Hornsea Project Four

Written Summary of the Applicant's Oral Case at Issue Specific Hearing 5

Deadline 4, Date: 10 May 2022
Document Reference: G4.5
Revision: 01

Prepared Pinsent Masons, May 2022
Checked APEM Ltd, May 202
Accepted Hannah Towner-Roethe, Orsted, May 2022
Approved Julian Carolan, Orsted, May 2022

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Revision Summary

Rev	*Date*	*Prepared by*	*Checked by*	*Approved by*
01	10 May 2022	Pinsent Masons	Hannah Towner-Roethe, Orsted	Julian Carolan, Orsted

Revision Change Log

Rev	*Page*	*Section*	*Description*
01	-	-	Submitted at Deadline 4

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1 Introduction

1.1.1.1 Issue Specific Hearing 5 (ISH5) on marine and coastal ornithology for Hornsea Four took place on 28 April 2022 at 10:00 am and was held virtually, with attendees attending via Microsoft Teams.

1.1.1.2 The ISH5 broadly followed the agenda published by the Examining Authority (the ExA) on 19 April 2022 (the Agenda). The ExA, the Applicant, and the stakeholders discussed the Agenda items which broadly focus on examining evidence relating to marine and coastal ornithology, including populations of seabirds that may nest, feed or winter in and around the area affected by the Proposed Development.

Table 1: Summary of the Issue Specific Hearing 5

Item	ExA Question/Context for discussion	Applicant's Response
Agenda Item 1 Welcome, introductions, arrangements for the Hearing		
1	Introductions	The representatives of the Applicant introduced themselves as follows: - Gary McGovern, Partner at Pinsent Masons LLP - Sean Sweeney, Associate Director and Head of Ornithology Consultancy at APEM - Matthew Boa, Senior Ornithologist at APEM - Dr Julian Carolan, Consents Project Manager at Ørsted
Agenda Item 2 Application of the MRSea model and baseline ornithological data characterisation		
2	The ExA raised the issue of the application of the MRSea model and noted that the Applicant had re-run its baseline calculations for gannet. The ExA noted that the first section of the gannet report was submitted at Deadline 2 and the full report was then submitted at Deadline 3 after discussions with Natural England The ExA asked whether the documents submitted by the Applicant had already been seen by NE prior to submission.	Mr Sweeney on behalf of the Applicant confirmed that the Applicant had presented the outputs of the report submitted at Deadline 3 to Natural England prior to submission. Mr Sweeney confirmed no technical amendments had been made to the report thereafter and that Natural England's comments on the report were awaited. Mr Sweeney confirmed that the RSPB had not been involved and had not reviewed the report prior to submission. The ExA asked the Applicant to outline the background to the MRSea model and the differences between the first version (i.e. that submitted at DCO application) ("MRSea v1") and second version (i.e. that submitted at Deadline 3) ("MRSea v2"). The Applicant explained that following the Hornsea Four DCO Application, Natural England submitted its Relevant Representations (**RR-029**). Comments received related to the preparation and approach used in running the MRSea model for Hornsea Four to define the baseline, which informs the impact assessments undertaken. Further to **RR-029**, Natural England provided the Applicant with an additional review (Scott-Hayward, 2021 (not initially submitted in Examination, but now presented in Table 2 of the MRSea Baseline Sensitivity Report (Gannet) – Revision:02 (**REP-029**)). The review was undertaken by the MRSea model developers (Centre for Research into Ecological & Environmental Modelling (CREEM), University of St Andrew's), including retrospective requests for additional screenshots and downloads from the initial model preparation stages of the approach to model building, coding, testing and running stages that are not routinely saved or downloaded due to the scale of such a task. The review requested confirmation of a number of MRSea modelling inputs and outputs that had not been submitted by the Applicant within A5.5.6 ES Volume A5 Annex 5.6 Offshore Ornithology MRSea Report (**APP-079**).

