2019), but we again note that we had concerns/queries regarding this PVA that were not resolved during the examination:

namely regarding the adjustment of the productivity to take account of the proportion of birds that miss breeding each year; and that we were unable to check the baseline growth rate predicted by the model from the outputs of counterfactuals presented. Please see our Deadline 8 response⁷ from the Norfolk Vanguard examination. Therefore, whilst we have considered the outputs from this model, as it currently represents the best available evidence on which to base an assessment, this should not be taken as a Natural England endorsement or ‘acceptance’ of the model outputs and we reserve the right to revise the advice provided here, which is based on the best available evidence.

- 3.25. Natural England has again focused our conclusions on the PVA outputs from the density independent model (Table 4).

Table 4 Predicted population impacts on the LBBG population of the Alde-Ore Estuary SPA for the range of annual mortality impacts predicted for Norfolk Boreas in-combination with other plans and projects. PVA impact metrics are as provided in MacArthur Green (2019). The shaded cells represent the level of impact closest to the in-combination predictions in Table 3.

LBBG – ALDE-ORE ESTUARY SPA			
Additional mortality	% Baseline Mortality using population size of 4,000 adults (2007-2014), as used by the Applicant	Density Independent Model	
		Counterfactual of Final Population Size (CPS) after 30yrs – see Table 2 of MacArthur Green (2019)	Counterfactual of Growth rate (CGR) after 30yrs – see Table 3 of MacArthur Green (2019)*
55	11.96	0.669 (0.616-0.731)	0.986 (0.983-0.990)
60	13.04	0.645 (0.592-0.703)	0.985 (0.982-0.988)

* The Norfolk Vanguard Applicant confirmed that the headings for the median and lower CIs are the wrong way around in MacArthur Green (2019). So, we have presented the figures the correct way around above

- 3.26. The Conservation Objective for the LBBG population of the Alde-Ore Estuary SPA is to restore the size of the breeding population to a level which is above 14,074 whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.
- 3.27. If the additional mortality from the windfarm is 55 adults per annum (closest PVA outputs available in MacArthur Green (2019) to the 54.4 in-combination total using 30% breeding season apportionment for both Norfolk Boreas and Vanguard) then the population of the Alde-Ore Estuary SPA after 30 years will be 33.1% lower than it would have been in the absence of the additional mortality. The population growth rate would be reduced by 1.4% (Table 4). If it is assumed that the population is stable then this would mean that the population would be 33.1% lower than the current

⁷ Natural England (2019) Norfolk Vanguard Offshore Wind Farm: Deadline 8 – Natural England’s comments on Norfolk Vanguard Ltd. Deadline 7 and Deadline 7.5 submissions in relation to Offshore Ornithology Related Matters. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010079/EN010079-003121-DL8%20-%20Natural%20England%20-%20Deadline%20Submission.pdf>

population size. This would be counter to the restore conservation objective for this feature of the site.

- 3.28. It is not known what the growth rate of the colony will be over the next 30 years and this should be considered when judging the significance of predicted impacts against the conservation objectives for the feature.
- 3.29. As the Alde-Ore LBBG population is at best currently stable and the PVA undertaken for Norfolk Vanguard (MacArthur Green 2019) suggests a baseline growth rate of -2% for the density independent model we have considered these levels of growth rates per annum. We have also considered a range of 1-5% growth rates per annum for if the colony may potentially grow in the future, although at present there seems considerable uncertainty regarding whether this can be achieved.
- 3.30. If we assume a -2% per annum growth rate, a stable population or a 1% per annum growth rate then 55 additional mortalities per annum would result in the population declining below its current level, let alone be able to reach the target population of the conservation objective.
- 3.31. If we assume a 2% per annum growth rate then 55 additional mortalities per annum would result in the population being approximately 2,400 birds lower than without the additional mortality after 30 years, and it would take over an additional 145 years to reach the target population compared to the no windfarm mortality scenario.
- 3.32. If the LBBG population were to grow at a rate of 3% per annum over the next 30 years, then additional mortality of 55 per annum would result in the population being approximately 3,300 birds lower than without the additional mortality after 30 years and it would take over an additional 35 years to reach the target population compared to the no windfarm mortality scenario.
- 3.33. There is no evidence to suggest that the future population trend will be significantly different from the current trend, which is most likely to be stable, in which case there is a risk that the population could decline due to predicted mortality levels. Furthermore, given that the population is likely to be hindered from restoration to target levels even when more optimistic assumptions about the population trend of the colony are made, Natural England again also considers that it is not possible to rule out AEOI even if the population starts to show modest growth.
- 3.34. **Therefore, as this feature has a restore conservation objective, and because there are indications that the population might even decline from current levels, Natural England again advises that it is not possible to rule out an adverse effect on integrity (AEOI) of the LBBG feature of the Alde-Ore Estuary SPA for from in-combination collision impacts with other plans and projects.**
- 3.35. We note that based on the revised WCS for Norfolk Vanguard (i.e. 14.7MW turbines with a 30m draught height), the predicted number of LBBG collisions from the Alde-Ore Estuary SPA of 2.6 (range: 0.1-7, based on Natural England's apportionment rates) contributes 4.8% of the in-combination total collision mortality of 54.4 LBBGs from the Alde-Ore Estuary SPA.

4. Precaution in Assessments

4.1. Norfolk Vanguard considers that ornithology impact assessment for offshore wind farms has become highly over-precautionary through the accumulation of individual precautionary elements at different stages of the assessment, whilst noting that each of these individual elements is justifiable to a degree.

4.2. Natural England notes the following with regard to the specific aspects listed by Norfolk Vanguard regarding the sources of precaution in the kittiwake assessment:

a. Nocturnal Activity

I. Norfolk Vanguard considers that nocturnal activity of kittiwakes is likely to be half the level currently advised. We note the level that Norfolk Vanguard is referring to is a factor of 3 (i.e. 50%). As we have noted previously during the Norfolk Vanguard examination (see our Relevant and Written Representations, our Deadline 2⁸ and Deadline 8^{Error! Bookmark not defined.} submissions for this examination), we recognise that from recent evidence presented e.g. by MacArthur Green (2015) and Furness et al. (2018), nocturnal activity levels relative to daytime levels for some species may be lower than the levels that equate to the nocturnal activity factors currently used in CRM. However this does not necessarily translate into over-estimation of nocturnal collision risk, because of the way that densities of birds derived from baseline digital aerial surveys may not reflect diurnal activity patterns as measured by tagging studies.

II. Our position regarding nocturnal activity rates/factors position remains unchanged from that set out during the Norfolk Vanguard examination (i.e. to consider a range of factors of 2-3, or 25-50% for kittiwake for assessments), which includes that offshore survey periods will have missed the periods of peak activity around dawn and dusk, which means it is not appropriate to apply 'empirically derived' nocturnal activity rates from tracking studies to offshore survey recorded results. Additionally, as we have previously noted during the Norfolk Vanguard examination (see our Deadline 2⁸ and 8^{Error! Bookmark not defined.} responses for this examination), Natural England considers that it is not appropriate to simply adjust the CRM figures for the other OWFs included in the cumulative assessments to account for a change in nocturnal activity rate without re-running the CRM, as the modelling calculates the reduction in activity at night through the interaction of nocturnal activity and the latitude of the specific wind farm. Therefore this is a calculation specific to the windfarm in question and hence a re-run of the model is required.

b. Flight Speed

I. Norfolk Vanguard considers that the currently advised flight speed of kittiwakes of 13m/s is likely to be around 30% higher than realistic values (10m/s). We note that no evidence sources are given for the more realistic value considered by Norfolk

⁸ Natural England (2019) Norfolk Vanguard Offshore Wind Farm: Comments on Offshore Ornithological Aspects of Applicant's Response to Section 51 Advice from the Planning Inspectorate. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010079/EN010079-002461-Natural%20England%20-%20NE%20detailed%20comments%20on%20Offshore%20Ornithology%20S51%20Advice.pdf>

Vanguard. Natural England acknowledges that bird flight speeds are an important issue in the context of CRM and we are aware of the review of kittiwake flight speeds undertaken by the Norfolk Boreas Applicant that was submitted at Deadline 5⁹ of that project examination. We note our response to the Boreas document that was submitted at Deadline 7¹⁰ of the Norfolk Boreas examination and our general advice that any review of flight speeds for use in collision risk modelling (CRM) needs to be rigorous. We note that there is an ongoing Marine Scotland Science project on behaviour of seabirds at sea, that we understand will contain analysis of kittiwake flight speeds derived from GPS tag deployments. This is yet to conclude. Therefore, Natural England will wait for the outputs from this work and then consider this alongside the Norfolk Boreas Applicant's review when considering our advice regarding appropriate flight speeds to use in CRM.

- II. In the meantime we recommend that as there is uncertainty in the appropriate flight speeds to use, the currently used value from the literature (i.e. 13.1m/s) and the value from the work undertaken by the Norfolk Boreas consultants are used in the CRM (as is the recommendation for other CRM input parameters where there is uncertainty, such as nocturnal activity). We note that this suggested approach does not quantify the range of flight speeds in a statistical way – i.e. it should not be seen as confidence intervals around a mean, as it is entirely possible that the variability could extend beyond these two values.

c. Breeding season definition

- I. Norfolk Vanguard notes that Natural England has recommended that the months treated as breeding season are those covering the 'full breeding season' definition in Furness 2015, i.e. March to August and that these extend into periods when large numbers of migrants are known to be passing through the southern North Sea to colonies further to the north (in March) and early post-breeding movements southwards (in August). The tracking data of kittiwake from the FFC SPA up until 2015 suggests low connectivity of the Norfolk Vanguard sites with foraging birds from the colony. However, further tagging of kittiwakes from the FFC SPA colony has been undertaken in 2017 and the results of this does indicate that some birds from the FFC SPA do forage within the Norfolk Vanguard footprints, particularly Vanguard West (Aitken et al. 2017; Wischniewski et al. 2018). Therefore, we consider that the full breeding season in Furness (2015) is the most appropriate for assigning monthly impacts to the breeding season.

d. Proportion of birds from the FFC SPA at present on the Norfolk Vanguard sites during the breeding season

- I. In terms of breeding season apportionment rates, we note that there is uncertainty in exact figures to use and this uncertainty should therefore be considered in

⁹ Royal HaskoningDHV (2020) Norfolk Boreas Offshore Wind Farm: Review of Kittiwake Flight Speed for use in Collision Risk Modelling. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010087/EN010087-001681-Kittiwake%20Flight%20Speed.pdf>

¹⁰ Natural England (2020) Norfolk Boreas Offshore Wind Farm: Deadline 7 Natural England's Updated Ornithology Advice. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010087/EN010087-001965-DL7%20-%20NE%20-%20Updated%20Ornithology%20advice.pdf>

assessments and a range based approach is considered entirely appropriate. In terms of the upper rate of the range of 86%, we have previously acknowledged in our Deadline 87 response during the Vanguard examination that this likely to be precautionary and we considered the Norfolk Vanguard collision predictions alone and in the in-combination totals using both the Natural England precautionary rates and the Applicant's preferred rates for Norfolk Vanguard in our Deadline 87 response (and have also considered both of these rates for both for Norfolk Vanguard and Norfolk Boreas for in-combination in the updated assessments and advice given above).

e. PVAs and density vs density independent models

- I. We agree that density dependence is likely to be operating at seabird colonies. Our position regarding density dependent versus density independent PVA outputs is that if there is clear evidence of the form and strength of density dependence operating on the focal population (colony), then we would (depending on the evidence provided) consider the outputs from density dependent models. Accordingly it is important to consider whether there is any actual evidence that density dependence is acting on the focal population at the present time. Where there is no information on population regulation for the focal population, we recommend using a density independent model. In the case of the colonies relevant for Norfolk Boreas (e.g. kittiwake at FFC SPA and LBBG at Alde-Ore Estuary SPA), we have considered the density independent model outputs to be the most appropriate in previous offshore wind farm assessments as there is no clear evidence to support the application of any particular form or magnitude of density dependence operating.
 - II. Without having good evidence to support what form and strength of density dependence to add to a model we have no way of knowing whether the predictions from a density dependent model are robust or accurate, which is why we advise use of the density independent models in such circumstances. If an Applicant has acceptable evidence to support the use of density dependence in the models then Natural England would of course consider these outputs, but there should be a justification of the density dependent terms used and presentation of a range of outputs, which hasn't tended to be the case with previous submissions.
 - III. In any event, the use of the counterfactual metrics recommended by Natural England (counterfactual of growth rate and counterfactual of population size) does make the metrics less sensitive to mis-specifying density dependence or density independence.
- 4.3. Norfolk Vanguard considers that while each element of precaution on its own does not necessarily result in an overly precautionary conclusion, it is the combined effect which is of primary concern. In response to this, Natural England notes that whilst each uncertainty has the potential to compound the overall uncertainty, our understanding is that in the collision assessments the central predicted value (i.e. those for the mean bird density, mean/central avoidance rate, mean/central flight height) from each individual project assessment is carried forward into cumulative and in-combination assessments, rather than the upper figures from any predicted range based on uncertainties in the input data. In any event, for all Round 1 and Round 2 projects the use of a range of figures is simply not possible, because earlier windfarm

Environmental Statements did present information to generate ranges of predicted impacts.

