The Planning Inspectorate

NATURAL ENGLAND

THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES

2010

Natural England Response to Examining Authority's written questions and requests for information (ExQ1) issued on 28th February 2022. Revision 1

For:

The construction and operation of Hornsea Project Four Offshore Wind Farm, located approximately 69 km from the East Riding of Yorkshire in the Southern North Sea, covering an area of approximately 468 km^2.

Planning Inspectorate Reference EN010098

06th April 2022

In compiling this response the following documents have been considered:

REP1-038 - G1.9 Applicants comments on relevant representation

The Planning Inspectorate

Natural England have amended this document following Deadline 2 to update some question reference numbers. None of the text within our responses have been changed.

The Examination Library

References in these questions set out in square brackets (eg [APP-010]) are to documents catalogued in the Examination Library. The Examination Library can be obtained from the following link:

https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010098/EN010098-000837-Hornsea%20Project%20Four%20Offshore%20Wind%20Farm%20Examination%20Library.pdf

It will be updated as the Examination progresses.

Citation of Questions

Questions in this table should be cited by issue reference and question number. For example, 'BGC.1.1' refers to broad, general and cross-topic question 1 in this table.

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ExQ1	Question to:	QUESTION	NE RESPONSE
BGC Broad, General and Cross-Topic Questions			
How it is intended to use the land, alternatives and whether rights sought are legitimate, proportionate and necessary			
DCO .1.17	Applicant ERYC Natural England	Article 36(2)(a) As currently drafted, this Article would allow the removal of any hedgerows within the Order limits AND any hedgerows specified in Schedule 10. Applicant: Should this be limited to those specified in Schedule 10 and if not, why not? ERYC and Natural England: Do you have any concerns about the Applicant's ability to be able to remove all hedgerows within the Order limits AND any hedgerows specified in Schedule 10?	Natural England feel this issue warrants further scrutiny, and we were unable to go into the detail for this deadline, however from our perspective, the focus of discussions within the technical panels was on the removal of the hedgerows specified within Schedule 10, rather than the removal of any hedgerows within the order limits. We are concerned about the whole sale removal of any hedgerows that the applicant wishes to removed, without first understanding the importance of them for bats (and or course biodiversity and other species that use them). We would welcome ERYCs views on this matter.
Schedules			
Requirements			
ES Environmental Impact Assessment (EIA) and Environmental Statement			
Environmental Statement (ES)			
ES.1.3	Natural England Applicant	**Breadth of magnitude categories** In its Relevant Representation [RR-029], Natural England expresses concern that that the definitions of magnitude used in the benthic and intertidal habitats assessment are very broad with no suitable incremental step between 'minor' and 'moderate'. It suggests that this may result in the underestimation of impacts. Which impacts does Natural England believe may have been underestimated? Could Natural England also	**Benthic** Natural England raised issues with the definition of minor and moderate magnitude within the benthic and intertidal ecology chapter. The terms used are too broad and without a suitable incremental step between minor and moderate. For example, an impact of permanent nature but over a minority of the site/receptor doesn't fit into either category well. In these cases, the true impact potentially gets lost because the step between the minor and moderate magnitude definitions is too large and the lower magnitude is always chosen. This had led

		confirm whether this concern is restricted to that Chapter of the ES, or if it is of broader concern.	to numerous examples where impacts are likely to be underestimated. This concern is most related to the following Benthic impacts • Temporary habitat disturbance (in the Hornsea Four array area and offshore ECC) from construction activities (BIE-C-1) • Long-term habitat loss/ change from the presence of foundations, scour protection and cable protection (BIE-O-8). • Colonisation of the WTGs and scour/ cable protection may affect benthic ecology and biodiversity (BIE-O-9). • Temporary habitat disturbance from decommissioning of foundations, cables and rock protection (BIE-D-15)**.** Furthermore, all of these impacts are given a conclusion of slight (not significant) effect within the matrix to assess the significance, even when the matrix itself gave a range of slight or moderate, further diluting the impact. **<u>Fish and Shellfish</u>** A similar concern is apparent in the Fish and Shellfish chapter where there is no suitable incremental description between 'minor' or 'moderate' magnitude, resulting in likely underestimation of impacts. Examples where this is of most concern include; • Direct damage (e.g. crushing) and disturbance to mobile demersal and pelagic fish and shellfish species arising from construction activities (FSE-C-1) • Long term loss of habitat due to the presence of turbine foundations, scour protection and cable protection (FSE-O-6) • Increased hard substrate and structural complexity as a result of the introduction of turbine foundations, scour protection and cable protection (FSE-O-7) • Temporary localised increases in SSC and smothering (FSE-C-2)

			• Mortality, injury, behavioural changes and auditory masking arising from noise and vibration (FSE-C-4) **<u>Marine mammals</u>** Upon review of the definitions of magnitude in the marine mammal environmental statement chapter (APP-016), we consider that the definitions of moderate and minor magnitude are very similar with minimal material change between them (the reverse scenario to Benthic and fish). We advise that they are reviewed and amended to make clearer the differences between the definitions, to provide a clear incremental step between them. The impact assessments should then be reviewed to identify if the changes to the definitions of magnitude would have a material change on the outcome of the assessments.
ES.1.7	Applicant Natural England MMO Royal Society for the Protection of Birds (RSPB)	**Dudgeon and Sheringham Shoal Extension** In light of the Secretary of State's Norfolk Vanguard decision letter and the publication of the proposed Dudgeon and Sheringham Shoal Extension projects' Preliminary Environmental Impact Report (PEIR) on 29 April 2021, are any changes needed to the cumulative assessment, given that some topics were screened out at the time of the assessment due to low data confidence?	Natural England are not aware of any changes needing to be made to the cumulative assessment. Additional receptors do not need to be added back in.
Management plans			
Without prejudice derogation and compensation documents			
ES.1.23	Applicant Natural England RSPB	**Compensation site selection** The Compensation Project Description [APP-057] notes that further site selection information is provided in the Derogation Information documents. However, while addressing site selection criteria, these appear to fall short of identifying sites that	Natural England consider that compensation measures should be well defined at the point of application. Appendix C of our Relevant Representation submission [RR-029] included a checklist of those aspects of compensatory measures that we consider need to be described in detail when developers are submitting or updating applications where impacts on MPAs are