		In response to Natural England's Relevant Representations (RR-029) and CREEM review the Applicant agreed to produce a Baseline Sensitivity Report that incorporates all responses (from CREEM and also from Natural England's RRs on MRSea) and additional information to inform Natural England and the Examining Authority of the progress made on the MRSea modelling queries. The Baseline Sensitivity Report was submitted in three parts into the examination, as a complete model re-build proved to be time-consuming and an iterative process requiring multiple video calls and clarifications from the model developer. The three parts provide the following; **Part 1** - The Applicant's response to Natural England and CREEM comments and advice on MRSea approach and methodology. This part of the report (submitted at Deadline 2 (REP2-046)) provided an account of the Relevant Representations received on MRSea modelling, the consultation process undertaken by the Applicant to resolve any issues and agreed actions and approach to re-run the MRsea model for a single species (gannet). It also provided the initial revised MSRea model outputs from the initial stages of the re-building and testing process (see Appendix A of REP2-046); **Part 2** – The results of the revised MRSea modelling for a single species (gannet) are presented in the updated report (submitted at Deadline 3 (REP3-029)), following the final agreed and best fit modelling approach, with model inputs and outputs (where available and / or appropriate) inserted to satisfy Natural England with regards to their Relevant Representations on the use of MRSea (RR-029); and **Part 3** - A full comparison between the DCO MRSea v1 results used to define the Hornsea Four baseline that underpins the impact assessments with the revised MRSea results (MRSea v2) in the updated report (submitted at Deadline 3 (REP3-029)). This final part of the report sets out the implications, if any, of the changes to the baseline characterisation and impact assessments for Hornsea Four for a single species (gannet). Agreement was reached between the Applicant and CREEM on the revised MRSea model (MRSea v2) that was determined to be the best model fit that also had the optimal spatial representation of the survey data. This was presented to NE, who also agreed that the MRSea v2 was the best model fit that represents the data for this project (for gannet). The comparison between the MRSea v1 and MRSea v2 results did not differ significantly, which would translate to differences of less than a single bird when considering potential impact levels

		from collision risk and displacement for gannet at the EIA level. This can be demonstrated through the worked EIA example from using MRSea v2 data on gannet for both collision risk and displacement analysis (see Comparative Gannet Assessment (G4.13)). The ExA asked the Applicant if the comparison for MRSeaV2 was based on a 12-month period. The ExA noted that the original outputs showed results on a survey-by-survey basis. The revised version showed results for each calendar month. The ExA asked what the reason was for the difference in approach. Mr Sweeney explained the inputs for the MRSea model which relate to useful components of the biology of the bird species, to give a better spatial distribution within the area of study. The Applicant used the data from 24 months aerial digital surveys from the original Agreement for Lease (AfL) area, which provided a much wider dataset to provide increased strength in model outputs. The Applicant discussed and ran the best model fit with Natural England and the RSPB and agreed MRSea v1 as appropriate for the DCO Application at that point, but since then the additional review was carried out by CREEM. MRSea is a model-based approach. The basic function of a model is to find the best fitting relationship between a response variable (in this case the number of birds present) and specified explanatory variables. For this analysis, each data point is a transect segment – the "response" is the number of birds (of a given species) in that transect segment, and there are many potential explanatory variables – including the "Survey ID" (a unique identifier for each of the 24 surveys) and also the calendar month in which the survey was undertaken (i.e. Jan – Dec). The input to the model building process is the full dataset from all 24 surveys. During the model building process, it became evident that it was not possible to successfully fit a model using "Survey ID" as an explanatory variable in the way desired, and therefore that approach was not progressed, due to several surveys having very few birds observed, and as such the model could not fit to so few data points per survey. Instead, "month" was used as an explanatory variable, which ensured there were more data points per month (given that most months included data points from two separate surveys) and therefore the model could fit successfully. There is no separate "smoothing" process in order to fit the model this way, although it is somewhat inevitable that building the model in this way means that the central prediction for each of the 12 months will be intermediate between a prediction based on each of the two surveys separately. For clarity, MRSea does incorporate CReSS (Complex Region

		Spatial Smoother) to build the model, but that is a fundamental part of MRSea analysis and not additional smoothing as a result of fitting the data to 12 survey months. The ExA asked the Applicant to explain the rationale for the definitions of bio-seasons used in MRSea v2. Mr Sweeney explained both MRSeav1 and MRSeav2 followed the Furness (2014) definitions of bio-seasons, which were supported by site-specific survey data findings on the behaviour of birds (particularly their flight directions) within those bio-seasons. The ExA noted that the Applicant had previously expressed an intention to consult on the application of the MRSea v2 model and asked when this was likely to happen. Mr Sweeney for the Applicant noted that a consultation meeting with Natural England had been held and that the parties agreed the best model fit had been found. Mr Sweeney noted that the Applicant understands Natural England is reviewing MRSea v2 in more detail and will provide their full response at Deadline 4. The ExA queried whether MRSea v2 would be used for other species of interest (i.e. kittiwake, guillemot and razorbill) and asked for an update on the timeline for further work. The Applicant confirmed it was not its intention to apply MRSea v2 to those other species, as the gannet results demonstrate that MRSea v1 was suitable for use for assessment purposes and was sufficiently precautionary. The Applicant noted that Natural England's feedback is awaited. Mr Sweeney explained that gannet was chosen for the rerun of the MRSea model because it is not a species which is easily misidentified and there is no need to apportion any unidentified birds into the abundance and density estimates, and because the Applicant continues to seek agreement from Natural England on the Applicant's conclusion of no adverse effects on integrity to allow for this species to be removed from any compensation requirements. Mr Sweeney confirmed that Natural England had agreed to the use of gannet for the re-run and application of the MRSea model.
Agenda Item 3 Regional breeding season populations		
3	The ExA asked whether there had been any progress between Natural England and the Applicant on their differences on regional breeding season populations.	The Applicant explained that it welcomed the note and explanation as to how Natural England derived higher breeding season populations for use in estimating the breeding bio-season and annual total impacts at the BDMPS scale for these two species at the EIA level (and others if the same process is to be applied). Utilising these revised BDMPS values to assess the breeding bio-season and