- 4.4. There are also elements where the assessment may not be precautionary (e.g. the potential limitations in recording of site-specific data on seabird flight heights may have the potential to lead to underestimates of potential collisions and hence assessments may be lacking in precaution in this aspect). Further, the level of uncertainty in the assessments is high and therefore there is a requirement to be precautionary in our assessment of impacts.
- 4.5. Finally, we note that there are aspects of CRM that may under- rather than over-estimate collision risk. Bowgen & Cook (2018) note that the data collected as part of the Offshore Renewables Joint Industry Programme (ORJIP) bird collision avoidance study suggests that the Band model may underestimate the probability of a bird passing through a turbine colliding with the blades. A potential reason for this may be that birds crossing a rotor swept area at an oblique angle may be more likely to collide than those making a perpendicular approach to the rotor (Band 2012; Bowgen & Cook 2018). Band (2012) notes that this effect can be offset by the fact that the elliptical shape of the rotor means that birds are less likely to enter the rotor swept area. However, subsequent analyses have shown that accounting for an oblique approach may result in a substantially increased collision risk (Christie & Urquhart 2015; Bowgen & Cook 2018).

5. Headroom

Summary

- 5.1. Natural England acknowledges the work that Norfolk Vanguard and their consultants have done to consider potential headroom in the in-combination/cumulative collision risk figures by assessing the 'as built' rather than the worst case scenario (WCS). We recognise 'headroom' as an important issue; it is a highly complex one though, and it is important to note that there is not yet an agreed way forward at present and Norfolk Vanguard's approach has also not been subjected to wider industry scrutiny and approval. Natural England agrees there is likely to be some headroom; however, the exact extent of any potential headroom is not agreed.
- 5.2. There are a number of uncertainties/issues with the approach set out by Norfolk Vanguard, which are set out below and in our separate comments on the 'Ornithology Position Statement Appendix 1 Headroom Calculations' document (MacArthur Green 2020c) submitted by Norfolk Vanguard. Until these uncertainties/issues are addressed and an industry wide approach is agreed we recommend that the default 'standard' approach is appropriate.

Background to headroom issues

- 5.3. Natural England agrees with Norfolk Vanguard that the standard approach to cumulative and in-combination assessments is to use the consented parameters of each project and to refer to the worst case scenario (WCS) assessed within the

relevant Environmental Statement, taking account of any updated assessments provided throughout the examination process.

- 5.4. As offshore windfarms are consented based on the Rochdale Envelope approach, the worst case scenarios predicted within the Environmental Statements (ESs) are often different to the predicted impacts from the project 'as built' i.e. once the design is finalised/constructed. Consequently, the use of collision risk estimates calculated based on worst case scenarios may lead to a potential over-estimate of the total cumulative or in-combination assessments in terms of both EIA and HRA. However, it is also possible that the predicted impacts from 'as built' designs are greater than those predicted in the ES e.g. the collision mortalities at Lincs OWF increased after application of the correction factor used when calculating the impacts of 'as built' development.
- 5.5. Within the headroom section (Section 2.2.1) of the 'Ornithological Position Statement' (MacArthur Green 2020b) and 'Appendix 1 Headroom Calculations' (MacArthur Green 2020c) documents from Norfolk Vanguard, we note that Norfolk Vanguard is seeking to reassess/redefine collision risk for some consented projects where it is considered that the 'as-built' or consented scenarios for projects is different to the WCS that was originally assessed.

Natural England's previous advice on assessed vs consented vs as-built turbine numbers

- 5.6. As Natural England has stated previously during the Norfolk Vanguard examination, we consider that in order for the Examining Authority/Secretary of State (SoS) to be able to factor in retrospective changes to the collision figures for projects in the cumulative and in-combination assessments, Norfolk Vanguard would need to:
 - a. Provide documentary proof that the design envelope used to calculate new collision figures is:
 - Secured through a licensing or legally binding mechanism with no further change possible;
 - In addition, for projects that are not built, it should be demonstrated that the design parameters proposed for any updated collision risk modelling (CRM) do not exceed the worst case scenario design envelope for collision mortality of the species of concern e.g. through consideration of other layouts/turbine options and evidence that the total rotor swept area/ CRM for these options are lower than for the design envelope.
 - b. For projects where revisions to the turbine design parameters can be used to update CRM figures (i.e. where there is a new design envelope which is secured through appropriate conditions or legally binding commitments), Natural England would need to agree the appropriate model/option and parameters for the updated CRM figures.
 - c. Our advice is that in these circumstances CRM should be re-run to generate updated collision figures against any agreed changes to turbine design layouts. Where this is not possible for a project because the original bird density data cannot be obtained, we would need to agree whether it is possible for correction ratios to be calculated (for example following an approach such as that presented in Trinder (2017)). Natural England advise that simplistic scaling of collision figures based on reductions in turbine numbers from the consented number should not be used, for example due to variation in flight activity at different heights and differences in turbine parameters such as rotor speeds.

- 5.7. Where these requirements cannot be met, cumulative assessments should be based on consented worst case scenarios.

Legal certainty: Assessed vs. consented schemes

- 5.8. In the 'Ornithology Position Statement' document, Norfolk Vanguard states that they have identified projects where the figures used in the CRM are currently derived from the worst case scenario (WCS) assessed, as opposed to the final scheme consented. Worked examples are provided for Hornsea Project One and Triton Knoll. Paragraph 53 of the 'Ornithology Position Statement' document submitted by Norfolk Vanguard notes that:

- 5.9. *'In each case either the original Development Consent Order, or a non-material change, or a section 36 variation has reduced the parameters in the consent from what was originally assessed as the worst case and therefore considers, as for the East Anglia ONE decision, it must be without doubt that headroom has been created by those projects and that such headroom is "legally secured".'*

- 5.10. Natural England notes that regarding non-material changes (NMC), several unconstructed projects have increased their Rochdale envelopes to include larger turbines rather than reduced it to the new design e.g. the NMC for the Dogger Bank Creyke Beck projects. Please see Natural England's advice regarding inclusion of these figures in the cumulative/in-combination assessments provided during the Norfolk Boreas examination¹¹. So whether headroom is potentially available will depend on the specific nature of the NMC in question. Our understanding of all four Dogger Bank projects is that the Rochdale envelope has been increased rather than reduced.

- 5.11. Natural England notes that Hornsea Project One applied for a non-material change which increased their capacity from 1200MW to 1218MW so that they could use 174 of the Siemens 7MW turbines they thought they were most likely to be installed. But their consent still allowed various other configurations and so the WCS was still available. Therefore whilst legally secured at the time of DCO/DML change, there was still the potential for the WCS to be built.

Legal certainty: Consented vs. as-built schemes

- 5.12. On consented versus as-built schemes, paragraph 54 of the 'Ornithology Position Statement' submitted by Norfolk Vanguard notes that:

- 5.13. *'...There are a number of reasons why the Applicant considers that the as-built scheme (and its associated parameters) is "legally secured". This is partly due to the way in which the DML conditions require approval of final layouts and certification of final layouts on completion of construction.'*

- 5.14. Norfolk Vanguard also notes that *'their submission is no different to the MMO's and Natural England's recent (draft) advice on cable protection – that new areas of cable protection cannot be installed following certification that construction has completed. This is not least because in the a number of cases which the Applicant has so far*

¹¹ Natural England (2020) Norfolk Boreas Offshore Wind Farm: Pre 22nd January 2020 Issue Specific Hearing Advice Updated Ornithology Advice. Planning Inspectorate Reference EN010087. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-001592-DL4%20-%20Natural%20England%20-%20Ornithology%20Advice.pdf>

considered, the age of the environmental information is now in excess of seven years. As Natural England state in their recent position statement on new areas of cable protection, environmental information which is more than five years old would be considered out of date and updated environmental information would be required. This includes any requirement for a further Habitats Regulation Assessment, which would therefore amount to a material change requiring a new consent.'

- 5.15. In response to the above we raise the following points:
- a. It is Natural England's view that for some of the projects included in the cumulative/in-combination collision totals, the marine licence and/or DCO/DMLs do not have a specific requirement to provide information on the as built parameters upon the completion of construction. They also do not have a condition that clearly specifies that the built project becomes fixed for the lifetime of the DCO/DML. In addition phased builds are challenging in this situation as there were no limitations for the timings of any subsequent phases. Therefore, we believe that in such circumstances the DCO/DML remains too ambiguous to say it is legally committed to for these projects.
 - b. The age of the data scenario presented above by Norfolk Vanguard has never been legally tested, and to do so would require regulatory input. One potential implication of the above argument would be that if an Applicant is going to use this data to re-run CRM modelling there would be inherent issues with the age of the data, how data was collected and compatibility with current survey platforms and modelling such that the original surveys may have under/over-estimated abundance, distribution and flight height - but there is no way of knowing this. Therefore, it may be overly simplistic to say there is headroom with certainty. If the above is taken forwards there needs be a consistent strategic approach agreed in an industry wide forum, and the developer for the project/s in question should have the right to reply on what they think the as built collision risk for their project/s are.

Extent to which headroom can be modelled and whether there is headroom for Norfolk Vanguard to use

- 5.16. In the 'Ornithology Position Statement' document (MacArthur Green 2020b) Norfolk Vanguard has presented recalculated collision predictions for Hornsea Project One (based on re-run CRM for the 'as-built scenario and revised figures using the approach developed for The Crown Estate (TCE) (Trinder 2017) and for Triton Knoll (based on using the approach in Trinder 2017). Full details of the approaches taken to generate these revised figures has been set out by Norfolk Vanguard in the 'Ornithology Position Statement Appendix 1 Headroom Calculations' document (MacArthur Green 2020c).
- 5.17. Natural England has identified some concerns/issues with the updated CRM undertaken by Norfolk Vanguard for Hornsea Project One. We have also identified some issues with the approach developed for TCE by Trinder (2017) to adjust altering the collision figures of planned and consented projects, and as a result Natural England does not advise that this approach is used. Full details of our concerns/issues regarding these approaches are set out in our detailed comments on the 'Ornithology

Position Statement Appendix 1 Headroom Calculations' document (MacArthur Green 2020c).