		could be secured, should they be deemed necessary. In the light of the SoS's decision on the Norfolk Boreas and Norfolk Vanguard projects, and in particular the requests for evidence of the location and deliverability of the proposed compensation measures (notably in relation to the kittiwake interest feature of the Flamborough and Filey Coast Special Protection Area (SPA), is further assessment (EIA) required? If so, how will this be addressed in the ES and on what timescale, noting the Secretary of State's indications of an expectation that such matters, if required, should in future be dealt with in Examination? If not, why not?	anticipated. Whilst not exhaustive, it lists key areas where sufficient detail is needed to allow the Secretary of State to determine the case with confidence that appropriate compensatory measures can be secured if required. These include: a) What, where, when: clear and detailed statements regarding the location and design of the proposal. c) For measures on land, demonstrate that on ground construction deliverability is secured and not just the requirement to deliver in the DCO e.g. landowner agreement is in place. For measures at sea, demonstrate that measures have been secured e.g. agreements with other sea or seabed users. We consider this information should be presented at application, and fully considered through the Examination.
ES.1.25	Applicant Natural England MMO RSPB ERYC East Suffolk Council	**Environmental assessment of compensation measure sites** Given the lack of refinement of possible sites for the proposed compensation measures, how reliable is the assessment of likely environmental effects set out in the ES [APP-057] for them? Please explain your reasoning.	Without an appropriate level of detail being provided on the locations and implementation methods of the proposed compensation, we are not able to comment meaningfully on the likely environmental effects.
HRA Habitats Regulations Assessment (HRA)			
HRA.1.1	Applicant	**European site citations** Natural England's Relevant Representation [RR-029] notes that the formal citations and conservation objectives for European sites are live documents that are updated on a regular basis to incorporate the most up to date evidence. Nevertheless, it is important that the documents on which the Examination concludes are 'fixed'	Citation documents are fixed at the time of classification/designation of the site and the high-level conservation objectives for the site remain constant. These can be considered "fixed" at any time. Natural England's Conservation Advice Packages (including Supplementary Advice on Conservation Objectives and Advice on Operations) are updated on a more regular basis, with publication windows in March and September. We therefore

		before its completion, so that the SoS and others are aware of the version used. Could the Applicant please confirm an arrangement for ensuring that this is the case and how the appropriate information would be provided in an Examination document at the appropriate time (ideally this should be prior to the issue of the Report on the Implications for European Sites by the Examining Authority on 28 July 2022).	recommend that this information is taken as fixed from April 2022.
HRA.1.2	Applicant Natural England RSPB The Wildlife Trusts	**Research findings** The Report to Inform the Appropriate Assessment (RIAA) [APP-174] draws extensively on guidance, technical reports and published scientific papers, with the list summarised in Part 8 of the RIAA. Given the currency and dynamic nature of the topics considered, have any relevant references been published subsequently that should be taken into account in the HRA, and, if so, what are they and might they change the outcome materially?	Marine processes Carpenter, J. R., Merckelbach, L., Callies, U., Clark, S., Gaslikova, L., and Baschek, B. (2016). Potential impacts of offshore wind farms on North Sea stratification. PloS one 11, e0160830 In addition to this Natural England have provided 2 additional references in answering ExQ MC.1.12 in relation to the Flamborough Front. Ornithology Buckingham, L., Bogdanova, M.I., Green, J.A., Dunn, R.E. et al. (2022). Interspecific variation in non-breeding aggregation: a multi-colony tracking study of two sympatric seabirds. Marine Ecology Progress Series, 684: 181-197. https://doi.org/10.3354/meps13960 This recent paper investigates non-breeding distributions, and the extent of population aggregations, in guillemot and razorbill from 11 colonies around the northern UK. These are two of the focal species of the Hornsea 4 EIA and HRA. This research provides insights into the mixing of birds from different breeding colonies outside of the breeding season. This is particularly relevant considering the large numbers of guillemot and razorbill found in the Hornsea 4 project area in August and September,

			and concerns surrounding apportioning of impacts to FFC SPA at this time. The tracking included is largely limited to Scottish colonies, with no birds tracked from FFC SPA during the non-breeding season. However, the core colony distributions for both species over two years did not overlap with the Hornsea 4 area during mid-August to mid-September, or even later in the year. This suggests that it is unlikely that birds from the more northerly SPAs reach and use the Hornsea 4 area in August and September. The birds present in the Hornsea 4 area at this time are therefore likely to be dominated by those from the relatively nearby FFC SPA. This reinforces Natural England's concerns relating to the weighted apportioning approach used by the Applicant for guillemot during the non-breeding season, as the assessment removes the emphasis from the impacts on birds that are likely to be from FFC SPA at a vulnerable lifecycle stage. We consider that the potential impacts are presently being underestimated. <u>Marine mammals</u> We consider that there are no new relevant references that have been published since the RiAA that would materially change the outcome.
HRA.1.4	Applicant Natural England	**Grey seal interest of the Noordzeekustzone SAC** The screening matrices [APP-169] and screening report [APP-168] identify potential Likely Significant Effects in relation to the grey seal interest of the Noordzeekustzone SAC (Netherlands). However, this does not appear to be considered in the integrity matrices [APP-170] alongside other transboundary grey seal sites. Should it have been included in the analysis reported in integrity matrix 9? If so, is a reassessment necessary? If it is, when will this be submitted into the Examination?	The Applicant has submitted revised RIAA integrity matrices at Deadline 1 [REP1-013]. The revised RIAA integrity matrices now include Noordzeekustzone SAC (in integrity matrix 9). We consider that the inclusion of this site in the matrix and the accompanying assessment text is sufficient to address the concerns raised (although we defer to the Dutch authorities on this site).

HRA.1.5	Applicant Natural England	**Screening** Natural England's relevant representation advises that Flamborough Head SAC, Humber Estuary SAC, SPA and Ramsar site, and the Southern North Sea SAC should be screened in for assessment due to the potential for Likely Significant Effects arising from changes to physical processes, and in the case of the Southern North Sea SAC, changes to the hydrodynamic regime and sediment transport regime. Drawing on responses to other questions around physical processes including the assessment of the Flamborough Front, can the Applicant provide an updated screening assessment of these matters or justification as to why this is not necessary? Can Natural England provide a view on whether any progress made in these areas has affected its position on the screening of Likely Significant Effects in these matters?	Natural England has not yet seen any additional information, therefore our advice remains unchanged. However, we note that the applicant is intending to submit a supplementary report at Deadline 3. We note that there will be insufficient time ahead of the Issue Specific Hearings for us to review this submission, so we will aim to provide written feedback at Deadline 4. However, we note that this will only leave approximately two weeks to review and therefore Deadline 5 may be more realistic. Although we welcome this supplementary information, we also note that these areas of concern are particularly data poor, and that consequently this additional information may not be sufficiently conclusive to allow impacts to these designated sites to be screened out.
HRA.1.6	Applicant Natural England	**Assessment of effects in relation to marine mammal qualifying features** Could Natural England please expand on the further information required in order to inform the assessment of Likely Significant Effects on harbour seal in The Wash and North Norfolk Coast SAC from vessel collision risk? Could the Applicant please address the points raised by Natural England on: • Likely Significant Effects on harbour seal in The Wash and North Norfolk Coast SAC from vessel collision risk; • the worst-case scenario assessed in relation to simultaneous and concurrent piling; and • the in-combination assessment tiers and inclusion of seismic surveys?	Natural England requests information on: • Location of ports for construction, and operation and maintenance; • Anticipated vessel transit routes; • Baseline vessel density along these routes; • Vessel density taking into account the addition of project vessels; • Seal densities along the routes and an estimate of number of individuals that may be impacted to inform the assessment of LSE on harbour seal in The Wash and North Norfolk Coast SAC from vessel collision risk. If the final locations of the ports and routes have not been determined, then the *likely options* should be detailed. Each option should be presented with a high-level assessment of the impact of each option relative to the others.