		annual total impacts from Hornsea Four alone and cumulatively with other plans and projects would lead to a reduced overall effect, which would mean the current effect levels are overly precautionary as in both these cases the number calculated following Natural England's methods is higher than that which the Applicant used. The Applicant did note, however, that when considering annual impacts, birds from both the breeding and non-breeding season should be accounted for. In order to fulfil this the Applicant suggests that, as well as the breeding population from UK colonies that reside within the species-specific BDMPS area, additional non-breeding bird populations from outside the UK should also be accounted for in order to reflect the spread of potential impacts across the entire population of birds residing within the BDMPS area across the different bio-seasons. Following agreement on the use of the MRSea v2 values for gannet and that MRSea v1 are acknowledged as being precautionary to determine the baseline for Hornsea Four the Applicant intends to update impacts following the above methods once clarification is also received as to the inclusion of non-UK birds into the overall total annual values at the BDMPS level. This information will be presented at Deadline 5.
Agenda Item 4 Definition of seasons for kittiwake and gannet		
4	The ExA asked the Applicant to explain the rationale for using the migratory breeding season rather than the full breeding season.	Mr Sweeney for the Applicant explained that the Hornsea Four array is in a similar area of the southern North Sea as Hornsea Three and in an area that is also subject to migratory pulses of seabirds throughout the spring and autumn when birds move to and from their breeding colonies further north (both to UK and continental locations). The migratory patterns and timing of gannets, kittiwakes, guillemots and razorbills through the southern North Sea are similar when considering their routes and interaction with other projects within the Hornsea Zone, so the Applicant's consideration of migratory birds should remain an important factor in order to apportion birds appropriately from Hornsea Four and to understand the risk to FFC SPA and other colonies accordingly. This is demonstrated through the provision of supporting evidence from the site-specific survey data collected for Hornsea Four in the flight directional rose diagrams in Appendix C of the Baseline Characterisation Report (**APP-074**) that shows birds are more aligned to north-south flight directions outside of the migration-free breeding bio-seasons and with more east-west flight directions within the migration-free breeding bio-seasons for gannet and kittiwake.

		In the Habitats Regulations Assessment for Hornsea Three, the Secretary of State accepted the Applicant's breeding seasons definitions for gannet and kittiwake, based on their evidence, plus Langston (2013) and Cleasby (2018) tracking studies (see section 5.3.1 which concluded): "*Given the above, the Secretary of State agrees with the conclusions of the ExA that the use of the longer breeding season to apportion impacts to the gannet and kittiwake populations at Flamborough and Filey Coast SPA is not justified and therefore, in this case, favours the Applicant's preferred shorter breeding season.*"
Agenda 5 Assessment methodology		
5.1	The ExA noted that the RSPB and Natural England had raised concerns with the Applicant's approach to auk displacement and mortality. RSPB had also highlighted that the statutory nature conservation body's interim displacement advice note was published in 2022. The ExA asked the Applicant if it had had regard to that advice note.	The Applicant explained it issued a report that following an agreed methodology to review, analyse and report on empirical data in relation to auk displacement and consequent mortality, which is presented in the Auk Displacement and Mortality Evidence Review (**REP1-069**) submitted at Deadline 1. The methodology for this report was agreed with Natural England and the RSPB through a consultation process, during which previous versions were shared and commented on. The Applicant flagged it does not suggest a new single figure for auk displacement, but rather a new range based upon empirical evidence from all available post-consent monitoring reports in European waters. The report also demonstrates where the SNCBs join advice note's (SNCBs, 2017 and the updated version issued in 2022) displacement range of 30-70% for auks is derived and highlights concerns in the underlying data sets used to come to this range (not least the use of high zero count data sets and the exclusion of data sets with positive values, i.e. offshore wind farms where auk numbers increased post-construction). It also offers evidence in support of auk mortality as a consequence of displacement as being extremely low (up to a maximum of 1%, but likely to be considerably lower). The Applicant acknowledges that there are always limitations to any studies, but that this latest empirical review of a substantial pool of evidence provides the best and most up-to-date data analysed to determine the most accurate level of displacement of auks from OWFs. The Applicant, therefore, considers that the evidence strongly agrees with the data presented in the report on auk displacement and that a maximum of 50% is still precautionary for Hornsea Four with a rate of 1% mortality in relation to displaced birds also being appropriate.