- 5.18. We also note that if Norfolk Vanguard successfully identify headroom this does not necessarily mean that headroom is the project's to utilise, as there are multiple projects not yet consented.

Natural England's conclusions regarding headroom

- 5.19. Given the issues noted above and in our detailed comments on the 'Ornithology Position Statement Appendix 1 Headroom Calculations' document (MacArthur Green 2020c), our position remains that CRM should be re-run in full to generate updated collision figures against any agreed changes to turbine design layouts. Where this is not possible for a project, because original bird density data cannot be obtained, we would need to agree whether correction ratios can be calculated (for example following an approach such as that presented in Trinder (2017)). Natural England would need to see the full calculation details for these correction factors. It is Natural England's advice that simplistic scaling of collision figures based on reductions in turbine numbers from the consented number should not be used, for example due to variation in flight activity at different heights and differences in turbine parameters such as rotor speeds. There are also case-specific issues that need to be addressed: Natural England notes that the Race Bank and Dudgeon assessments didn't use the Band model, and were based on the Folkerts model.
- 5.20. As noted during the Norfolk Boreas Issue Specific Hearing on 22nd January 2020¹², Natural England has been raising the issue of whether as built or consented projects should be considered for in-combination effects with The Crown Estate and we note the need for a strategic approach to this issue. If conducted simply on a project-by-project basis this has significant risks of inconsistency of approach across applications. Therefore, we consider that this issue needs to be addressed strategically on behalf of the whole sector, including developing consensus on an approach. However we do recognise that this is not possible in time for the Norfolk Vanguard determination examination.

6. Derogation / compensation

- 6.1. In the 'Ornithology Position Statement' (MacArthur Green 2020c) and the 'Additional Mitigation' (Royal HaskoningDHV 2020a) documents submitted by Norfolk Vanguard, Norfolk Vanguard has also considered other mitigation options to reduce collision risk in the form of consideration of potential seasonal turbine operation restrictions and reducing the number of turbines to achieve less than 1 individual kittiwake mortality from the Flamborough and Filey Coast (FFC) SPA. Natural England welcomes that Norfolk Vanguard has given consideration to these additional options for potentially reducing collision predictions from the Norfolk Vanguard project alone. We consider

¹² Natural England (2020) Norfolk Boreas Offshore Wind Farm: Natural England's Written Summary of Oral Representations made at Issue Specific Hearing 4 on offshore effects including the Draft Development Consent Order. Planning Inspectorate Reference: EN010087. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-001630-DL4%20-%20Natural%20England%20-%20Written%20Representation%20of%20Oral%20Case.pdf>

that Norfolk Vanguard has demonstrated due consideration and significant efforts to reduce the impacts of their proposal, which we welcome.

- 6.2. With regard to the information provided by Norfolk Vanguard and consideration of alternative solutions, Imperative Reasons of Overriding Public Interest (IROPI) and in-principle compensatory measures in respect of the FFC SPA and the Alde-Ore Estuary SPA (the Derogation Case), please see our responses to the 'Habitats Regulations Derogation Provision of Evidence' document (Royal HaskoningDHV 2020b) and associated Appendices (Appendix 1 on FFC SPA kittiwake, MacArthur Green 2020d and Appendix 2 on Alde-Ore Estuary SPA LBBG, MacArthur Green 2020e).

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MacArthur Green (2020e) *Norfolk Vanguard Offshore Wind Farm: Habitats Regulations Derogation, Provision of Evidence – Appendix 2: Alde-Ore Estuary SPA – In Principle Compensation Measures for lesser black-backed gull*. Document Reference: 8.24. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010079/EN010079-004229-8.24%20Appendix%202%20Alde-Ore%20Estuary%20SPA%20In%20Principle%20Compensation%20Measures%20for%20lesser%20black-backed%20gull.pdf>

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NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

Deadline: 27th April 2020

**Annex 9:
Natural England's comments on Norfolk Vanguard Summary Overview on
Habitats Regulations Assessment (HRA), ExA; Sum; 11.D10.2.**

1. Secretary of State Consultation

- 1.1. Paragraph 13 of the submission states that the Flamborough and Filey Coast (FFC) SPA is designated for a kittiwake population of 44,520 pairs and the population of kittiwake is currently stable and/or increasing and has been for a considerable period.
- 1.2. Natural England note that the Conservation Objective for the kittiwake population of the FFC SPA is to 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. The latest monitoring report for the FFC SPA from 2019 (Lloyd et al. 2019) indicates kittiwake productivity shows a sustained decline at Flamborough Head (though a modest increase at Filey). These productivity studies indicate productivity is not high enough to maintain the population at its current level, let alone restore it, so a population decline over the lifetime of the project seems plausible.
- 1.3. Please note many of the points raised in this Annex are covered in full in Annexes 8 – 13.

2. Ornithology - mitigation

- 2.1. Natural England welcomes the additional mitigation measures presented by Norfolk Vanguard to reduce seabird collisions by:
 - Reducing the maximum number of turbines from 180 to 158 by increasing the minimum turbine size from 10MW to 11.55MW; and
 - Increasing in the draught height:
 - Minimum draught height increased from 27m to 35m (above Mean High Water Springs, MHWS) for turbine models up to and including 14.6MW capacity
 - Minimum draught height increased from 27m to 30m (above MHWS) for turbine of 14.7MW capacity and above
- 2.2. Please see our separate comments provided in Annex 10 on the 'Additional mitigation' document (Royal HaskoningDHV 2020) submitted by Norfolk Vanguard for detailed comments regarding the additional mitigation.

3. Over precaution in ornithology assessments

Natural England notes that whilst each uncertainty has the potential to compound the overall uncertainty, our understanding is that in the collision assessments the central predicted value (i.e. those for the mean bird density, mean/central avoidance rate, mean/central flight height) from each individual project assessment is carried forward into cumulative and in-combination assessments, rather than the upper figures from any predicted range based on uncertainties in the input data. Therefore, Natural England queries why the Applicant considers the uncertainties to be compounded. In any event, for all Round 1 and Round 2 projects the use of a range of figures is simply

not possible, because earlier windfarm Environmental Statements did present information to generate ranges of predicted impacts.

- 3.1. There are also elements within CRM where the assessment may not be precautionary. For example, the potential limitations in recording of site-specific data on seabird flight heights may have the potential to lead to underestimates of potential collisions and hence assessments may be lacking in precaution in this aspect.
- 3.2. For further details of our response to over-precaution in assessment, please see our separate comments provided in Annex 8 on the 'Ornithology Position Statement' document (MacArthur Green 2020a) submitted by Norfolk Vanguard.
- 3.3. Natural England recognises 'headroom' as an important issue; it is a highly complex one though, and it is important to note that there is not yet an agreed way forward at present and Norfolk Vanguard's approach has also not been subjected to wider industry scrutiny and approval. Natural England agrees that there is likely to be some headroom; however, the exact extent of any potential headroom is not agreed.
- 3.4. Please see our separate comments on the 'Ornithology Position Statement' (MacArthur Green 2020a) and 'Headroom Calculations' documents (MacArthur Green 2020b) provided in Annexes 8 and 13 submitted by Norfolk Vanguard for detailed comments regarding the consented vs as built turbine numbers and headroom.

4. Adverse Effect on Integrity (AEol) conclusion

- 4.1. Norfolk Vanguard considers that there cannot be reasonable scientific doubt in a conclusion of no AEol of all European site(s), alone or in-combination with other projects or plans.
- 4.2. As noted in Natural England's separate comments on the 'Ornithology Position Statement' (MacArthur Green 2020) and on the 'In Principle Compensation Measures' documents for kittiwake at the FFC SPA (MacArthur Green 2020) and LBBG at the Alde-Ore Estuary SPA (MacArthur Green 2020), Natural England agrees that AEol can be ruled out for both kittiwake at the FFC SPA and LBBG at the Alde-Ore Estuary SPA from Norfolk Vanguard **alone**. However, we consider that it is not possible to rule out AEol on either of these features due to in-combination collision mortality (indeed for kittiwake at the FFC SPA we consider that mortality levels have exceeded those that would result in an adverse effect) and that includes a contribution from Norfolk Vanguard.

5. Norfolk Vanguard derogation case

Compensation

- 5.1. Natural England welcomes the in principle compensation measures presented by Norfolk Vanguard for kittiwakes at the FFC SPA and for LBBGs at the Alde-Ore Estuary SPA (as detailed in MacArthur Green 2020c; MacArthur Green 2020d). We believe that these proposals are in principle heading in the right direction. Nesting ledge provision for kittiwakes and predator proof fencing for LBBG at the Alde-Ore Estuary SPA have

the potential to be considered as appropriate compensatory measures to address collision mortality impacts. We note there are still major matters of detail around the evidence base that require much greater analysis, and there are implementation/legal issues to fully understand and address.

- 5.2. However, Natural England does not consider it appropriate to restrict the potential compensation for kittiwakes at the FFC SPA to just the option of provision of artificial nesting sites at this time. We consider that sandeel fisheries management also has potential value as a compensatory measure, though again this option would need greater analysis. Therefore, we would recommend that alternative draft conditions are produced which allow for a range of compensatory measures. This would allow the SoS to consider the appropriateness of a range of potential compensatory measures.
- 5.3. Please see our separate comments on the 'FFC SPA In Principle Compensation Measures for kittiwakes' (MacArthur Green 2020c) and the 'Alde-Ore Estuary SPA In Principle Compensation Measures for LBBG' (MacArthur Green 2020d) documents submitted by Norfolk Vanguard for detailed comments on the in principle compensation measures proposed by Norfolk Vanguard.

6. References

Lloyd, I., Aitken, D., Wildi, J. & O'Hara, D. (2019) *Flamborough and Filey Coast SPA Seabird Monitoring Programme – 2019 Report*. RSPB.

MacArthur Green (2020a) *Norfolk Vanguard Offshore Wind Farm: Ornithology Position Statement Department for Business, Energy and Industrial Strategy (BEIS) Request for Information*. Document Reference: ExA; Pos; 11.D10.2. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-004225-ExA;%20Pos;%2011.D10.2%20Ornithology%20Position%20Statement.pdf>

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MacArthur Green (2020d) *Norfolk Vanguard Offshore Wind Farm: Habitats Regulations Derogation, Provision of Evidence – Appendix 2: Alde-Ore Estuary SPA – In Principle Compensation Measures for lesser black-backed gull*. Document Reference: 8.24. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-004229-8.24%20Appendix%20%20Alde-Ore%20Estuary%20SPA%20In%20Principle%20Compensation%20Measures%20for%20lesser%20black-backed%20gull.pdf>

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NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

Deadline: 27th April 2020

Annex 10:
Natural England's comments on Norfolk Vanguard Additional Mitigation, ExA; Mit; 11.D10.2 (Royal HaskoningDHV 2020) and Norfolk Vanguard Additional Mitigation Appendix 1: Updated Collision Risk Modelling, ExA; Mit; 11.D10.2.App1 (MacArthur Green 2020)

1. Summary of Natural England's advice

- 1.1. We welcome the sustained efforts of Norfolk Vanguard to reduce the impacts of the proposal on seabirds. Whilst the impacts have been significantly reduced, Natural England's advice remains that the project's contribution to in-combination collision mortality totals is such that an adverse effect on the integrity (AEOL) cannot be ruled out for kittiwake from the Flamborough and Filey Coast (FFC) SPA and lesser black-backed gull (LBBG) from the Alde-Ore Estuary SPA.