		(*If not fully addressed in the Applicant's Deadline 1 response to Relevant Representations.*)	
HRA.1.8	Natural England RSPB The Wildlife Trusts	**In-combination assessment for kittiwake** Do Natural England and the other nature conservation bodies agree with the approach used in compiling the RIAA [APP-167] that the contribution to the losses of the kittiwake feature of the Flamborough and Filey Coast SPA as a result of the Hornsea Three project is compensated for and that the project's contribution to an in-combination assessment can therefore be discounted? Can the same rationale now be applied to the Norfolk Boreas and Norfolk Vanguard projects? If so, does this change any of the positions reached in representations to date on whether it is possible to exclude Adverse Effects on Integrity on the SPA in relation to in-combination effects on kittiwake?	As Hornsea Three has been consented following recourse to the derogations within the Habitats Regulations, and the SoS is in the process of securing compensation, we would advise that it is appropriate to discount Hornsea Three's contribution to the in-combination assessment. We consider this to also be the situation for Norfolk Boreas and Norfolk Vanguard. This does not change any of the positions reached in representations to date. Our advice is that it is not possible to rule out an adverse effect on integrity (AEoI) for the kittiwake feature of the FFC SPA for collision impacts in-combination with other plans and projects, for all projects **up to** and including Hornsea 3, Norfolk Vanguard, Norfolk Boreas, East Anglia One North and East Anglia Two. Without the impact of these projects, we would still consider collision mortality to have exceeded levels which are considered to be AEOI, irrespective of the treatment of Hornsea 3's contribution.
HRA.1.10	Applicant Natural England RSPB	**Offshore ornithology modelling** Natural England's Relevant Representation [RR-029] raises fundamental concerns about possible errors in the application of the model used to analyse the baseline offshore ornithological characterisation data to produce the density and abundance estimates that underpin the HRA. Has the Applicant engaged with Natural England subsequently, has progress been made towards a resolution, and will further assessment be submitted into the Examination? If so, when, given the fundamental importance of this issue to the HRA? If not, why not? In the absence of further assessment based on an agreed methodology, what would be the	Natural England have engaged with the Applicant since Application on this matter, through provision of further written advice (1st February 2022) detailing our concerns with the modelling and presenting options that provide potential solutions, and then through attendance at an additional technical panel meeting (17th February 2022) to discuss the way forward. The options we have previously presented to the Applicant are: • Provide a robust defence of the adopted modelling approach (what this would entail was provided), including a clear comparison with design-based estimates; • Revise the modelling approach to address specific issues, or • Revert to design-based estimates.

		implications for decision-making in terms of quantification and understanding of the likely effects on the offshore ornithology interests of European sites of the Proposed Development? (*If not fully addressed in the Applicant's Deadline 1 response to Relevant Representations) (Cross-reference may be made to relevant responses to ExQ1 Marine Ecology, provided any specific HRA implications are detailed in this response*.)	However, following further discussion with the Applicant on 17th February 2022, it became clear that the first option is no longer viable. (Natural England will be able to provide further comment on this when the information we have seen is formally submitted into the examination at Deadline 2). Of the remaining options we consider reverting to design-based estimates would offer the quickest solution, however concerns have been raised informally by the Applicant that this would represent a 'fundamental change' to the Application. We would welcome a view from the ExA on this issue. We note and welcome that the Applicant will be submitting the design-based estimates at Deadline 2 which will enable comparison with updated model-based estimates. We understand it is the Applicant's intention to rerun the modelling for one of the key species (gannet) addressing methodological concerns, to test whether it makes a material difference to the outputs. At this point, further decisions about whether the modelling for the other species should also be rerun would be made. As it has been determined that the original modelling cannot be defended, Natural England considers that the modelling for each species should be updated, unless the applicant opts to use their design-based estimates. Whilst Natural England welcomes the further work being done, we highlight that the outputs from the model rerun for a single species are not expected to be submitted to the Examination until Deadline 3[1]. Natural England are very concerned about the implications of this for the Examination timetable. The documents will likely only be available for review for a matter of 2 or 3 working days before the associated Issue Specific Hearing, meaning that Natural England will not be in a position to discuss any of the new information contained therein at the hearing. We will aim to comment in writing at Deadline 4

[1] REP1-065 suggests the gannet rerun will be submitted at Deadline 2, however it has been indicated by the Applicant (*pers comm*) that it will be formally submitted to Examination at Deadline 3, with the intention of providing it to Natural England in advance of this.

			but given that this would only leave approximately 2 weeks for review, Deadline 5 may be more realistic. Natural England are concerned that if the Applicant waits for formal instruction from the ExA to re-run modelling for the remaining species, this would mean that the baseline issues would not be resolved until Deadline 5 or 6 at the earliest. Following this, all of the associated assessments would need to be re-run (Collision Risk Modelling, Displacement Analysis, Population Viability Analysis etc) incorporating the corrected baseline along with Natural England's additional advice. This would involve a large amount of additional information being submitted for review late in the Examination, with limited progress being made in the interim. This would allow minimal time to close out any remaining concerns and progress topics (e.g. compensation) which are reliant on these outputs. We highlight that additional documentation on auk displacement is also due to be submitted at Deadline 5. Until this matter is resolved, it will not be possible to quantify or understand the likely effects on the offshore ornithology interests of European sites of the Proposed Development. We therefore consider resolving these issues should be given the utmost priority.
HRA.1.14	Applicant Natural England	**Predicted gannet mortality** Unlike the subsequent corresponding analyses for other features, why does the analysis of potential effects on gannet from the Flamborough and Filey SPA population during operation and maintenance not include a summary of predicted mortality based on a wider range of displacement mortality rates (the 'Natural England range') [APP-167]? (The combined effect of displacement and collision risk, and the in-combination displacement assessment similarly does not include it). Are additional calculations and conclusions based on the Natural England approach necessary? If so,	Natural England considers that the range-based approach to displacement, which considers displacement rates of 60-80% and mortality rates of 1-10% to account for uncertainty, should be provided for gannet. The outcomes of this should be considered, in addition to collision risk, in the cumulative and in-combination assessments.

		when would they be submitted into the Examination?	
HRA.1.15	Applicant Natural England RSPB	**Comparison with Sula Sgeir gannet colony** At various places in the RIAA [APP-167], the Applicant makes a comparison with the harvesting of chicks from the Sula Sgeir gannet colony when discussing gannet mortality impacts and the Population Viability Analysis. The comparison seems to seek to demonstrate that even the loss of several thousand birds annually from the Sula Sgeir colony does not challenge the resilience of the colony. What weight should be placed on this comparison, given the likely material difference in average natural survival rates of gannet chicks and adult breeding birds?	It is Natural England's opinion that this comparison is not appropriate. The effects of the selective harvesting of juvenile gannet, at a colony where it is currently thought to be sustainable (see Trinder 2016), cannot be compared with increases in adult mortality rates associated with wind farm related impacts at Flamborough and Filey Coast SPA. Juvenile gannet have a much lower survival rate (0.424) than adult birds (0.919) (Horwsill and Robinson 2015) and therefore have a low chance of reaching breeding age and contributing to future reproductive output. In contrast, breeding adult gannets already contribute to colony productivity and resilience, and being a long-lived species, may do so for many years. Impacts on adult survival rates can therefore be expected to have a much greater effect on population growth rates relative to the harvesting of chicks. For example, Hunter et al. (2005) suggested that, for sooty shearwater, there was likely to be a 10-fold greater impact on population growth rates when adults were removed relative to an equivalent level of chick harvest. Horswill, C. & Robinson R. A. 2015. Review of seabird demographic rates and density dependence. JNCC Report No. 552. Joint Nature Conservation Committee, Peterborough. Hunter, C. M., & Caswell, H. (2005). Selective Harvest of Sooty Shearwater Chicks: Effects on Population Dynamics and Sustainability. Journal of Animal Ecology, 74(4), 589–600. http://www.jstor.org/stable/3505438 Trinder, M. 2016. Population viability analysis of the Sula Sgeir gannet population. Scottish Natural Heritage Commissioned Report No. 897.