		The ExA noted that the Applicant's response indicated that the inclusion of flying birds may lead to impacts rising and asked if the Applicant was able to provide an idea of what the ExA might be faced with in the revised report. The Applicant confirmed an updated data set for auks was submitted at Deadline 1 that includes both flying and sitting birds within the displacement analysis (**REP2-002**). Mr Sweeney confirmed there were some differences in monthly counts between the displacement values used in the DCO Application (sitting birds only) and those updated values (sitting and flying birds) when translated into bio-seasons for auk species, but confirmed that when these are translated into assessments the differences are very minor. When the Applicant has agreement on the original dataset being fit for use, which it has confidence in, the Applicant can provide worked examples for the benefit of examination. Mr Sweeney confirmed the final outputs would be of no material difference to those which formed part of the EIA assessment. The ExA asked the Applicant to confirm it was intending to defend its position in relation to its original assessment. The Applicant confirmed it had conceded this point on the inclusion of both sitting and flying birds. The ExA asked the Applicant to clarify its current position on using a weighted mean approach. The Applicant explained this approach was developed for species such as guillemot where there is considerable difference between abundance data in different months within and across the wider non-breeding bio-season, with some months having a larger abundance and other months with considerably less birds. Using a standard mean peak bio-season abundance approach presents the overinflation of the impacts, as the use of this method was not intended for sites that have such variation within a bio-season. This method was also not originally developed for use when considering an extended bio-season for guillemots, particularly where abundance varies within the bio-season significantly, as the consequence of such more heavily weights the short periods of time when birds may occur in higher abundances, even if abundances are significantly lower across the remainder of the extended bio-season, therefore not reflecting a balance to the overall displacement effect estimated. Natural England suggested a bespoke approach would be needed when considering displacement assessments during this period, for which the Applicant's approach provided an account of through the weighted mean approach.

5.2	The ExA noted that NE suggest using 1-10% mortality rates for gannet. The ExA asked the Applicant to confirm how it has responded to NE's concerns and how it will revise any assessments undertaken.	The Applicant confirmed it had issued a report that followed a similar methodology to the auk report (**REP1-069**) to review, analyse and report on empirical data in relation to gannet displacement and consequent mortality rates, which is presented in the Gannet Displacement and Mortality Evidence Review (**REP2-045**) submitted at Deadline 2. This is the first complete review of gannet behaviour in relation to OWFs for displacement and also how their response may change during the breeding and non-breeding seasons. The conclusions provide evidence that suggest lower displacement rates should be applied during the breeding season and higher displacement rates during the non-breeding seasons, based upon empirical evidence from all available post-consent monitoring reports in European waters. It also offers evidence in support of gannet mortality in relation to displacement as being extremely low (up to a maximum of 1%, but likely to be considerably lower). The Applicant, therefore, considers that the evidence strongly agrees with gannet displacement assessments within the DCO application, which can also be considered to be precautionary for Hornsea Four. The ExA confirmed it understood both positions (particularly with regards to the use of 1% or a range of 1-10% mortality) and asked if there would be benefit in presenting both sets of calculations alongside each other. The Applicant confirmed this information (for any percentage to be applied to either the displacement rate or consequent mortality rate) was already presented in the Offshore Ornithology Displacement Analysis Annex submitted with the DCO application (**APP-075**). Within the Ornithological Assessment Sensitivity Report (**G4.7** to be submitted at Deadline 4 and 5), there will be an explanation and a worked example of the consequences of over-precaution being added at different stages of the assessment process, for a project alone, cumulatively and in-combination assessments when considering a range of displacement and mortality rates. The ExA summarised and asked the Applicant to confirm that the information [mortality and displacement rates using the different range of percentages] would be made available in the documents for readers who wanted to apply a different percentage to the one being used by the Applicant. Mr Sweeney confirmed that was the case. The ExA noted the Deadline 2 submissions suggested that the statutory nature conservation body had identified double counting and asked the Applicant to comment on this. The Applicant is aware that Natural England are currently in the process of producing a revised new guidance note with a method to assess the combined impacts of both displacement and collision risk for gannet. It is