2. Main Comments

- 2.1. Natural England welcomes the additional mitigation measures through reduced numbers of turbines and increased draught heights presented in the 'Additional Mitigation' (Royal HaskoningDHV 2020) and the 'Updated Collision Risk Modelling (CRM)' (MacArthur Green 2020) documents ('Additional Mitigation submissions'). Norfolk Vanguard now proposes to consider 11.55MW turbines with a minimum draught height of 35m above mean high water springs (MHWS) and 14.7MW turbines with a minimum draught height of 30m above MHWS. We acknowledge that the worst case scenario (WCS) is now based on the 14.7MW turbines as the predicted collisions are greater for this turbine layout than for the 11.55MW. Although these are larger turbines, we note that this greater number of collisions is largely due to the larger turbines having a lower minimum draught height.
- 2.2. In addition to the refinements in turbine layout between Norfolk Vanguard East and West set out during the examination phase (see AS-043), the numbers of turbines have been reduced from 200 x 9MW in the original ES submission (see APP-217) to 180 x 10MW during the examination (see REP6-021). Further reductions are now presented in the Additional Mitigation submissions from Norfolk Vanguard that reduce the turbine numbers to 158 x 11.55MW turbines for the smallest turbine now considered within the project envelope, and to 124 for the revised WCS of 14.7MW turbines.
- 2.3. We welcome that Norfolk Vanguard has engaged with the supply chain for both turbine manufacturers and construction vessels regarding constraints around draught height increases and turbine installation. Based on the information in the Additional Mitigation submissions regarding constraints on hub heights through installation vessel capacity limits it appears that Norfolk Vanguard has considered as much additional mitigation regarding draught height increases as they can reasonably do given such construction constraints. We consider that Norfolk Vanguard has demonstrated due consideration and significant efforts to reduce the impacts of their proposal, which we welcome.
- 2.4. Based on the collision predictions presented in the Additional Mitigation submissions, Norfolk Vanguard's contribution to the in-combination totals for kittiwake at the FFC SPA and for lesser black-backed gulls (LBBGs) at the Alde-Ore Estuary (SPA) have been significantly reduced by the additional mitigation. However, **Natural England's position remains that Norfolk Vanguard still makes a contribution to the totals: 21 (range 1-60) kittiwakes from the FFC SPA per annum and 3 (range: 0.1-7) LBBGs from**

the Alde-Ore Estuary SPA per annum for Natural England’s preferred methods for the WCS 14.7MW turbines).

- 2.5. With regard to headroom between consented and built wind farm designs, we advise Norfolk Vanguard considers Natural England’s separate response to the ‘Ornithology Position Statement Appendix 1 Headroom Calculations’ (MacArthur Green 2020) document submitted by Norfolk Vanguard .
- 2.6. If the turbine options presented in the Additional Mitigation submissions are going to represent the final assessed WCS for CRM for the Norfolk Vanguard project, we would therefore welcome a mechanism that secures the revised assessments/technical documents/WCS as those upon which a decision will be or has been made (as was advised for Norfolk Boreas at Deadline 5 on 26 February).

3. Detailed Comments

Increases to Draught Height:

- 3.1. We note that for the additional mitigation in the Additional Mitigation submissions, the point of reference to which the draught height is measured for all turbine scenarios is Mean High Water Springs (MHWS). We note that Hornsea Project 3 has considered an increase to the lower rotor tip height from 33.17m to 40m above Mean Sea Level (MSL). Therefore, the differences in reference points used between projects makes it very difficult to compare draught heights and increases committed to across projects.

DCO condition: Raised draught height:

- 3.2. Paragraph 15 of the ‘Additional Mitigation’ document (Royal HaskoningDHV 2020) and paragraph 19 of the ‘Updated CRM’ document (MacArthur Green 2020) note that in order to secure the additional mitigation, it is proposed to revise Requirement 2(1)(e) of the draft DCO (and the corresponding DML conditions), and part e) will be amended to say *‘have a draught height which is less than the minimum draught height specified for the relevant wind turbine generator capacity in the table below.’* We note the table given lists wind turbine generator capacity up to and including 14.6MW and 14.7MW and above. As Norfolk Vanguard are committing to removing the 9MW, 10MW and 11MW options from their design envelope, Natural England suggests that this needs to have something to indicate that turbines smaller than 11.55MW turbines cannot be installed. Please note both the DCO and DML need to be updated to reflect these changes.

Further assessment:

- a. Collision risk from Boreas alone
- 3.3. Natural England welcomes that information has been provided in Table 1 of the ‘Updated CRM’ document (MacArthur Green 2020) on the numbers of each turbine type and their associated parameters required to run the Band (2012) CRM, and that all other required CRM input parameters (i.e. bird densities, bird biometrics and other

species specific parameters e.g. nocturnal activity, proportions at collision height, avoidance rate) have been presented in Tables 3.1-3.3 of Appendix 1 of the 'Updated CRM' document (MacArthur Green 2020). We also welcome that updated CRM predictions have been provided in Table 2 of the 'Updated CRM' document (MacArthur Green 2020) for the revised turbine configurations (i.e. 11.55 MW with 35m draught height and 14.7MW with 30m draught height) for all of the key species at risk of collisions for EIA. Updated figures have also been provided for the relevant species and designated sites for HRA in Table 2.1 of the 'Additional Mitigation' document (Royal HaskoningDHV 2020) and Tables 2.6-2.8 of the 'Updated CRM' document (MacArthur Green 2020) for the revised turbine configurations (i.e. 11.55 MW with 35m draught height and 14.7MW with 30m draught height) for all of the key species at risk of collisions for EIA and the relevant species and designated sites for HRA.

3.4. We have verified the CRM for the 11.55MW and 14.7MW turbines and confirm that we agree with the collision predictions presented in the 'Additional Mitigation' (Royal HaskoningDHV 2020) and the 'Updated CRM' (MacArthur Green 2020) documents, with only minor differences due to rounding.

b. Collision risk from Boreas cumulatively/in-combination with other plans and projects

3.5. We welcome that Norfolk Vanguard have presented updated cumulative/in-combination collision figures for all key species at risk of collision in Tables 3.4-3.9 of Appendix 2 of the 'Updated CRM' document (MacArthur Green 2020). We note the figures presented in these tables are the same as those submitted by the Norfolk Boreas Applicant at Deadline 6¹. These updated figures include revised collision predictions for both Norfolk Vanguard and now include figures for Norfolk Boreas, East Anglia One North, East Anglia Two and Hornsea 4 (which were not previously included in the Vanguard figures submitted during the project examination).

3.6. The figures included for Norfolk Vanguard have been updated to account for the revised mitigation and project design committed to in the 'Additional Mitigation' document (Royal HaskoningDHV 2020). The numbers included for Norfolk Boreas are the updated figures for Norfolk Vanguard submitted by the Norfolk Boreas Applicant at Deadline 5² to account for additional mitigation committed to by this Applicant to also remove the smallest turbines from the project envelope and to commit to a

¹ Norfolk Boreas Limited (2020) Norfolk Boreas Offshore Wind Farm: Offshore Ornithology Assessment Update – Cumulative and In-combination Collision Risk Modelling. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-001802-Offshore%20Ornithology%20Assessment%20Update%20Cumulative%20and%20In-combination%20Collision%20Risk%20Modelling.pdf>

² MacArthur Green (2020) Norfolk Boreas Offshore Wind Farm: Offshore Ornithology Assessment Update – Project Alone Collision Risk Modelling. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-001683-Offshore%20Ornithology%20Assessment%20Update,%20Project%20Alone%20Collision%20Risk%20Modelling.pdf>

smallest turbine option of 11.55MW with a draught height of 35m and a worst case scenario of 14.7MW turbines with a 30m draught height.

- 3.7. The figures included for East Anglia One North and East Anglia Two are from the submission documents for these projects, whilst the Hornsea 4 figures are from the project PEIR.
- 3.8. We welcome that the figures included in the cumulative/in-combination Table 3.5 in the 'Updated CRM' document (MacArthur Green 2020) for Hornsea 3 have not been updated to reflect the revised post examination kittiwake collision estimates for that project, which were submitted to the Planning Inspectorate on the 14th February 2020. Natural England notes that whilst any amendments to the Hornsea 3 project design envelope (i.e. elevated lower tip height and reduction in turbine numbers and rotor swept area) would result in a proportional reduction in the collision estimates, Natural England is unable to agree on what the absolute level of reduction for Hornsea 3 will be as we believe the issues with the underlying baseline data have still not been resolved. **Therefore, again due to Natural England's significant concerns regarding the incomplete baseline surveys for the Hornsea 3 project, and the associated level of uncertainty as regards the potential impacts of that project, and the shortcomings of the proposed compensation measures for that project; Natural England is not in a position to advise that a significant adverse impact for cumulative impacts at EIA scale or that an adverse effect on integrity (AEOI) can be ruled out for any relevant feature of an SPA when the Hornsea 3 project is included in the totals.**
- 3.9. The figures included for Hornsea 4 come from the PEIR for that project, which currently represents the best available data to include for this project. However, as noted during the Norfolk Boreas examination, these figures and the methodologies to produce them are subject to ongoing discussions through the evidence plan process, and therefore have an element of uncertainty associated with them and a likelihood of being subject to change. For example, the CRM figures presented in the Hornsea 4 PEIR were undertaken using the stochastic CRM, and therefore are potentially affected by the issues currently being investigated with this model. Therefore, the inevitable uncertainty around the Hornsea 4 figures, along with our position set out above regarding inclusion of Hornsea 3 in the cumulative/in-combination assessments, means that Natural England is not in a position to advise that a significant adverse impact for cumulative impacts at EIA scale or that an AEOI for in-combination impacts at HRA can be ruled out for any relevant species or feature of an SPA when the Hornsea 3 and Hornsea 4 projects are included in the totals.
- 3.10. In this context we welcome that Norfolk Vanguard has presented cumulative and in-combination collision totals for all projects including Hornsea 3 and Hornsea 4 and excluding Hornsea 3 and Hornsea 4 in the 'Updated CRM' document (MacArthur Green).
- 3.11. With regard to the gannet figures, we advise that Norfolk Vanguard checks the apportioned collision figures to the FFC SPA presented in Table 3.4 of the 'Updated CRM' document (MacArthur Green 2020) for autumn and spring for Norfolk Vanguard and Norfolk Boreas, as it appears that a 6.2% apportionment rate has been applied to the autumn collision predictions and a 4.8% apportionment rate applied to the spring

collision predictions rather than vice versa. We note that this does not materially affect the annual in-combination totals.