HRA.1.22	MMO Natural England Applicant	**Mitigation for effects on marine mammal qualifying features and monitoring** Could Natural England and MMO explain if any of their proposed post-consent monitoring for effects on the marine mammal qualifying features would: inform the Site Integrity Plan process; serve a purpose of verification of assumptions made in the assessment; or would it simply be useful data collection? What monitoring is required to deliver control over in-combination effects and is it necessary to secure this in the draft DCO process? Could the Applicant explain what, if any, options for mitigation measures in relation to underwater noise effects on marine mammals could be committed to at the consenting stage to address uncertainties with control in the post-consent stage? Explain how any mitigation measures could be secured through any DCO.	In our Relevant Representation Natural England proposed the following post-consent monitoring: • Source level noise of wind turbine generators (WTG) with a direct-drive gearbox for turbines with a 305m rotor diameter. • Monitoring of the distribution of bottlenose dolphin along the northeast English coast. <u>Operational WTG noise monitoring</u> The operational WTG noise monitoring's primary purpose would be to verify the assumptions made in the assessment. The current evidence base for underwater noise levels from operational WTG is very limited. The Applicant presented 4 datasets of measurements of operational noise from WTG; for these data, the largest WTG was 120m in diameter, and the maximum water depth was 15m. This is significantly smaller than the 305m diameter WTGs proposed for HOW04, and also in notably shallower waters. As a result, and as acknowledged by the Applicant, "the extrapolation that must be made is significant" in order to determine the likely operational noise from WTGs at HOW04. Operational WTG noise is classified as continuous noise rather than impulsive. As such, it would not be included in the assessment of cumulative noise disturbance across the Southern North Sea (SNS) SAC in the Site Integrity Plan (SIP). <u>Monitoring bottlenose dolphin</u> The bottlenose dolphin monitoring's primary purpose would be to verify the assumptions made in the assessment. As acknowledged by the Applicant, "knowledge of bottlenose dolphin movement along the east coast of Scotland beyond the Moray Firth SAC (which was considered to be their core area of distribution), further south and northeast England is currently developing". Specifically, the following information on this population is missing: • A reliable density estimate;

			• Understanding of the coastal (or otherwise) distribution of this bottlenose dolphin population along the east of England; • The appropriate reference population to use depending on the location of the impact (which links directly to the distribution of the coastal population). The Applicant has had to make assumptions about these parameters in order to inform their RiAA (specifically APP-178). Monitoring should be undertaken to verify these assumptions. As the SIP process is only applicable to harbour porpoise SACs, it would not be informed by this monitoring. <u>In-combination effects</u> Natural England has not made any specific recommendations on monitoring requirements to control in-combination effects. We consider that monitoring to demonstrate in-combination effects on the harbour porpoise qualifying feature of the SNS SAC is best achieved at the strategic level i.e. beyond the project-specific level. There is currently no mechanism to co-ordinate strategic monitoring beyond the project-specific level. In principle we would support any project's consideration or suggestion of strategic monitoring to demonstrate the effectiveness of controls on in-combination effects on the SNS SAC. We note that, in the OMMP [APP-242], the Applicant has stated that "additional monitoring may be required for marine mammals within the Southern North Sea SAC, depending on the further assessments provided during the development of the SIP for the Southern North Sea SAC". We are supportive of the Applicant's consideration of monitoring in relation to the Southern North Sea SAC and the SIP. We have recently been made aware that the MMO have begun to introduce a condition on Marine Licences to further manage in-combination noise in the SNS SAC. Specifically, that the undertakers of noisy activities in the SNS SAC must co-ordinate with other undertakers of noisy activities to ensure that the

			disturbance thresholds are not exceeded. Evidence of the agreement with the other undertakers must be submitted to the MMO prior to the start of works, and the works cannot begin without written approval from the MMO. We are supportive of this condition **in principle**, noting that the outcomes of this new condition should be reviewed periodically to ensure it is working as intended to meet the goal of no AEoI of the SNS SAC. We consider that this condition **should** provide additional control over in-combination effects on the SNS SAC. As one of the licence conditions, the developer will be required to submit data to JNCC's Marine Noise Registry (MNR) on their noisy activities (piling and UXO). The MNR and data stored therein allows for a retrospective look at whether the thresholds have been exceeded. The MNR is currently in development to add a forward-looking aspect. We are hopeful that these developments of the MNR will improve the current mechanism to monitor and control in-combination effects. Though these initiatives are welcome, Natural England has outstanding concerns regarding the implementation of SIPs and continue to advise the applicant to commit to mitigation measures at the consenting stage that can be removed later, if subsequent assessment identifies that these are not necessary.
Without prejudice derogation case and compensation			
HRA.1.26	Applicant RSPB Natural England	**Norfolk Boreas and Norfolk Vanguard DCO decisions** Do the SoS's HRAs and decisions on the Norfolk Boreas and Norfolk Vanguard projects affect the process or conclusions of the shadow HRA undertaken for this Proposed Development by the Applicant, including the deliverability and timing of the proposed compensation measures, especially in relation to the kittiwake interest feature of the Flamborough and Filey Coast SPA?	Natural England fully supports artificial nest structures being in place for four years in advance of operation, as consented in the Norfolk Boreas and Norfolk Vanguard decisions.
HRA.1.35	Applicant	**Quantum of compensation measures**	The scale and extent of compensation measures required is tied to the nature and scale of impact to individual species.