		understood that the aim of this guidance note is to address the risk of assessing collision impacts on birds that may have already been subject to displacement, therefore reducing any double counting or over-inflation of impacts as a consequence of combining the two on the inclusion of macro avoidance into sCRM aimed at reducing the issue of double counting of impacts. Through discussion with Natural England on this topic and Mr Sweeney's involvement in an initial workshop led by Natural England's consultants for their project, the Applicant believes that Natural England agrees with the rationale put forward by the Applicant, which is to reduce density estimates by the applied displacement rates. In advance of Natural England's guidance note, therefore, Part 2 of the Comparative Gannet Assessment report (G4.13) will provide revised collision risk modelling for gannet which includes reduced monthly flying gannet density estimates to account for macro avoidance to demonstrate the differences this would make to project alone, cumulative and in-combination assessments for both collision risk alone and when combining collision risk with displacement consequent mortality rates. The ExA asked the Applicant for an estimate on when Natural England's updated guidance for gannet assessments was likely to be published. Mr Sweeney advised he could not confirm this on behalf of Natural England. The Applicant subsequently notes that it is an action point for Natural England to confirm when revised guidance will be available.
5.3	The ExA noted that RSPB had raised an issue with how stochastic collision risk modelling ("CRM") is used in the Applicant's assessments but that it seemed to have agreed to the Applicant's approach earlier in the application process. the ExA asked the Applicant if it knew why RSPB had changed its position.	Mr Sweeney advised that he could not represent the RSPB's position.
5.4	The ExA asked for an update on the disagreement between the Applicant and the RSPB on confidence intervals.	Mr Sweeney confirmed that a range within the input parameters for the Applicant's collision risk modelling were applied, including confidence intervals for a number of input parameters. The results of using a range for the input parameters provided the Applicant with a mean value to base assessments, whilst acknowledging a range may exist that culminates in lower and higher collision mortality rates. However, the Applicant does not agree with the use of 95% CI maximum likelihood flight height distributions from the Johnstone et al. (2014) dataset.

		The Applicant's view, which is reflected in the approach taken by other experts undertaking collision risk modelling for OWFs, is that the use of 95% CIs around generic flight heights are unsuitable for assessment. This is due to the Johnston et al. (2014) datasets being comprised from an extensive number of studies, therefore the Applicant has confidence that the maximum likelihood values for each species are a reflective values of a species average flight behaviour. The paper itself concludes and provides supporting evidence that the model for the maximum likelihood range of flight heights is very good for all species considered for assessment of collision risk for Hornsea Four. Conversely due to the numerous studies included, if assessments use the 95% CIs these values are likely to be affected by outlying uncharacteristic flight behaviours (many in relation to studies from OWFs that are either onshore or in nearshore environments that are very different in nature to Hornsea Four). They may also relate to erroneous data or birds considered to be behaving in very uncharacteristic manners for reasons perhaps not explained. Therefore, when assessing uncertainty relating to the collision risk assessment the Applicant relies on variation in seabird density estimates and other input parameters where uncertainty remain (for instance in the nocturnal activity rates or avoidance rates) and not the generic flight height values.
5.5	The ExA noted that RSPB recommends using a lower avoidance rate in breeding season than the 98.9% used by the Applicant. The ExA believed that this rate was accepted in the decisions for East Anglia One North Offshore Windfarm and East Anglia Two Offshore Windfarm (the "East Anglia decisions").	Mr Sweeney confirmed the Applicant would double check, but believed that was correct. The Applicant can subsequently confirm that 98.9% avoidance rate is correct.
5.6	The ExA asked the Applicant whether there was now agreement between Natural England, RSPB and the Applicant that it was appropriate to use the counter factual population growth rate rather than the counter factual population size in the population viability analysis.	The Applicant explained it considers that the CFPS and CPGR are not equally appropriate for model interpretation when modelling in the absence of density dependence. A density independent population has no constraint on growth. Thus, a density independent population with a positive growth rate will grow exponentially and the baseline and impacted populations will diverge by an increasing amount as the duration increases, meaning that the CFPS is time sensitive. Due to the absence of density dependence, neither the baseline nor impacted population projections are likely to be credible since seabird populations are constrained by environmental and demographic variables, resulting in unrealistic population prediction for both the baseline (unimpacted) and impacted scenario modelled.