- 3.12. With regard to the kittiwake figures, we recommend that Norfolk Vanguard checks all of the total collision figures (cumulative and in-combination, for all seasons and annually) presented in Table 3.5 of the 'Updated CRM' document (MacArthur Green 2020) for excluding Hornsea 3 from the totals, as these do not appear to be correct.
- 3.13. We note that there is a slight error in the revised great black-backed gull (GBBG) cumulative collision totals presented in Table 3.8 of the 'Updated CRM' document (MacArthur Green 2020) when Hornsea 4 is included in the total. This is due to an error in the summing of the annual collisions of Hornsea 4: the combined total of 3 collisions in the breeding season and 13.6 collisions in the non-breeding seasons is 16.6 and not 13.6 as presented in Table 3.8, meaning the cumulative total including Hornsea 3 and Hornsea 4 is 1,069 birds (and not 1,066 as presented in Table 3.8).
- 3.14. Paragraph 23 of the 'Additional Mitigation' document (Royal HaskoningDHV 2020) states: *'The Applicant considers that Natural England's position on in-combination kittiwake collisions given for the consented East Anglia THREE offshore wind farm (and for which the Secretary of State was satisfied there would be no adverse effects on integrity for the project alone or in-combination) is of relevance to the current submission. The East Anglia THREE alone collision estimate for Flamborough and Filey Coast SPA was 10.2 individuals (i.e. only 10 less than for Norfolk Vanguard). Natural England described the contribution that East Anglia THREE made to the in-combination total (of 323) as ' "...while not de minimis is so small as to not materially alter the significance or the likelihood of an adverse effect on the integrity of the SPA" (BEIS 2017). Given the similarity in estimates the Applicant considers the same description is applicable to Norfolk Vanguard.'*
- 3.15. Natural England notes that based on the revised WCS for Norfolk Vanguard (i.e. 14.7MW turbines with a 30m draught height), the predicted number of kittiwake collision from the FFC SPA of 21 (based on NE's apportionment rates) contributes 5.8% of the in-combination total annual collision mortality of 363 kittiwakes from the FFC SPA (excl. Hornsea 3 and Hornsea 4). Natural England had already previously advised (at Hornsea 2 and East Anglia 3 examinations onwards) that it was not possible to rule out an adverse effect on integrity (AEOI) on the FFC SPA from operational and consented projects due to the level of annual in-combination collision mortality predicted for kittiwake. Natural England's advice regarding both the Hornsea 3 and Norfolk Vanguard projects is that there is an adverse effect on the integrity on FFC SPA kittiwake due to in-combination collision mortality levels.
- 3.16. There is the potential for Flamborough kittiwakes to be impacted by the Norfolk Vanguard proposal during the breeding and non-breeding seasons, and there is therefore the potential for the proposal to make a contribution (WCS prediction of 21 birds per annum, range: 1-60) to the overall in-combination kittiwake collision mortality total. We note Natural England's advice during the Thanet Extension examination was that whilst this project made a small contribution to the in-combination annual collision mortality total for kittiwake, Natural England advised the

competent authority that it could not be concluded that there would be no AEOI on the FFC SPA when the project was considered in-combination.

- 3.17. Paragraph 24 of the 'Additional Mitigation' document (Royal HaskoningDHV 2020) states: *'With respect to lesser black-backed gull, for which the predicted mortality due to Norfolk Vanguard following the additional mitigation is at most 2.6 individuals, the Applicant notes Natural England's comment (in their letter dated 19th December 2019) that the in-combination total for the Alde-Ore Estuary SPA is lower now (57) than that for the consented Galloper wind farm alone of 119 and considerably lower than the in-combination estimate of 270-357 (Natural England figures; DECC 2013).'* We note that assessment methodologies and Natural England advice regarding these have modified since the Galloper consent (consent 24th May 2013), e.g. the shift from the use of Potential Biological Removal (PBR) to recommendation that Population Viability Analysis (PVA) should be used, and the associated recommendation for use of PVA models run using a 'matched pairs' approach and interpretation using the metrics of counterfactual of population size and counterfactual of growth rate. In addition, there has also been the publication of the formal updated Conservation Advice package for the Alde-Ore Estuary SPA and restore conservation objective for the LBBG site population.
- 3.18. We note that whilst the Norfolk Vanguard alone contribution to the total in-combination LBBG collisions from the Alde-Ore Estuary SPA will have decreased following the design revisions compared to that at the point of submission, the project still makes a relevant contribution (3 birds per annum, range: 0.1-7) to the annual in-combination total based on the revised WCS. Natural England notes that based on the revised WCS for Norfolk Vanguard (i.e. 14.7MW turbines with a 30m draught height), the predicted number of LBBG collisions from the Alde-Ore Estuary SPA of 3 (based on NE's apportionment rates) contributes 4.8% of the in-combination total annual collision mortality of 54 LBBGs from the Alde-Ore Estuary SPA (irrespective of whether Hornsea 3 and Hornsea 4 are included in the total, as no birds are apportioned to this site from this project, which Natural England is content with).

Consideration of other collision risk mitigation options

- 3.19. Natural England welcomes the information provided by Norfolk Vanguard regarding the reduction in turbine numbers required to reduce the collisions of FFC SPA kittiwake to less than 1 individual per year. This states that to achieve an FFC SPA kittiwake mortality of no more than 1 individual the wind farm would comprise less than 6 turbines. We acknowledge the Applicant's evidence that an offshore windfarm of less than 6 turbines is unlikely to be a viable project, and agree that such a development would not make any meaningful contribution to the de-carbonisation of energy production.

4. References

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NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

Deadline: 27th April 2020

**Annex 11:
Natural England's comments on Norfolk Vanguard Habitats Regulations
Derogation, Provision of Evidence Appendix 1 Flamborough and Filey Coast
SPA In Principle Compensation Measures for Kittiwakes, ExA; IROPI;
11.D10.3.App1**

1. Summary of Natural England's advice

- 1.1. Natural England welcomes the in principle compensation measures presented by Norfolk Vanguard for kittiwakes at the Flamborough and Filey Coast (FFC) SPA. We believe that these proposals are in principle heading in the right direction in relation to addressing the ecological impacts. Although, we note that the compensation measure mostly likely to increase the FFC SPA productivity i.e. fisheries management measures has not been taken forward by Norfolk Vanguard in the proposed approach to delivery and draft conditions to secure the compensation; in favour of providing nesting ledge provision for kittiwakes.. Please be advised that we still have significant concerns in relation to the evidence base for this proposal, which requires much greater analysis, and implementation/legal issues to fully understand and address before this can be considered an appropriate compensatory measure to address collision mortality impacts.
- 1.2. Natural England does not consider it appropriate to restrict the potential compensation for kittiwakes at the FFC SPA to just the option of provision of artificial nesting sites at this this time. Therefore, we would recommend that alternative draft conditions are produced which allow for a range of compensatory measures (e.g. to also include fisheries management). This would allow the Secretary of State (SoS) to consider the appropriateness of a range of potential compensatory measures.

2. Scale of Impact

- 2.1. As noted in our response to the 'Additional Mitigation' (Royal Haskoning DHV 2020) and the 'Additional Mitigation Appendix 1 Updated Collision Risk Modelling (CRM)' (MacArthur Green 2020a) documents submitted by Norfolk Vanguard, Natural England welcomes the additional mitigation measures committed to by Norfolk Vanguard through reduced numbers of turbines and increased draught heights.
- 2.2. Based on the collision predictions presented in the 'Additional Mitigation' (Royal Haskoning DHV 2020) and 'Appendix 1 Updated CRM' (MacArthur Green 2020a) documents the revised collision predictions are now 21 kittiwakes from the Flamborough and Filey Coast (FFC) SPA (range of collisions to account for uncertainty in input parameters: 1-60), based on the new worst case scenario (WCS) of 14.7MW turbines with a draught height of 30m above mean high water springs (MHWS), using Natural England's preferred breeding season apportionment rate.
- 2.3. Using the updated WCS figures for both Norfolk Vanguard and Norfolk Boreas (as submitted at Deadline 5¹ of the examination for the Norfolk Boreas project), the in-combination collision totals when Natural England's preferred breeding season apportionment rates are applied for Norfolk Vanguard and Boreas for kittiwakes at

¹ MacArthur Green (2020) Norfolk Boreas Offshore Wind Farm: Offshore Ornithology Assessment Update – Project Alone Collision Risk Modelling. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010087/EN010087-001683-Offshore%20Ornithology%20Assessment%20Update,%20Project%20Alone%20Collision%20Risk%20Modelling.pdf>

the FFC SPA are 363 per annum if Hornsea Projects 3 and 4 are excluded from the total, and 701 per annum if Hornsea 3 and 4 are included.

- 2.4. The mitigation provided by Norfolk Vanguard must either avoid or reduce as far as possible the impacts associated with the development. That mitigation should mean the development will not, alone, have an adverse effect on the integrity (AEOI) of the SPA. Any residual effects of the development which alone are not adverse must be considered in combination with the residual impacts of other plans and projects.
- 2.5. The revised predicted WCS collision predictions based on Natural England's preferred breeding season apportionment of 21 (range: 1-60) equates to less than 1% of baseline mortality of the FFC SPA kittiwake colony. On that basis, Natural England agrees that AEOI can be ruled out for kittiwake at the FFC SPA from Norfolk Vanguard **alone** and therefore, there is no need for compensation due to Norfolk Vanguard **alone**. However, we consider that there is an AEOI of these features due to in-combination collision mortality and that includes a contribution from Norfolk Vanguard of 21 of 363 birds per annum if Hornsea 3 and 4 are excluded and 21 of 701 per annum if Hornsea 3 and 4 are included. Natural England notes that we have already advised at Hornsea 2 and East Anglia 3 examinations onwards that it was not possible to rule out an AEOI on the FFC SPA from operational and consented projects due to the level of annual in-combination collision mortality predicted for kittiwake.
- 2.6. Whilst Norfolk Vanguard's contribution to the in-combination totals for kittiwake at the FFC SPA has been significantly reduced by the additional mitigation, Natural England's position remains that Norfolk Vanguard still makes a contribution to the total (based on the figures for the revised WCS in the 'Additional Mitigation' (Royal HaskoningDHV 2020) and 'Appendix 1 Updated CRM' (MacArthur Green 2020a) documents): of 21 (range: 1-60) kittiwakes from the FFC SPA for Natural England's preferred breeding season apportionment rates. It should be noted that the Norfolk Vanguard alone figure of 21 is an estimation which is underpinned by a number of assumptions, several of which have considerable uncertainty associated with them. Accordingly, Natural England takes a range-based approach to considering impacts. We note Natural England's advice during the Thanet Extension examination was that whilst this project made a small contribution to the in-combination collision mortality, it could not be concluded that there would be no AEOI on the site by the project, when considered in-combination.
- 2.7. Norfolk Vanguard notes that the reduced project alone kittiwake collision predictions are lower than those for several consented offshore wind farms (Hornsea One, Dogger Bank Creyke Beck A and B, Dogger Bank Teesside A and B and Triton Knoll). We note that these are already consented and therefore represent an already increased level of anthropogenic mortality that the Norfolk Vanguard project adds to. The relative contribution of Norfolk Vanguard compared to these consented projects is therefore not relevant. The assessment for Norfolk Vanguard therefore needs to be in the context of this existing consented impact.
- 2.8. Norfolk Vanguard note in paragraph 35 the impacts from Norfolk Vanguard alone are more than offset by the reductions in in-combination totals currently locked up in the available headroom, created by the difference between assessed, consented and as built schemes. Natural England has provided detailed comments raising several issues

regarding the approach to headroom taken by Norfolk Vanguard in our response to the ‘Ornithology Position Statement’ (MacArthur Green 2020b) document, provided in Annex 8. We also note that that if Norfolk Vanguard successfully identify headroom this does not necessarily mean that headroom is the project’s to utilise, as there are multiple projects not yet consented.

- 2.9. Natural England therefore welcomes the ‘in-principle’ compensation measures proposed by Norfolk Vanguard for kittiwakes at the FFC SPA.

3. Flamborough and Filey Coast (FFC) SPA

- 3.1. With regard to the 1987 count of 83,370 pairs of kittiwake at the site, we note our comments regarding this in our response to the Norfolk Vanguard ‘Ornithology Position Statement’ document (MacArthur Green 2020b) and our Deadline 4 [Norfolk Boreas: REP4-037] and 7 Norfolk Boreas: REP7-045] responses submitted during the Boreas examination^{2,3}.