	Natural England RSPB	Uncertainties have been highlighted regarding the offshore ornithological modelling and completeness of the assessment, for example with respect to functionally-linked habitat for auks and the effects of changes to marine processes on seabirds: consequentially, the outcomes with respect to Adverse Effects on Integrity are also highlighted as uncertain. Natural England and the RSPB have raised concerns that the scale and extent of any compensation that might be necessary cannot therefore be determined. Has any progress been made towards resolution regarding the quantum of compensation, and will further assessment be submitted into the Examination? If so, when, noting that it would be required as soon as possible. If not, why not? (*If not fully addressed in the Applicant's Deadline 1 response to Relevant Representations. Cross-reference may be made to relevant responses to ExQ1 Marine Ecology, provided any specific HRA implications are detailed in this response*.)	Determining the extent required therefore cannot be progressed until matters relating to the baseline ornithological modelling and then the assessments that follow are resolved. See also response to HRA.1.10. We do note that the Applicant has submitted a compensation calculation methodology document at Deadline 1 [EP1-063] and acknowledge that whilst it is not possible to agree on any final outputs, it is possible to agree the approach to calculating the compensation required. We are unable to provide formal comment on this document at this time due to staff absence, however we have previously reviewed and provided verbal comment to the Applicant on it at Workshops held on 3rd February 2022 and 14th February 2022, which is reflected in the Statement of Common Ground [REP1-036]. We will submit our formal advice at Deadline 3.
HRA.1.36	Applicant Natural England RSPB	**Seabird colony dynamics and population limiting factors** The Applicant reports that the guillemot and razorbill colonies at Flamborough Head have increased in recent years [APP-196]. Are there national or regional differences in colony dynamics, for example is there any evidence that warming waters along the south coast of the UK are causing reduced prey availability and affecting colonies on cliffs and islands there, including the Channel Islands? What evidence is there that the auk colonies associated with islands targeted for rat eradication have been reduced or lost as a result of predation	Natural England assumes that the first two questions are directed at the Applicant. We provide an answer to the third question below. To Natural England's knowledge there is no further evidence demonstrating/quantifying the extent of nest limitation for kittiwake since the time of application. Regarding offshore structures, as noted in our Relevant Representation [RR-029], determining the reasons for existing offshore structures being colonised versus not colonised may be key to ensuring the success or failure of the measure, and also improving our understanding of the extent to which offshore nest site availability is currently a limiting factor to kittiwake.

		by rats rather than other influences such as reduced prey availability? In its Relevant Representation [RR-029], Natural England considers it unclear if nesting habitat is a limiting factor for the breeding population of kittiwake in the southern North Sea. Is any further or updated evidence available to inform the Examination on this matter?	Please see response to HRA.1.42 for further comment regarding onshore and offshore nest structures.
HRA.1.38	Natural England Applicant	**Level of detail and confidence in compensation measures** In its Relevant Representation [RR-029], Natural England raises concerns that, in the absence of specific locations and delivery mechanisms being identified, the confidence that any of the proposed compensation measures can or will be secured is significantly reduced. The RSPB, in its Relevant Representation [RR-033], explains why it considers that inadequate detail has been provided to enable proper scrutiny of the proposed compensation measures, and why this detail should be available in the application documentation before the Examination. Given the lack of refinement of possible sites for the proposed compensation measures, how reliable is the shadow HRA, derogation case and compensation proposals [APP-179]?	Natural England recognises that further information will be submitted during the Examination to further refine the proposals. At present the proposals are not sufficiently well-defined, which limits the reliability of the shadow HRA. As noted in our response to ES.1.18, Natural England included a checklist in Appendix C of our Relevant Representation submission [RR-029] of the aspects of compensatory measures that we consider need to be described in detail where impacts on MPAs are anticipated. In order for a shadow HRA to be reliable we would particularly need: • Locations for delivery of measures • Implementation mechanism for measures • Scale/extent of measures
HRA.1.42	Natural England Applicant	**Likely success of further onshore nesting structures for kittiwake** Could Natural England explain its view [RR-029] that further onshore artificial nesting structures for kittiwake are unlikely to result in sufficient benefits to provide adequate compensation. Nest for nest, why does it consider that offshore nesting structures might provide a higher level of compensation than onshore nesting structures? What is the Applicant's view on this?	It is Natural England's view that the provision of artificial nesting structures in locations where natural breeding sites are highly limited or non-existent is likely to bolster the breeding kittiwake population, and could deliver quantifiable compensation. Bespoke structures may also offer increased opportunity in areas where kittiwake have colonised pre-existing structures but may be in conflict with their use. Designs can take account of knowledge on ideal nest site parameters and therefore, it is also likely that productivity can be increased.

			However, a number of submitted and/or consented projects are currently proposing the provision of onshore artificial nesting structures as a compensatory measure. These projects represent a planned provision of ca. 3000 nests on the English east coast, with most being in the Southern North Sea region. With no detailed quantification of the extent to which onshore nest site availability is a limiting factor, until these artificial nest sites have been well-occupied and proven to be productive, it is not appropriate to assume that further onshore nest sites could be provided to supply additional compensation. Furthermore, it is becoming apparent that securing suitable land on which to provide nesting structures is not straightforward, indicating a limitation to the number suitable locations. Further projects are likely to struggle to identify viable sites in the future, as those sites that are practicable sites are identified and secured by those developers already with consents. Kittiwakes are known to nest offshore on many existing structures; however, it is logical that nesting opportunities offshore are highly limited compared with coastal regions. Nesting is also relatively opportunistic, as structures must have suitable ledges, be somewhat undisturbed (intentionally or through normal operations), and offer access to suitable foraging. This indicates that purpose built structures located in the most ecologically suitable areas could offer breeding kittiwakes access to foraging grounds that no coastal colony could easily reach. It is also possible that offshore structures could be accessible to a greater 'pool' of colonising birds, i.e. not only those that may visit a specific coastal area when prospecting colonies. There is also some suggestion that productivity could be higher at offshore structures (Christensen-Dalsgaard et al 2019). Therefore, not only does further onshore structure provision appear to be risky with uncertain outcomes, offshore structures are also likely to be functionally superior.
HRA.1.43	Natural England Applicant RSPB	**Effectiveness of bycatch compensation measures** Natural England [RR-029] highlights the high level of uncertainty associated with bycatch reduction	Natural England have attended workshops with the Applicant on 3rd February 2022 and 14th February 2022 where preliminary results from ongoing bycatch trials were presented. We look

		compensation measures. The RSPB [RR-033] describes them as experimental research that could not yet be considered as a compensation measure. Are there any updates on research or trials? Is it the Applicant's intention to continue to put such measures forward as compensation?	forward to seeing the full survey report, which we understand will be submitted at Deadline 5.
HE Historic Environment including Marine Archaeology			
Offshore heritage and marine archaeology			
LV.1.2	ERYC Historic England Natural England HCC	**Representative viewpoints** The Applicant notes [APP-028, Table 4.4] that the viewpoints presented have been agreed by all stakeholders. Is the selection of viewpoints presented by the Applicant satisfactory or do you believe that additional viewpoints are required? If you believe additional viewpoints are required, please provide further details to explain why they are required.	Natural England is restricting its advice to the Flamborough Head Heritage Coast, in line with our statutory remit on designated landscapes. For landscape effects outside of this area, with the exception of the candidate Yorkshire Wolds AONB which is addressed in LV.1.4, advice should be sought from the Local Authority. No further viewpoints are required in respect of the Flamborough Head Heritage Coast.
LV.1.14	Applicant Natural England	**Assessment of the Yorkshire Wolds as an Area of Outstanding Natural Beauty** Could the Applicant please Provide comment, or signposting which indicates where comment is provided, in response to [RR-029, Appendix H, page 3] from Natural England on the implications of the possible designation of the Yorkshire Wolds as an AONB for its Landscape and Visual Assessment. Would a change in designation alter the significance of effects and would any additional mitigation be necessary or possible? Could Natural England provide an overview of the assessment process and likely timeframes for any potential decision on designation?	A change in designation would alter the significance of effects and additional mitigation would likely be necessary. However, until the special qualities of the area have been identified and the designation order limits defined and approved, Natural England is not able to provide specific advice as to what these mitigation measures should comprise. However, provision of a high standard of mitigation regarding views from the Wolds now would minimise the risk of additional measures being found to be required in the post-consent phase. Unfortunately we have been unable to liaise with the team leading the work on the AONB to confirm the assessment process and likely timescales ahead of this deadline. We will provide an update on this at Deadline 3.