		Furthermore, there is significant uncertainty relating to the interpretation of the outputs relating to the CFPS, this is because the CFPS is a highly subjective output, with no way to validate what such predicted reductions in population size (as a consequence of predicted impacts) is likely to have on a specified population, further adding to the unreliability of the CFPS for assessment. Whereas for the CFGR, the predicted reduction in growth rate can be cross examined against known recent and historic population growth rates to provide an informed decision on the likely impact such an effect will have on the colony long term. The ExA asked the Applicant if it was aware which model had been used (population size or growth rate) in the East Anglia decisions. Mr Boa advised that in the East Anglia decisions, both models outputs were presented, but only the CFGR was used for the interpretation of results. This was also the case for Hornsea Project Three OWF, Norfolk Boreas OWF and Norfolk Vanguard OWF. Mr Boa advised that the Applicant did initially present both modelled outputs but decided to remove the CFPS to avoid confusion. The ExA asked the Applicant to give further thought as to whether both models could be included in order to satisfy RSPB's concerns. **Post-hearing clarification:** The Applicant's position on this matter remains that the CFGR is the only output value that should be relied upon when running a PVA with density independence. The ExA noted that the responses to relevant representations indicated the Applicant will revise the PVA model and subsequent assessments. The ExA asked if the Applicant would put both before the examination. The Applicant confirmed it is currently undertaking further interrogations into the validity of the Natural England Seabird PVA tool (2019) and suitability of both outputs for assessment, the results of which will be shared with Natural England in a new Ornithological Assessment Sensitivity Report to be submitted to the ExA during the examination at Deadline 4 and 5.
Agenda 6 Indirect effects on bird populations through impacts on prey species		
6	The ExA noted that there was some disagreement between the Applicant and Natural England on the basis on which indirect impacts on bird populations had	Dr Carolan for the Applicant confirmed that there was a workstream underway to address a number of stakeholder concerns and to present in one report information on bathymetry, benthic habitat, marine processes and marine mammals at Flamborough Front.

	been assessed. The Applicant had said at Deadline 2 that it was considering any supplementary impacts and would make further submissions at Deadline 5 if necessary.	The Applicant can confirm this report will be submitted at Deadline 5.
6	The ExA noted that the Applicant's response to RR-029-APDX-B:11 appeared to be blank.	Mr McGovern confirmed this was an oversight and that the Applicant would submit a response by Deadline 4. Please see response to action point 11 below.
Agenda 7 Impacts on gulls		
7	The ExA asked the Applicant to summarise the differences between the Applicant and Natural England in terms of cumulative CRM for gulls. The ExA referred to the Applicant's response to relevant representation RR-029-APDX-B:23. The representation made related to gulls but the response is in relation to gannet. The ExA asked the Applicant to clarify.	The Applicant summarised: • Kittiwake – at an EIA level the Applicant's position remains that any adverse effect from collision risk from Hornsea Four alone or cumulatively would be of no significance. At the HRA level the Applicant has conceded acceptance of the risk of an adverse effect on integrity for Hornsea Four in-combination with other plans and projects (not for Hornsea Four alone) for this species from FFC SPA. • Great black-backed gull – at an EIA level the Applicant's position remains that any adverse effect from collision risk from Hornsea Four alone or cumulatively would be of no significance. Mr Sweeney welcomed the additional methodological approach provided by Natural England compiling the breeding BDMPS and that the Applicant will be forthcoming in updating the assessment. • For herring gull and lesser black-backed gull the impact levels for both species from collision risk are approximately one individual or less mortality per annum, so of negligible and non-material nature from Hornsea Four alone or no material contribution to any cumulative or in-combination effects at the EIA and HRA levels. The Applicant's position that lesser black backed gull (significantly less than one bird) should have been scoped out of assessment due to no likely significant effect. Therefore, the Applicant does not consider it is appropriate following CIEEM guidance to provide full cumulative tables of impacts from distant projects from Hornsea Four, which would misrepresent the impacts from Hornsea Four. The ExA asked the Applicant if it would continue discussions with NE on this topic. Mr Sweeney confirmed that discussions between Natural England and the Applicant would continue. Mr Sweeney also highlighted recent submissions from Natural England on the East Anglia decisions,