4. Prey Enhancement

I. Closure of sandeel fishing to benefit kittiwakes at the FFC SPA

- 4.1. We agree that in principle, the enhancement of sandeel populations through the reduction or removal of fishing of the sandeel stocks on which FFC kittiwakes rely, is likely to be beneficial to that kittiwake population, and therefore is a compensatory measure worth exploring. Such a measure is likely to be of benefit to adult bird health/survival as well as productivity and this should be factored in when considering the merits of this approach.
- 4.2. However, much greater consideration is required of the evidence around the certainty that the sandeel stock will recover and by how much as fishing mortality is reduced (potentially to zero), or whether this is likely to be constrained by other environmental drivers (e.g. increases in abundance of sandeel predators, climate change, changes in sandeel prey abundance). Additionally, greater detail is required of the quantitative nature of the relationship between kittiwake productivity (and adult survival) and

² Natural England (2020) Norfolk Boreas Offshore Wind Farm Updated ornithology Advice: Deadline 4 – Natural England’s comments in relation to the Norfolk Boreas updated offshore ornithological assessment, submitted at Deadline 2 [REP2-035]. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-001629-DL4%20-%20Natural%20England%20-%20Updated%20Ornithology%20Advice.pdf>

³ Natural England (2020) Norfolk Boreas Offshore Wind Farm: Deadline 7 – Natural England’s response to Applicant’s comments on Deadline 4 submissions. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-001974-DL7%20-%20NE%20-%20Comments%20on%20Applicants%20Comments%20on%20Deadline%204%20Responses.pdf>

sandeel stock, to determine by how much fishing mortality needs to be reduced (again possibly to zero) in order to lead to the desired increase in kittiwake productivity.

a. Spatial scale

- 4.3. Due to the uncertainty of success and the uncertainty associated with the predicted level of impact, Natural England would suggest that the aim should not just be looking for an extra 42 chicks fledged to offset the 21 predicted additional mortalities (noting that the range of predictions is 1-60 kittiwake collisions), but that a multiplier should be applied (e.g. x2, x4) to reflect the uncertainty of success. We note that the examples of x2 or x4 are typical multipliers used in existing habitat related cases where there is uncertainty regarding the success of compensatory measures delivering required habitats. However, as this is entirely new method of compensation, with significantly greater uncertainty around effectiveness, it therefore shouldn't necessarily be constrained by established multipliers. The appropriate figure should be derived from the best available evidence and deliver sufficient confidence for the competent authority to be sure that the adverse effects will be compensated for.
- 4.4. Greater scrutiny of the analysis by Carroll et al. (2017) and any other relevant studies is required in order to demonstrate the validity of the argument that halving fishing mortality (i.e. from 0.6, as given in paragraph 54, to 0.3), would see kittiwake productivity increase by 0.2 chicks per nest.
- 4.5. To ensure that compensatory measures are fully effective, if this option were progressed the number of kittiwake chicks that are being foregone currently at the FFC SPA would need to be calculated, rather than relying on a statement that there are "*large numbers of kittiwake chicks dying at the FFC SPA*". It would also need to be demonstrated by how much the sandeel stock would need to increase in order to offset that, and by how much fishing effort would need to be reduced to deliver that increase in stock size. All these issues need to be carefully worked through, with a range of measures of variation included, in order to gauge the scale of the measure needed to deliver the desired benefit and to decide upon an appropriate multiplier, to ensure that, given the scale of uncertainty, impacts will be compensated for.
- 4.6. Natural England recognises that this sort of proposal has the potential to provide compensation for a positive outcome for the population for an order of magnitude greater than the risk from the Norfolk Vanguard project in isolation. We agree that it is likely to be difficult to precisely deliver the exact amount of compensation required for Norfolk Vanguard, and that it would also be very difficult to measure the effect of the very small change to productivity required to compensate for loss of the predicted number of kittiwakes predicted due to this development. But again consideration could be given to this option providing wider more strategic industry compensation. Please see point 4.8 below.
- 4.7. When deciding on a proposed location, consideration should also be given to the proposed extension projects and Round 4 offshore windfarm zones as the development of projects in those areas may limit the ongoing deliverables of any compensation measure. Whilst it is recognised that the onus will be on future projects to fully assess the impacts and address any hindrance to existing compensation

measures, if possible we advise that potential spatial overlapping issues are avoided at project consenting.

b. Timescale

- 4.8. Natural England agrees that the recovery of sandeel stocks may be constrained by other environmental drivers (e.g. increases in abundance of sandeel predators, climate change, changes in sandeel prey abundance) and we therefore agree that any compensation (in terms of improved stock biomass) on these grounds should aim to exceed the minimum suggested by the statistical relationship between sandeel total stock biomass and kittiwake productivity.
- 4.9. Natural England considers this option has significant potential to deliver compensatory measures for multiple offshore windfarms (including Norfolk Vanguard), noting that there are currently five offshore windfarm projects currently in examination, another likely to be submitted in 2020, and a series of seabed leases for extensions to existing North Sea windfarms. However, a more detailed analysis of the predicted scale of benefits would help strengthen the case for implementing this measure, and to demonstrate the scale of sandeel fishing reduction that would be required.

c. Feasibility

- 4.10. Natural England notes that if measures directly benefiting kittiwake at the FFC SPA are considered necessary (noting that compensation should be first aimed at the feature and site affected), then fisheries management would seem to be the only plausible option. We note that fishery closure for conservation of seabirds has been done in Scotland, so whilst not for offshore wind farm impacts in that case, the approach is not without precedent.
- 4.11. We recognise that this approach is not in Norfolk Vanguard's gift to deliver alone, but it would likely require facilitation by the UK Government/the regulating authority. However, the benefits of this approach could be supportive of the wider offshore windfarm industry and help facilitate future progress towards 'net zero'.

II. Purchase of sandeel fishery quota

- 4.12. As noted above regarding the closure of sandeel fisheries, there are again considerable uncertainties with this suggestion. Therefore, Natural England questions the aim that Norfolk Vanguard simply needs to deliver 42 extra fledged kittiwakes per annum and suggests that the aim should not just be looking for an extra 42 chicks fledged to offset the 21 predicted additional mortalities (noting the range of predictions is 1-60 kittiwake collisions), but that an appropriately precautionary multiplier should be applied to reflect the uncertainties.
- 4.13. We consider the piecemeal approach whereby Norfolk Vanguard might buy out the quota of a single or multiple vessels would come with high levels of uncertainty. Any non-linearity in the relationships between fishing mortality and subsequent sandeel stock size or kittiwake productivity may mean that reducing fisheries effort by purchasing the quota of many boats has no beneficial effect at all for kittiwake foraging success and productivity. It may be necessary to significantly reduce sandeel

quotas to produce any tangible benefits. The work by Cury et al. (2011) indicates that non-linear relationships between seabird productivity and fish stock biomass are the normal pattern, so it will be necessary to identify the nature of the present relationship and the shift required to deliver sufficient compensation.

- 4.14. Therefore we would not advise in favour of this kind of approach unless it is undertaken in a precautionary (i.e. buying out a substantial proportion of quota in order to realise tangible benefits) manner.

5. Predator control / mortality reduction

- 5.1. We agree with Norfolk Vanguard that it is unlikely that predator control would significantly increase breeding success of kittiwake colonies to offset the predicted collision mortalities from the FFC SPA. We also note that predator control at other colonies will not benefit kittiwakes at the FFC SPA.

6. Productivity Improvement – Construction of artificial nest sites

- 6.1. Natural England agrees that in principle, the provision of additional nest sites for kittiwakes in the southern North Sea/south-east of England might have the potential to be of benefit to the regional kittiwake population, though unlike sandeel fisheries management, this measure would not directly benefit the FFC SPA population.

Furthermore, we feel that greater confidence is needed on the following relevant issues:

- I. That there would be a net benefit to the overall kittiwake population size (not just simply causing a redistribution); and
 - II. That there are sufficient food resources within likely foraging range around any new location to support the required level of productivity.
- 6.2. In order to select potential new nesting locations that are not likely to result in the kittiwakes from the new colony entering into competition with the foraging ranges of the FFC SPA, site selection could be informed by the modelled distribution of kittiwake from the FFC SPA shown in Cleasby et al. (2018). An analysis of population trends/productivity of kittiwake colonies in East Anglia with those in south-east England and the Channel, drawing on Hamilton et al. (2016), would also help identify locations that are most likely to host productive kittiwakes over the project lifetime. In addition, proximity to existing or proposed windfarms should be considered, in order to select a location where collision mortality will not risk the success of the compensatory measure.

a. Delivery mechanism

- 6.3. Whilst the creation of artificial nest sites in the southern North Sea/south-east England would have the obvious benefit of increasing the number of colonies, whether that delivers a net gain to the overall size of the kittiwake population will depend upon whether the birds that recruit to new colonies would be more productive than if they had tried to recruit to some existing colony. To establish this a

better understanding of the nature and strength of density-dependence and an understanding of patterns of movement/immigration/emigration between colonies is likely to be required, together with perhaps the development of an integrated meta-population model that builds in that density dependence (e.g. such as the roseate tern model, Seward et al. 2019). As noted above, certainty is required around the availability of good food supplies around any proposed additional nest site location. Encouraging birds to nest in areas where they might come into significant levels of competition with birds from the large FFC SPA colony could reduce the amount of compensation provided, at least until the fishing pressure on the sandeel stock is reduced.

- 6.4. As noted above regarding fishery closures, a precautionary multiplier should be applied to take account of the uncertainty of success and of the level of the predicted impact, and aiming for double the number of kittiwake chicks produced to that predicted to be killed by collisions does not appear to robustly take account of this.
- 6.5. The compensation aspect of creating additional nesting sites would presumably involve purchasing or leasing the structure (for its new purpose), modifying it as needed, and then maintaining it and monitoring success. Alternatively a bespoke structure may need to be installed. We raise the question for the SoS as to how to ensure that the structure would form part of the Natura 2000 network and that it is appropriately protected and managed in the future. Recognising that there would be potential negative impacts to the N2K network if removal of said structure was proposed at the time of decommissioning.

b. Spatial scale

- 6.6. The information provided by Norfolk Vanguard in paragraph 87 regarding the size and productivity of any new colonies required as compensation represents the broad nature of a future, more detailed analysis, which would be required to determine the sufficient level of compensation. The key aspect to demonstrate would be that the required number of individuals will reach breeding age in comparison to what would otherwise happen without the artificial structure i.e. that additional kittiwakes will be produced to compensate for the collision mortality. It would not be sufficient to set up a new colony and attract kittiwakes to it if these birds were simply attracted from one existing colony (e.g. the FFC SPA) to the new one.
- 6.7. We agree that depending on the location of any artificial site and its proximity to wind turbines, there may be a risk that birds in the new colony are at risk of collisions themselves, thereby reducing the degree of compensation delivered for the FFC SPA. Therefore, the location of any new site needs to be carefully considered – see our comments above. This also again highlights the need to consider a multiplier to account for such issues and other uncertainties when deciding on the level of compensation required.
- 6.8. Natural England is uncertain of the merits of encouraging additional nesting close to key feeding areas on Dogger Bank (and also the large existing kittiwake colony at the FFC SPA) rather than elsewhere. Bolton et al. (2019) showed that segregation of foraging areas between colonies of seabirds is the norm. Therefore, the level of competition exerted by kittiwakes from the large FFC colony may effectively exclude foraging kittiwakes from other colonies which in theory could have overlapping

foraging ranges. The distribution of foraging birds dictated by the point source foraging constraints of breeding compared to where the actual feeding resource is may indicate areas where a new colony would have access to 'under-utilised' foraging, thus securing sufficient productivity and minimising impacts on existing breeders. There is also the issue of introducing another hard substrate (the structure itself and any scour protection) into a soft substrate environment. These factors would need careful consideration before a final location for the artificial structure is selected.