MC	Marine and Coastal Geology, Oceanography and Physical Processes		
MC.1.1	Natural England	**Numbering of Natural England's Relevant Representation** The paragraph numbering of Natural England's Relevant Representation [RR-029] (Smithic Bank section) runs directly from 5.44 to 5.55. Could Natural England confirm if any text is missing or if this is simply a numbering error and amend the document accordingly.	Natural England apologies for this typographic error and can confirm no text is missing. We would be happy to submit a corrected version of our Relevant/Written Representation if required.
MC.1.2	Applicant MMO Natural England	**Further geophysical surveys** Chapter 4 of the ES [APP-010] notes that pre-construction, high-resolution geophysical surveys were yet to be undertaken at the time of writing, but that they were planned for 2021 and that interpretation will be available Q4 2021. Could the Applicant provide an update and all invited parties comment on any implications?	Natural England has not seen these 2021 geophysical survey data. However, we note that the Applicant is undertaking a review of their Maximum Design Scenario (MDS) against the 2021 geophysical survey data and will be providing a Clarification Note on this at Deadline 3. We will aim to respond to this in our deadline 4 submissions (noting that there will be insufficient time for us to review Deadline 3 submissions ahead of Issue Specific Hearings).
MC.1.3	Applicant Natural England	**Impacts of any further geophysical surveys** Please respond to the MMO's question [RR-020] asking if any further geophysical surveys are proposed, and - if they involve noise generating activities such as multibeam echosounders and sub-bottom profilers - if the potential impact of these on marine wildlife been appropriately considered in the ES. (*If not fully addressed in the Applicant's Deadline 1 response to Relevant Representations*.)	The Applicant has responded to MMO's question stating: "*At the time of assessment, the timing, scope and scale of geophysical surveys associated with Hornsea Four were not known*" [REP1-038] RR-020-4.5.17. Natural England's initial query would be whether these geophysical surveys are likely to include sub-bottom profilers, as these are the main geophysical equipment of concern in terms of noise generated. A high-level assessment should be presented, with as much detail as is available at this time. However, we note that the precise detail and timings of surveys may not be known at this stage, which will present a challenge in assessing the potential in-combination effects. This should therefore be addressed the Site Integrity Plan.

MC.1.7	MMO Natural England	**Rock backfill** The ES [APP-013] says that additional material may be required in the backfilling of the eight Horizontal Directional Drilling [HDD] exit pits in the landfall area to make up for any loss in excavated sediment volume. It suggests that rocks may be used. Is this acceptable to the MMO and Natural England? If not, why not, and are there any alternatives that you would suggest to the Applicant?	No, the use of rock or any material from elsewhere is not acceptable to Natural England (please see RR - Appendix E Marine Geology, Oceanography and Physical Processes - point 24 [RR-029]). Backfilling with rock (or any material brought in) would not meet the same characteristics as the sediment removed and would fundamentally change the habitat type and marine processes of the area. Over time the rock used to backfill could become exposed and create an artificial berm which will have further implications for marine processes and sediment movement in the area. It is standard practice for developments along this coastline to use material extracted from the pits to backfill these to allow the sediment structure to be maintained. Depending on available land and completion of impact assessment, Natural England would recommend removing the extracted material to a suitable holding location on land to ensure it is available for re-instatement (As per Natural England RR -029). Natural England would also refer the Examiners to our Relevant Representation comment 25 in Appendix E Marine Geology, Oceanography and Physical Processes, where we highlight 'there is no mention of the reinstatement of the seabed profile following backfilling of the exit pits' which is also an important factor to consider when backfilling. Natural England, therefore, cannot agree with the assessment of significance of the impact pathway relating to *Seabed preparation activities in landfall area (MP-C-1)*
MC.1.13	Applicant Natural England	**Assessment of the Flamborough Front** The MMO [RR-020] notes a second outstanding pre-application request for further assessment through research and satellite thermal imagery of the impact of the Proposed Development on the productivity of the Flamborough Front. Can the Applicant signpost any assessment of impacts on the productivity of the Flamborough Front? Is it the Applicant's intention to undertake additional work and assessment? If so, this would be required in the Examination as soon as possible. When would	The Applicant has provided Natural England with a Scope of Works which details a marine process analysis to investigate/validate the position of the Flamborough Front, and the potential impacts of the Hornsea Four array on the Front, both alone and in-combination with other projects/plans. This is expected at Deadline 3. Natural England will aim to review and respond to this supplementary report at Deadline 4, noting that there will be insufficient time for us to review Deadline 3 submissions ahead of the Issue Specific Hearings.

		the results be available? If not, why not? (*If not fully addressed in the Applicant's Deadline 1 response to Relevant Representations*.)	Recent relevant research which may help inform the Applicant's assessment of the impact of the Hornsea Four array on the Flamborough Front include the following: Christiansen N, Daewel U, Djath B and Schrum C (2022) Emergence of Large-Scale Hydrodynamic Structures Due to Atmospheric Offshore Wind Farm Wakes. *Front. Mar. Sci.* 9:818501. doi: 10.3389/fmars.2022.818501 Dorrell *et al.* (2022) Anthropogenic Mixing of Seasonally Stratified Shelf Seas by Offshore Wind Farm Infrastructure 2112.12571.pdf (arxiv.org)
MC.1.14	Applicant MMO Natural England	**Location of the Flamborough Front** The information provided to the Examination suggests different views are held about the location of the Flamborough Front. The ES [APP-013, paras 1.7.9.2 and 1.7.9.3] suggests it is south of the proposed array area. Natural England's Relevant Representation [RR-029, Appendix E, entries 8, 74 and 97] argues that Figure 37 of the Marine Processes Technical Report [APP-067] shows the array area to be located within a zone of 90-100% occurrence of the Front. If the location of the Front is not fixed, to what extent does it vary and over what time frame? What implications does this have for turbulent wakes and their effects? What are the implications of the inclusion of the non-cylindrical, gravity base structure foundations in the array, and what level of certainty can be applied to the consequent wakes, their interactions, and potential direct impacts on the Flamborough Front and indirect impacts on seabirds and marine mammals through changes to its productivity?	NE believe Flamborough Front and HOW4 array could potentially overlap, based on the data presented within the ES and associated annexes. However, the data presented is currently insufficient to inform the baseline characterisation of the Flamborough Front. Recent research suggests that clusters of offshore wind farms could lead to structural changes to the water column which extend far beyond the associated wind farms. Given the importance of the Flamborough Front to nutrient availability, it is vital that the potential impact of the Hornsea Four array in respect of tidal flows, the related turbulent wakes and resultant mixing of the water column, be adequately assessed for all design options being considered (gravity bases, pin piles, monopiles). We would want to see this assessment irrespective of whether there is a direct overlap between Flamborough Front and Hornsea 4 array area. The applicant should also consider the cumulative impacts of the other impacts within the Hornsea Zone. Currently, potential adverse effects to designated sites such as the Flamborough Head SAC, Flamborough and Filey Coast SPA, and Southern North Sea SAC, cannot be discounted due to the lack of robust scientific evidence to the contrary. Yet, we know that the Flamborough Front has a significant influence over