		in which Natural England confirmed there was no significant cumulative collision risk to herring gull at that point and that assessment included Hornsea Project Four. Mr Sweeney apologised for the oversight in RR-029-APDX-B:23 and confirmed that the Applicant would provide clarification in relation to gulls at Deadline 4. Please see response to action point 12 below.
Agenda 8 Impacts on common scoter and red-throated diver		
8	The ExA noted that Natural England's relevant representation and the SoCG between the Applicant and NE still highlighted disagreements on displacement mortality rates and asked whether this had relevance for the EIA or just the Habitats Regulation Assessment ("HRA").	Mr Sweeney confirmed that this related primarily to the Greater Wash SPA, therefore primarily to the HRA. As such, the matter was deferred to ISH6.
Agenda 9 Conclusions on project and cumulative EIA effects		
9	The ExA asked the Applicant to summarise the current position in relation to likely significant effects on seabirds for the project alone and cumulatively	Mr Sweeney confirmed that the Applicant's position is that for all seabirds any adverse effects were concluded from Hornsea Four alone or cumulatively to be of no significance. The ExA asked if this was likely to be the Applicant's final position and Mr Sweeney confirmed that it was, reiterating the confidence the Applicant has in its baseline characterisation and impact assessments.
Agenda 10 Effects of artificial lighting		
10	The ExA noted that the Applicant had offered to provide supplementary information on artificial lighting but the submission of that information had been delayed from Deadline 3. The ExA asked the Applicant to provide an update on the likely point of submission.	Mr Carolan noted that in NE's Risks and Issues Log, it sets out various additional lighting requirements that it would like the Applicant to consider. Dr Carolan advised that the Applicant was giving due consideration to legal and consenting requirements and that it would submit a report at Deadline 5 setting out what the legal and technical requirements are (to show the flexibility the Applicant has) and then will make conclusions and recommendations. The ExA asked the Applicant if whether there could be any change to the assessment presented in the Environmental Statement. Dr Carolan advised that it was not within the Applicant's power to change the lighting design significantly as it is largely dictated by regulation. Dr Carolan advised that if the analysis reveals anything can be changed, the Applicant would give it due consideration.

		The ExA asked the Applicant to include in its supplementary information it would submit at Deadline 5 an indication of how any changes would be secured in the DCO.
Agenda 11 AOB		
11	Examination timetable and MRSea modelling	Mr McGovern confirmed that the Applicant was mindful of the examination timetable and was working hard to provide ornithological information requested by stakeholders as soon as possible. The Applicant confirmed that the ExA will have all supplementary information submitted by Deadline 5. The Applicant also encouraged RSPB and NE to focus on the material issues pertinent to the application, and to attend the hearings which may be held in July.
The ExA adjourned the hearing at 11:49.		

Table 2: Action Points

Action	Description	Action by	Deadline	Applicant's Comment/where has the action been answered.
1	Ensure timely delivery of accurate information to allow due consideration of new submissions by parties to the Examination, particularly those that may have resource constraints.	All	Ongoing	Noted.
2	Submit a fully worked and interpreted example of the revised gannet displacement assessment using MRSea_V2 in an interim Assessment Sensitivity Report	Applicant	4	This point has been clarified in a stand-alone document which has been submitted at Deadline 4 as Comparative Gannet Assessment (G4.13). This document includes consideration of both collision risk and displacement.
3	Submit completed Ornithology Assessment Sensitivity Report using the MRSea_V2 and final Population Viability Analysis results.	Applicant	5	Noted. The first part of the Ornithological Assessment Sensitivity Report has been submitted at Deadline 4 (G4.7), whilst the results will be included in the final version submitted at Deadline 5.
4	Provide updated analysis of regional breeding populations using updated Biologically Defined Minimum Population Scale values, adding in non-breeding element if appropriate.	Applicant	4	Confirmation of the largest BDMPS values following Natural England's worked examples has been completed for those species of relevance to the Applicant and presented alongside alternate values accounting for non-UK birds. This has been presented in the Ornithological Assessment Sensitivity Report Part 1 at Deadline 4 (G4.7).
5	Update relevant documents to include both flying and sitting auks in the displacement mortality analysis.	Applicant	5	An updated set of data were provided on this topic using the DCO MRSea v1 at Deadline 2 (REP2-003).