- 6.9. When deciding on a proposed location, consideration should also be given to the proposed extension projects and Round 4 offshore windfarm zones as the development of projects in those areas may limit the ongoing deliverables of any compensation measure. Whilst it is recognised that the onus will be on future projects to fully assess the impacts and address any hindrance to existing compensation measures, if possible we advise that potential spatial overlapping issues are avoided at project consenting.

c. Timescale

- 6.10. We would expect that by the time a project was consented that the compensation was agreed and shown to be deliverable on the ground. In the terrestrial world this is normally done by the windfarm agreeing terms with a landowner that only come into force if the agreement is approved and whose execution is a condition of permission. If a an artificial kittiwake nesting structure approach was to be agreed 'in-principle', then Norfolk Vanguard would need to secure a site and prepare a detailed design so that Natural England can comment on the suitability of this before a conditional consent was discharged. The structure would need to be in place by the time construction of the windfarm started, and if offshore should include the provision of artificial nest structures. 'Seeding' artificial structures with nest domes from existing colonies (albeit those being lost to development) appears to have been successful in attracting kittiwakes to new locations on Tyneside (Peter Bell, former Gateshead Council ecologist, pers. comm.).

d. Monitoring

- 6.11. Natural England notes that monitoring of the changes in breeding numbers of kittiwake at the affected SPA and any new compensation colony will be needed as part of the package of measures. There will be a need to verify efficacy of the measures, so there will need to be a monitoring package that allows for kittiwake: (a) adult survival and (b) productivity at both the FFC SPA and any new compensation colony to be understood to quantify net impact. Monitoring at any new colony should also include tagging of birds using the site in order to be able to model the foraging range of these birds and relationships with windfarm infrastructure.
- 6.12. It should be noted that such monitoring of the FFC SPA colony will be required regardless of any compensation measure that is approved for impacts to this SPA (i.e. prey enhancement through fisheries closures/buying of quotas, productivity

improvement through construction of nest sites). However, we note that monitoring in itself is **not** a compensation measure.

- 6.13. Natural England has concerns regarding the use of figure of 0.8 chicks per pair as a suitable target to include within any licence condition as a measure of success of the compensation measure. Other studies e.g. Frederikson et al. (2004) and Cook & Robinson (2010) have calculated higher productivity levels are needed to produce stable population trends, so this matter requires further consideration to produce an agreed productivity target.

e. Feasibility

- 6.14. The availability of nest ledges at the FFC SPA is not thought to be a limiting factor for the kittiwake population at the site at present. In any event kittiwakes using new nest sites provided at Flamborough would be competing with the c50,000 pairs of kittiwake already present at the colony.
- 6.15. In that context, Norfolk Vanguard notes that further south of Flamborough, nest sites are limited by a lack of suitable natural cliffs, the East Anglian colonies being artificial in nature (Lowestoft Pier and Sizewell Outfall). Therefore, providing a man-made site further south would increase the ability of kittiwake to utilise waters further away from the FFC SPA colony. These birds would also be less exposed to competition for prey resources from the Flamborough foragers, though as noted above it would need to be demonstrated that these birds would not be exposed to a level of collision risk from offshore windfarms that would prevent compensation from being effective. Nevertheless, we agree with Norfolk Vanguard that this is in principle a feasible option, though further analysis is required to identify a suitable location. Please see below for comments on Norfolk Vanguard's proposed approach to delivery of such a measure.

7. Proposed approach to delivery of compensation and DCO condition

- 7.1. Part 1 of paragraph 98 suggests that Natural England agrees with what follows. We are not in a position as yet to agree that the nest sites should be located offshore on a meteorological mast, and nor have we agreed where that structure might best be located. We note that use of a meteorological mast-type structure is novel as an artificial nesting structure for kittiwakes. However, we note that kittiwakes are known to occupy offshore rigs and so the concept seems reasonably likely to be successful, provided that the structure is designed to provide sufficient ledges with appropriate shelter/exposure to weather conditions, and that these are not susceptible to predation from large gulls. However, greater certainty is required that an artificial nesting site is likely to deliver a net increase in the size of the kittiwake population, and not just a redistribution of existing breeders.
- 7.2. Norfolk Vanguard state that the artificial nest sites are likely to be constructed within the existing Order limits for the project. Part 3 of paragraph 98 suggests that the division of turbines between Vanguard East and Vanguard West offers the potential to locate the artificial nest sites away from turbines whilst within the Order limits. If the artificial nest site structures are to be located within the project's Order limits then

it is highly likely that any birds that nest there will be at immediately greater collision risk than those nesting at the FFC SPA, limiting (perhaps severely) the effectiveness of the compensation measures. Therefore Natural England questions whether this represents an appropriate or sustainable location for compensatory measures, and advises that before any location can be agreed, a greater amount of evidence and analysis is required regarding the merits and risks of adding nests:

- I. Within the Order limit (e.g. between Vanguard East and West) as opposed to elsewhere within the FFC SPA kittiwake foraging range;
- II. Somewhere else completely different away from the FFC SPA.

7.3. The approach and draft conditions are limited to construction of artificial nest sites, as Norfolk Vanguard consider this to be the most appropriate measure to deliver compensation prior to the construction of Norfolk Vanguard. Natural England does not consider it appropriate to restrict the potential compensation to just this option at this time. Therefore, we would recommend that alternative draft conditions are produced which allow for a range of compensatory measures (e.g. to also include fisheries management options). This would allow the SoS to consider the appropriateness of a range of compensatory measures.

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NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

Deadline: 27th April 2020

Annex 12:
**Natural England's comments on Norfolk Vanguard Habitats Regulations
Derogation, Provision of Evidence Appendix 2 Alde-Ore Estuary SPA In Principle
Compensation Measures for Lesser black-backed gull, Document Reference
8.24**

1. Summary of Natural England's advice

- 1.1. Natural England welcomes the in principle compensation measures presented by Norfolk Vanguard for lesser black-backed gulls (LBBGs) at the Alde-Ore Estuary SPA. We believe that these proposals are in principle heading in the right direction. But, Natural England's view is whilst the Applicant proposal to fund of a project coordinator and scoping study is helpful, there must be a commitment to delivering measures on the ground that would offset the predicted collision risk mortality.
- 1.2. Therefore, we have reviewed all of options considered by the Applicant as compensation measures and we believe that predator proof fencing for LBBG at the Alde-Ore Estuary SPA has the most potential to be considered as an appropriate compensatory measure to address collision mortality impacts. However, there are other factors, including site suitability and management issues, which need to be considered in determining a suitable location for such fencing.
- 1.3. Natural England considers that it is achievable to have a suitable location identified and a predator proof fence erected before the construction of the windfarm.

2. Background

- 2.1. As noted in our response to the 'Additional Mitigation' (Royal HaskoningDHV 2020) and the 'Additional Mitigation Appendix 1 Updated Collision Risk Modelling (CRM)' (MacArthur Green 2020) documents submitted by Norfolk Vanguard, Natural England welcomes the additional mitigation measures committed to by Norfolk Vanguard through reduced numbers of turbines and increased draught heights.
- 2.2. Based on the collision predictions presented in the 'Additional Mitigation' (Royal HaskoningDHV 2020) and 'Appendix 1 Updated CRM' (MacArthur Green 2020) documents the revised collision predictions are now 3 lesser black-backed gulls (LBBG) from the Alde-Ore Estuary SPA (range of collisions to account for uncertainty in input parameters: 0.1-7), based on the new worst case scenario (WCS) of 14.7MW turbines with a draught height of 30m above mean high water springs (MHWS) and using Natural England's preferred breeding season apportionment rate.
- 2.3. Using the updated WCS figures for both Norfolk Vanguard and Norfolk Boreas (as submitted at Deadline 5¹ of the examination for the Norfolk Boreas project), the in-combination collision total when Natural England's preferred breeding season apportionment rates are applied for Norfolk Vanguard and Boreas for LBBGs at the Alde-Ore Estuary SPA is 54 per annum. This is irrespective of whether Hornsea

¹ MacArthur Green (2020) Norfolk Boreas Offshore Wind Farm: Offshore Ornithology Assessment Update – Project Alone Collision Risk Modelling. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010087/EN010087-001683-Offshore%20Ornithology%20Assessment%20Update,%20Project%20Alone%20Collision%20Risk%20Modeling.pdf>

Projects 3 and 4 are excluded or included in the total as no LBBGs collisions have been apportioned to the SPA from these projects, which we are content with.

- 2.4. The mitigation provided by Norfolk Vanguard must either avoid or reduce as far as possible the impacts associated with the development. That mitigation should mean the development will not, alone, have an adverse effect on the integrity (AEOI) of the SPA. Any residual effects of the development which alone are not adverse must be considered in-combination with the residual impacts of other plans and projects.
- 2.5. The revised predicted WCS collision predictions based on Natural England's preferred breeding season apportionment of 3 (range: 0.1-7) equates to less than 1% of baseline mortality of the Alde-Ore Estuary SPA LBBG colony. On that basis, Natural England agrees that AEOI can be ruled out for LBBG at the Alde-Ore Estuary SPA from Norfolk Vanguard **alone** and therefore, there is no need for compensation due to Norfolk Vanguard **alone**. However, we consider that it is not possible to rule out AEOI of this feature due to in-combination collision mortality and that includes a contribution from Norfolk Vanguard (3 of 54 birds per annum).
- 2.6. Whilst Norfolk Vanguard's contribution to the in-combination totals for LBBG at the Alde-Ore Estuary SPA has been significantly reduced by the additional mitigation, and the contribution to the overall in-combination mortality totals is relatively small when compared to other protects; Natural England's position remains that Norfolk Vanguard still makes a contribution to the total (based on the figures for the revised WCS in the 'Additional Mitigation' (Royal HaskoningDHV 2020) and 'Appendix 1 Updated CRM' (MacArthur Green 2020) documents). It should be noted that the Norfolk Vanguard alone figure of 3 (range 0.1-7) is an estimation which is underpinned by a number of assumptions, several of which have considerable uncertainty associated with them. Accordingly, Natural England takes a range-based approach to considering impacts.
- 2.7. We note that the Galloper offshore wind farm was consented on project alone (119 collisions) and in-combination (270-357) collision predictions that are higher than either the project alone or in-combination totals now predicted by Norfolk Vanguard. However, we note that assessment methodologies and Natural England advice regarding these have significantly improved since the Galloper consent (24th May 2013). There have been two critical changes: firstly, the shift from the use of Potential Biological Removal (PBR) to that the use of Population Viability Analysis (PVA), and secondly, the associated recommendation for interpretation of PVA model outputs using the metrics of counterfactual of population size and counterfactual of growth rate. In addition, there has also been the publication of Natural England's formal Conservation Advice package for the Alde-Ore Estuary SPA and associated conservation objective to restore the SPA's LBBG population, which are available from:
<https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCo>

- 2.8. Natural England therefore welcomes the ‘in-principle’ compensation measures proposed by Norfolk Vanguard for LBBGs at the Alde-Ore Estuary SPA.

3. Closure of sandeel and sprat fisheries close to the Alde-Ore Estuary SPA

- 3.1. We agree with Norfolk Vanguard that based on studies of diet and tracking of breeding adults suggesting that sandeels are not an important component of the diet of LBBGs, changes to sandeel fishery management are unlikely to represent a strong measure for compensation in relation to LBBG.