			primary production, the marine ecosystem and, in turn, the function of nearby marine protected areas. As raised above Natural England is concerned with the timeframes presented in examination and the addition of new material to consider. The additional submission expected by the Applicant at Deadline 3 could have significant implications for the assessment of impacts within the Marine Processes Environmental Statement.
MC.1.19	Applicant Natural England	**Intertidal access ramp** In its Relevant Representation [RR-029], Natural England highlights the possibility that the proposed temporary access ramp in the intertidal area could cause adverse environmental effects. Is it possible that such effects could include impacts on MCZs as well as the Dimlington Cliffs, Flamborough Head and Humber Estuary SSSIs? The Applicant has submitted a MCZ assessment [APP-070] that concludes that the Proposed Development would not hinder conservation objectives. Does this require updating in the light of the potential impact from the intertidal access ramp? Natural England has suggested that the intertidal access ramp has not been assessed in the ES. If it has, can the Applicant please signpost where? If it has not, why has it not? Does the Applicant intend to carry out any further assessment of the intertidal access ramp in relation to coastal processes, geomorphology, benthic and intertidal habitats, and protected sites? If so, this is required as soon as possible. When would it be submitted into the Examination? If not, why not?	Natural England is reassured that the temporary intertidal access ramp only partially encroaches on the very upper intertidal zone and is unlikely to interfere with beach processes ([REP1-038] RR-029-5.36). However, we are still concerned that the ramp will be installed at a low point of a rapidly eroding cliff. Any works that result in the lowering of the cliff will need to consider the impact on flood risk from wave action and spray. The impact of the intertidal access ramp on cliff stability and cliff erosion has not been fully considered. In addition, the potential impact of accelerated cliff erosion needs to be considered. Furthermore, no details have been provided regarding cliff slope re-grading, cutting into the existing cliff face, and/or surfacing of the cliff face. Similarly, there are no details regarding the storage of any removed cliff material and whether it will be reinstated on completion of the works. Given the very high rates of erosion along this coastline, the Applicant needs to consider cliff retreat and down-wearing of the upper beach at the ramp location, during the lifespan of the access ramp.
MC.1.20	Applicant	**Identification of marine process receptors**	Natural England has held further discussions with the Hornsea Four Project Team to explain our concerns. We note that the

	Natural England	Natural England's Relevant Representation [RR-029] notes disagreement with the Applicant's scope of marine process receptors. Has this matter been progressed between the parties? If not, why not, and will it be resolved before the close of the Examination? *If not fully addressed in the Applicant's Deadline 1 response to Relevant Representations*.)	Applicant will be providing their Marine Processes Supplementary Reports at Deadline 3 and we would anticipate further discussion on this topic following this submission. Natural England is concerned that there are significant marine process issues to work through within the examination. Although we are pleased that the applicant is seeking to draw upon all available information, we are conscious that overall the empirical evidence available is likely to be limited, and that this will make drawing definitive conclusions difficult. We therefore encourage the applicant to focus on identifying workable solutions that reduce the potential for impacts to acceptable levels, rather than seeking to definitively rule out impacts. Natural England would welcome the opportunity to help identify mutually acceptable solutions in the face of this uncertainty.
ME Marine Ecology			
ME.1.1	Applicant Natural England	**European and national sites** The ES [APP-014 and APP-015] notes that where an internationally designated site coincides with a nationally protected site, only the international site has been taken forward for assessment, on the assumption that the potential effects on the integrity and conservation status of the nationally designated site are inherent in the assessment of the internationally designated site. Where has this assumption been applied, and is it valid, given that SSSIs citations may include a broader range of notified special interest features than the qualifying features of a corresponding European site?	Natural England do not consider this assumption to be valid. We advise that it should be checked that where this assumption has been made, all affected features under both designations have been considered.
Fish and shellfish ecology			No questions for Natural England's attention in this section
Benthic and intertidal ecology			No questions for Natural England's attention in this section
Marine mammal ecology			No questions for Natural England's attention in this section

Marine and coastal bird ecology			No questions for Natural England's attention in this section
NAR Navigation and Radar (Marine and Air)			
Shipping and navigation			
NVL.1.2	Applicant Natural England	**Cetacean sensitivity to Permanent Threshold Shift** The MMO [RR-020] takes the position that cetaceans should be assessed as having a high sensitivity to Permanent Threshold Shift rather than the medium sensitivity allocated in the Applicant's ES [APP-016]. Should this be changed, and the assessment updated accordingly? If not, why not?	Natural England has not seen MMO's rationale for this position and is therefore unable to comment at this time.
NVL.1.6.	Applicant MMO Natural England	**At-source mitigation of underwater noise for cetaceans** Co110 of the Commitment Register [APP-050] is noted, but is it necessary in addition for the Applicant to refer specifically and to commit to the at-source underwater noise reduction measures that were included as mitigation measures in the underwater noise assessment? If such commitments are not made, what are the implications for the EIA and the HRA in relation to the harbour porpoise interest feature of the Southern North Sea SAC?	The Applicant has stated, in their EIA assessment, that the measures in the Outline MMMP will reduce the impact from PTS to negligible levels. At present, the only mitigation measure proposed in the Outline MMMP [APP-240] to mitigate the full PTS zone (based on SEL_{cum}) is the use of at-source noise mitigation. Indeed, the Applicant states in the Outline MMMP that "Hornsea Four will commit to providing at-source noise reduction measures in order to reduce the potential for cumulative PTS risk to negligible levels." We therefore consider that, in order to agree with the PTS impact assessment conclusion, at-source noise mitigation must be secured. This is of further importance given the Applicant's response to our Relevant Reps [REP1-038], specifically the response to comment 2. In this response the Applicant presents an assessment of animals in the PTS-onset zone (based on SEL_{cum}) during concurrent piling. When compared to single piling, there is a ~5- to 6-fold increase in the number of harbour porpoises that may experience PTS (up to 1792 individuals), and the number of minke whales increases too (<1 to 9). This significant increase in number of individuals potentially exposed to PTS places even greater importance on committing to mitigation of the full PTS zone.