Action	Description	Action by	Deadline	Applicant's Comment/where has the action been answered.
6	An update from Natural England (NE) on the timeline for publication of any revised guidance regarding the 'double-counting' of impacts on gannets through collision and displacement mortality.	Natural England	4	
7	Provide evidence from East Anglia ONE North and TWO decisions about which gannet avoidance rates were accepted by the Statutory Nature Conservation Bodies and the Secretary of State.	Applicant	4	The Applicant has provided this within the response to ISH5 Agenda Item 5.5 above.
8	Decide whether to provide a new report or annex to compare outputs when using the Counterfactual of Population Growth Rate and the Counterfactual of Final Population Size in the Population Viability Analysis. If not proposing to provide, justify why not. If it is to be provided, confirm it would be submitted by D5.	Applicant	4	The Applicant has presented justification as to why the use of the CFGR and not the CFPS is the most appropriate metric from the PVA outputs in the Ornithological Assessment Sensitivity Report Part 1 at Deadline 4 (G4.7). See also response to Agenda Item 5.6 above.
9	Submit further analysis of PVA model (including implications of Horswell paper) in updated Sensitivity Analysis report.	Applicant	4 and 5	The Applicant has provided a summary of this in the Ornithological Assessment Sensitivity Report Part 1 at Deadline 4 (G4.7).
10	Submit supplementary report on indirect effects through prey impacts following delivery of marine physical process report update.	Applicant	5	The Applicant intends to submit an Indirect Effects: Forage Fish and Ornithology Report at Deadline 5.
11	Applicant to clarify its response in entry RR-029-APDX:B-11 of [REP1-038], which was submitted blank at Deadline 1.	Applicant	4	The following text was omitted from REP1-038 in error. "The Applicant presented displacement matrices for all species within Volume A5 Annex 5.2: Offshore Ornithology Displacement Analysis (APP-075). Displacement matrices are also presented for all species for the operation and maintenance phase impacts in Section 5.11 of A2.5 Environmental Statement Volume A2 Chapter 5 Offshore and Intertidal Ornithology (APP-017). However, as the method for assessing construction phase impacts was agreed with Natural England as being half that predicted for the operation and maintenance phase additional matrices were not provided, as a narrative-led approach was drafted for these potential impacts.

Action	Description	Action by	Deadline	Applicant's Comment/where has the action been answered.
				The Applicant disagrees with Natural England. Impacts upon sandeel during the construction phase were assessed at a local scale (impact at the wind farm scale) in **A2.3 Environmental Statement Volume A2 Chapter 3 Fish and Shellfish Ecology (APP-015).** Fish and shellfish species are considered as receptors within the Fish and Shellfish chapter of the EIA. There are no significant impacts on wider stocks of forage fish as assessed **(APP-015)**. The Applicant shall continue to engage with Natural England on this matter. While the Applicant recognises Natural England's comment "that there are no significant impacts on wider stocks of forage fish does not mean there may not be redistributions or local declines that could impact specific seabirds at certain times of the year", our assessment concludes that if these reductions occurred, they would not be as a consequence of the construction phase impacts upon these receptors. Furthermore, the Applicant maintains the assessment of indirect effects is provided in Section 5.11 of **A2.5 Environmental Statement Volume A2 Chapter 5 Offshore and Intertidal Ornithology (APP-017**), in keeping with other recent OWF development applications. Furthermore, the conclusions from the fish and shellfish impact assessments were that no significant adverse impacts would occur as a result of the construction or O&M phases of Hornsea Four (**A2.3 Environmental Statement Volume A2 Chapter 3 Fish and Shellfish Ecology (APP-015**)). Please also refer to the Applicant's response to RR-029-5.10."
12	Applicant to clarify its response to entry RR-029-APDX:B-23 in [REP1-038] in respect of gulls or gannet.	Applicant	4	Confirmation of the largest BDMPS values following Natural England's worked examples will be completed for those species of relevance to the Applicant and presented alongside alternate values accounting for

Action	Description	Action by	Deadline	Applicant's Comment/where has the action been answered.
				non-UK birds. This has been presented in the Ornithological Assessment Sensitivity Report Part 1 at Deadline 4 (G4.7).
13	Provide a summary of current positions in relation to likely significant effects in Environmental Impact Assessment terms on seabirds both in respect of the project alone and cumulatively including an indication of whether this is likely to be their final position, or if this may change before the end of the Examination as a result of further work that is currently underway.	NE and RSPB	4	
14	Undertake a review of the lighting of offshore infrastructure including whether design solutions that meet or exceed the minimum regulatory requirements could be included to moderate any adverse effects on birds. Include an analysis of how any such measures could be secured through any DCO.	Applicant	5	The Applicant is currently undertaking a review of the lighting requirements and will submit any recommendations from the review at Deadline 5.
15	In order to ensure the efficiency of the Examination, allow comment and iterative discussion, and to be in a position to resolve any outstanding matters before the close, submission of all new or amended documentation regarding marine and coastal ornithology matters.	Applicant	5	Noted.