4. Predator control / Productivity improvement – Establish an area within the Alde-Ore Estuary SPA that is protected by predator proof fencing for LBBGs to nest

- 4.1. We agree that in principle the installation of predator proof fencing would have the potential to benefit for LBBGs at the Alde-Ore Estuary SPA. However, there are other factors, including site suitability and management issues, which need to be considered. Therefore, we welcome that Norfolk Vanguard has undertaken consultation with local Non Government Departs.

a. Delivery mechanism

- 4.2. Whilst installation of predator proof fencing at an area at Orfordness is likely to have the potential to work for LBBGs at the Alde-Ore Estuary SPA, other factors need to be taken into account, for example:

- Whether such fencing can be installed at the site due to ground conditions and that parts of the site is already covered in subsurface wires;
- Excessive growth of vegetation in the areas used by large gulls has proved an issue that has discouraged their nesting and this has proved impossible to manage by mechanical means due to the network of subsurface wires. Therefore, this would need to be tackled as well, unless a location can be found where vegetation growth is not an issue e.g. a sufficiently sized area of hard standing suitable for nesting LBBG.

- 4.3. These factors are issues that will need to be considered through the Alde Ore partnership that is being set up for site wider site management.

b. Spatial scale

- 4.4. We agree that provision of predator proof fencing for the benefit of SPA species has the potential to provide orders of magnitude greater than the risk from Norfolk Vanguard development in isolation. However, we also consider that delivery of compensation at a scale appropriate to Norfolk Vanguard’s anticipated impact is possible.

- 4.5. The idea of a proportionate approach where Norfolk Vanguard contributes in proportion to their share of the predicted impact seems reasonable. It will be

necessary to take account of the uncertainty in the in-combination predicted impact totals and of Norfolk Vanguard's individual contribution to the total. However, this does highlight the whole issue of additionality which needs to be demonstrated in regard to compensation measures. Given the small number of birds involved and the potential to predator-proof relatively small areas it may be more appropriate for Norfolk Vanguard to address the compensation as a stand-alone project (or in tandem with the sister project Norfolk Boreas if appropriate), and this would be more practical from a planning point of view.

c. Timescale

- 4.6. Natural England consider that it is achievable to have a suitable location identified and a predator proof fence erected before the construction of the windfarm.

d. Monitoring

- 4.7. Natural England notes that while monitoring of the changes in breeding numbers of LBBGs at the Alde-Ore Estuary SPA will be needed as part of the package of measures to validate the efficacy of the intervention, monitoring in itself is **not** a compensation measure.

5. Proposed approach to delivery of compensation

- 5.1. Consultation is only proposed with Natural England as the relevant Statutory Nature Conservation Body. However, as the proposal regarding LBBGs at the Alde-Ore Estuary SPA would be an onshore scheme, consultation should be undertaken with the wider Alde Ore partnership, to seek their support, as this will be of considerable importance to success. Natural England highlight that a key aspect of ensuring the delivery of sufficient compensation will be the ability to demonstrate the implementation of measures through the mitigation funding already secured.

6. References

MacArthur Green (2020) *Norfolk Vanguard Offshore Wind Farm: Additional Mitigation – Appendix 1 Updated Collision Risk Modelling*. Document Reference: ExA; Mit; 11.D10.2.App1. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-004215-ExA;%20Mit;%2011.D10.2.App1%20Additional%20Mitigation%20Appendix%201%20Updated%20Collision%20Risk%20Modelling.pdf>

Royal HaskoningDHV (2020) *Norfolk Vanguard Offshore Wind Farm: Additional Mitigation – Department for Business, Energy and Industrial Strategy (BEIS) Request for information*. Document Reference: ExA; Mit; 11.D10.2. Available from; <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-004214-ExA;%20Mit;%2011.D10.2%20Additional%20Mitigation.pdf>



NORFOLK VANGUARD OFFSHORE WIND FARM
POST EXAMINATION CONSULTATION

Planning Inspectorate Reference: EN010079

Deadline: 27th April 2020

Annex 13:
**Natural England's comments on Norfolk Vanguard Ornithology Position
Statement Appendix 1 Headroom Calculations, ExA; Pos; 11.D10.2. App1
(MacArthur Green 2020)**

1. Summary

- 1.1. In the 'Appendix 1 Headroom Calculations' document (MacArthur Green 2020) Norfolk Vanguard has presented details on the approaches used to recalculate collision predictions for Hornsea Project One (HOW01), based on re-run CRM for the 'as-built' scenario and revised figures using the approach developed for The Crown Estate (TCE) (Trinder 2017) and for Triton Knoll, using the approach in Trinder (2017).
- 1.2. Natural England has identified some concerns/issues with the updated CRM undertaken by Norfolk Vanguard for HOW01. We have also identified some issues with the approach developed for TCE by Trinder (2017) to adjust the collision figures of planned and consented projects and as a result Natural England does not advise that this approach is used.
- 1.3. Therefore, whilst Natural England agrees that there is likely to be some headroom; it is, the exact extent of any potential headroom which is not agreed. We advise that there would need to be wider industry scrutiny and agreement of such an approach, before it could be adopted. And input from the individual developers for each of the constructed projects, to ensure that the agreed figures are based on the more appropriate information.
- 1.4. Full details of these concerns/issues are set out below.

2. Updated Collision Risk Modelling (CRM) undertaken by Norfolk Vanguard for HOW1

- 2.1. Please note that HOW01 applied for a non-material change which increased their capacity from 1200MW to 1218MW so that they could use 174 of the Siemens 7MW turbines that the developer thought they were most likely to actually install. But their consent still allowed various other configurations and so the WCS was still available. Therefore whilst legally secured at the time of DCO/DML change, there was still the potential for the WCS to be built.
- 2.2. We note that in Annex 1 of the 'Ornithology Position Statement, Appendix 1 Headroom Calculations' (MacArthur Green 2020) Norfolk Vanguard has undertaken updated CRM for HOW01 using the Band (2012) model for both the consented (5MW turbines) and the non-material change and subsequently constructed (7MW turbines) layouts, and has included copies of the model input and output spreadsheets for kittiwake. It appears from the information presented that Norfolk Vanguard has used the bird density data from Table C.164 from the HOW01 Environmental Statement Ornithology Technical Report. Natural England is unclear whether Table C.164 of this document does contain the correct density data used in the HOW01 CRM, as there were several iterations of the CRM through the HOW01 examination. Furthermore, during the examination it was unclear to Natural England where the density data used in the CRM came from, and there were unresolved discrepancies between the figures in the tables presented.
- 2.3. For HOW01 Norfolk Vanguard has focused on presenting the CRM figures for all layouts for Option 1 of the Band model. Natural England continues to have several significant unresolved concerns regarding the robustness of the site-specific flight height data used in the CRM of Hornsea zone projects, and has consistently advocated

the use of Option 2 in preference to Option 1 outputs. Therefore, we are concerned that Norfolk Vanguard and Boreas have incorporated the Hornsea Project TWO cumulative assessment into their in-combination/cumulative assessments, because only the Option 1 figure with a 98.9% avoidance rate for kittiwake of 122 (for EIA) collisions from HOW01 was used for the 332 x 5MW turbines. Natural England is therefore unsure what Norfolk Vanguard's updated CRM assessments represent – given that HOW01 did updated CRM assessments based on 174 x 7MW turbines and they had already done various iterations of 240 x 5MW turbines during the Examination. Therefore, due to the uncertainty in the CRM assessments undertaken and agreed for HOW01, we believe there is a high risk that Norfolk Vanguard's assessments of Headroom could be incorporating significant errors such that there may not be the headroom envisaged.

- 2.4. We note that paragraph 14 of Annex 1 of the 'Ornithology Position Statement, Appendix 1 Headroom Calculations' (MacArthur Green 2020) suggests that the turbine parameters presented in Table 1.3 - and hence used in the revised CRM for the 174 x 7MW turbines - come from the HOW01 non-material change document. However, we note that the predicted kittiwake collision figures that HOW01 calculated for 174 x 7MW turbines when they did their non-material change are different to those presented by Norfolk Vanguard, and seek clarification regarding this. We are also uncertain of whether the 7MW turbine specifications presented in Table 1.3 are the exact specifications of the 7MW turbines that have actually been built at HOW01 - as if this is not the case, the revised CRM may not actually reflect the 'as built' turbines. This would also apply to the adjusted figure from the approach developed for The Crown Estate by MacArthur Green (Trinder 2017).

3. Use of approach developed for The Crown Estate by MacArthur Green (Trinder 2017)

- 3.1. As set out in our response to Examining Authority question 2.2.38 during the Hornsea Project Three (HOW03) examination (submitted at Deadline 6 of this examination , dated 07 February 2019), Natural England considers it important to make the overarching point that The Crown Estate commissioned the Trinder (2017) report in order to better understand the potential level of 'headroom' for their own purposes (i.e. potentially to inform their decisions on future leasing rounds) and that it was not the intention that the figures from this report, or the methods outlined within it, were used to revise the in-combination assessments of current and future applications.
- 3.2. Natural England reiterates the comment made during the HOW03 examination (at Deadline 6 of this examination¹, dated 07 February 2019) that Natural England has not checked the details of the calculation for scaling collisions as set out in Trinder (2017), but in principle Natural England is of the view that the calculation method is valid. However, there are a number of issues which mean that the results obtained will not always be accurate. These include the availability of accurate data on the input parameters used in the original modelling and the actual predicted collision figures eventually arrived at in the course of an examination, as these may change several times.
- 3.3. Consequently, Natural England does not advise that it is used as a method for altering the collision figures of planned and consented projects. We note that during the

HOW03 examination, there was an attempt to update the parameters in Trinder (2017) for some offshore wind farms due to this very issue. However, further errors and/or issues were identified with this (full details are set out in Natural England's Deadline 6 response of the HOW03 examination to ExA question 2.2.38¹, dated 07 February 2019). For these reasons, Natural England does not consider there to be robust evidence available for these corrections. There are also issues regarding having the actual turbine specifications for the 'as built' turbines – in the case of the updates undertaken by the Hornsea Project Three Applicant, these were done by simply referencing manufacturer information for particular turbine models as evidence of the 'as built' layout for the majority of projects. As noted in our Deadline 6 response to ExA question 2.2.38 at HOW03, while these may in some cases reflect the actual built turbine parameters, it is not a sufficient audit trail with respect to individual projects. Therefore consultation with the MMO may be required to obtain the detailed parameters from the construction management plan.

- 3.4. Whilst Norfolk Vanguard may have demonstrated in this document that taking the approach developed in Trinder (2017) produces the same predicted collision figure as that obtained through recalculation from the original dataset (using the Band spreadsheets) for HOW01 – though please note our comments on HOW1 above - we note that this has only been demonstrated for one project. Given the issues noted above, it is unlikely that this would be the case for every project. In that light, we note the recalculation of the Triton Knoll figures has only been undertaken using the approach set out in Trinder (2017).

4. 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.

MacArthur Green (2020) Norfolk Vanguard Offshore Wind Farm Ornithology Position Statement: Appendix 1 Headroom Calculations. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-004226-ExA;%20Pos;%2011.D10.2;%20App1%20Ornithology%20Position%20Statement%20Appendix%20%20Headroom%20Calculations.pdf>

Trinder, M. (2017) Estimates of Ornithological Headroom in Offshore Wind Farm Collision Mortality. Report to The Crown Estate.

¹ Natural England (2019) Hornsea Project Three Offshore Wind Farm – Natural England Written Submission for Deadline 6: ISH 5 Annex G: Natural England's Comments on the Applicant's Response to ExA Q2.2.38 [Ornithology, Cumulative and in-combination Assessment]. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-001695-Natural%20England%20-%20ISH5%20Annex%20G-%20Natural%20England%E2%80%99s%20Comments%20on%20the%20Applicant%E2%80%99s%20response%20to%20ExA%20Q2.2.38.pdf>