			We acknowledge that the Applicant is proposing to undertake further underwater noise modelling. We will consider the additional modelling once it has been submitted for examination. If the Applicant does not commit to at-source noise mitigation, then an assessment of the number of harbour porpoise that could experience PTS based on SEL_{cum} after the mitigation committed to in the Outline MMMP has been applied must be presented. This should not include at-source underwater noise mitigation. The Applicant should also ensure this is based on the MDS ranges and not the most likely scenario. Only after this assessment is presented can an assessment of the residual impact significance be undertaken. This will determine the implications for harbour porpoise at an EIA level. Similarly, only after this assessment is presented can an assessment against the SNS SAC harbour porpoise feature in view of the site's Conservation Objectives be undertaken.
NVL.1.7	Applicant MMO Natural England	**Concurrent piling** The MMO [RR-020] notes the Outline Marine Mammal Mitigation Protocol statement that there would be no concurrent piling between the array area and the HVAC booster stations in the export cable corridor but suggests that this is not made clear in Co85 of the Commitment Register [APP-050]. Does this need to be clarified in the Commitment Register? If not, why not?	At Deadline 1 the Applicant has provided a revised draft DCO [REP1-003]. In this, it is specified that "*It is possible for installation of the two piled foundations to occur concurrently i.e. within a 24-hour period at up to two locations within the HVAC search area or up to two locations within the array*". We are satisfied that this addresses our concern, in that concurrent piling between the HVAC booster stations and the array area is not permitted under the DCO. We agree with MMO that this should also be made clear in the Commitment Register.
Electromagnetic fields (EMFs)			No questions for Natural England's attention in this section
Onshore noise and vibration			No questions for Natural England's attention in this section
OE Onshore Ecology			
OE.1.1	Natural England ERYC	**Survey methodology – field survey dates** The field surveys for the Extended Phase 1 Habitat Survey [APP-100] and the individual species were undertaken in 2019. Given the time that has now elapsed since these field surveys were completed,	Natural England are satisfied with the surveys for informing letters of impediment on the basis that they will be updated in the pre-construction phase.

		and noting that Requirement 19 of the draft DCO [APP-203] requires pre-construction surveys for European protected species, are you satisfied with the validity of the various surveys for individual species that have been submitted? If not, why not?	
OE.1.3.	Applicant NE	**Mitigation measures for bat species - hedgerows** **Applicant:** In the Ecological Management Plan [APP-238, para 3.3.2.16] you refer to employing moveable features on a nightly basis for sections of hedgerow that have been removed along bat commuting and foraging routes. Would these features remain *in situ* at times when construction operations are not taking place, including after construction operations have ceased and until the replacement sections of hedgerow have become established? If so, then how would this be secured in the draft DCO and how has the post-construction reinstatement of hedgerows been assessed in the ES? Furthermore, in [APP-238, para 4.3.3.2] you refer to replacement hedgerows being of a comparative age. Is this feasible for all sections of hedgerow that are scheduled to be removed? **Natural England:** The ExA notes the comments you have made in regard to onshore ecology in [para 5.66 of RR-029]. Are you therefore satisfied that the Applicant's mitigation measures, as summarised in Table 3.23 of ES Vol. A3 Chapter 3 [APP-027], would address the effects on bats? If not, are there any other approaches that you consider would be effective in terms of mitigation measures for bats?	The mitigation measures summarised in Table 3.23 of ES Vol. A3 Chapter 3 [APP-027] are provided in full in the Commitments Register [APP-050] and the Outline Ecological Management Plan [OEMP; APP-238]. Natural England considers the mitigation proposals contained therein, with respect to removal of hedgerows and employment of movable features in active construction areas, to be largely satisfactory with regards to ensuring that there is continuity of commuting activity for bats. However, there is some disparity in the text between commitments in APP-050 and APP-238 which we consider needs to be addressed to ensure effects on bats are fully mitigated. For example, Co26 of [APP-050] states: "*Where hedgerows and/or trees require removal, this will be undertaken prior to topsoil removal. Sections of hedgerows and trees will be replaced using **like for like** hedgerow species. DCO Requirement 17 (CoCP); and; DCO Requirement 10 (EMP)*". Co194 [APP-050] states: "*Where agreed with landowners, removed hedgerows and trees will be replaced with hedgerows of a **more diverse and locally native species composition** than that which was removed*." The OEMP [APP-238] states: "*Where a hedgerow has been removed within an area that bats are using as a foraging/commuting route, the replacement hedgerow will be of a **comparable age** to minimise the impact of connectivity for foraging/commuting bats."* Table 5 of the Outline Enhancement Strategy [APP-249] also states that: "*Hedgerows removed for onshore export cable installation may be replanted to an **improved ecological standard**, one that aligns with local guidance of hedgerow*

			planting i.e. the East Riding of Yorkshire hedgerow Biodiversity Action Plan (BAP) strategy." Natural England do not have concerns with these approaches, but we consider that the conditions in the commitment register should be amended to reflect that some hedgerows may be enhanced. Further, we consider that the proposals for planting hedgerows of a comparable age to those lost should be made a commitment. We also note that the current commitments (Co26, Co168 and Co194) do not specifically mention what will happen during and post development to minimise/negate connectivity for foraging and commuting. We consider this should be addressed in the commitments.
OE.1.4	ERYC Natural England Yorkshire Wildlife Trust	**Biodiversity net gain - methodology** The ExA notes that on 11 January 2022 DEFRA opened a Consultation on Biodiversity Net Gain Regulations and Implementation, and this closes on 5 April 2022. Having regard to this Consultation and the comments made by the Environment Agency [RR-010] including that the proposed net gain only related to the onshore substation area, are you content with the methodology and measures for biodiversity net gain that have been proposed in the Outline Net Gain Strategy [APP-251]? If not, why not, and what other measures would you wish to see?	Biodiversity Net Gain is currently not mandatory, therefore we welcome the use of the net gain metric within part of the proposal. Whilst we would further welcome the entire of the project being put under consideration of the Net Gain Metric, we consider that it would be unreasonable for Natural England to request this at this stage in the process. During the development of the proposal, it was thought that NSIPs would be excluded from mandatory net gain. We worked with the developer in a positive manner and agreed the Net Gain Metric would be used on part of the development. This project will still provide a useful example of how to apply BNG to an NSIP. Please note, Natural England has no role in checking metric calculations, this should be carried out by the applicant's ecologist and checked with the Local Authority. Any metric should be accompanied with a qualitative assessment explaining the decisions made and why the overall plan is ecologically coherent, along with full access to the raw data.
PDS Proposed Development and Site Selection			
Land use and agriculture			

SEL.1.5	Natural England	**ALC surveys** Does Natural England now agree with the ES Chapter 6 on Land Use and Agriculture [APP-030]: "*Assessment has been undertaken using publicly available agricultural land classification (ALC) data...[a] conservative and protective approach which overestimates the area of BMV land. As such it is considered that ALC surveys are not required...*" and if not, why not?	The publicly accessible ALC data is mainly to aid strategic and scoping assessments, and also to help determine survey effort and methodology. We would therefore have preferred it if ALCs surveys were part of the assessment. However, we are satisfied that there is a commitment to surveys and mitigation, and consider that this is adequate to prevent significant harm to BMV soils.