



Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects

The Applicant's Comments on the Marine Management Organisation's Deadline 7 Submission

Revision A

Deadline 8

July 2023

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1 The Applicant's Comments on the Marine Management Organisation's Deadline 7 Submission

1. This document presents the Applicant's comments on the Marine Management Organisation's Deadline 7 submission [DCO/2019/00004].

Table 1 The Applicant's Comments on Marine Management Organisation Deadline 7 Submission

ID	Marine Management Organisation Comment	Applicant Response
1	<p>This document comprises the Marine Management Organisation's (MMO) Deadline 7 response in respect to the above Development Consent Order (DCO) Application. This is without prejudice to any future representation the MMO may make about the DCO Application throughout the examination process. This is also without prejudice to any decision the MMO may make on any associated application for consent, permission, approval or any other type of authorisation submitted to the MMO either for the works in the marine area or for any other authorisation relevant to the proposed development.</p> <p>The MMO reserves the right to modify its present advice or opinion in view of any additional matters or information that may come to our attention.</p>	No response required.
1 General Comments		
1.1	The MMO would like to highlight that Deadlines 8 is only 1 week after Deadline 7. This will create a short review period for interested parties to provide comments on representations made, especially given that there is usually a delay between the deadline and publication of documentation to the PINS website.	No response required.
2 Comments on any other information and submissions received at Deadline 6		
2.1 REP6-002 - Draft Development Consent Order (Revision I)		
2.1.1	The MMO are satisfied with the changes made to the dDCO and do not have any further comments to raise.	Noted – no further comments.
2.1.2	The MMO have reviewed the applicants updated report 'Appendix 10.2 Underwater Noise Modelling Report'. We can confirm that we are content with the revisions, and that they address our previous concerns. Specifically, the report has been revised to address our comments in relation to:	Noted – no further comments.

ID	Marine Management Organisation Comment	Applicant Response
	<ul style="list-style-type: none"> The addition of Level vs Range Plots (see section 4.3.3 of the report). Plots have now been included. Simultaneous piling. Additional information has been provided on the receptor movement and assumptions (see section 5.3, para 116). 	
2.1.3	<p>Regarding report 'Appendix 10.2 Underwater Noise Modelling Report' The MMO did request further information regarding the comparison plots (Figure 4-1 and Figure 4- 2). Figure 4-1 and Figure 4-2 “present a small selection of measured impact piling noise data plotted against outputs from INSPIRE covering both SPLpeak and SELs data. The plots show data points from measured data (in blue plotted alongside modelled data (in orange) using INSPIRE version 5.1, matching the pile size, blow energy and range from the measured data”. We thank Subacoustech for providing outputs for the single strike SEL as this was requested during the PEIR consultation in June 2021. It would be helpful if additional information could be provided here for context, such as details of the pile size and hammer energy etc. Without this information, these figures are not overly informative.</p>	<p>Appendix 10.2 Underwater Noise Modelling Report (Revision C) [document reference 6.3.10.2] has been updated at Deadline 8 addressing this comment. This is also reflected in the Final Statement of Common Ground with Marine Management Organisation (Revision D) [document reference 12.11], that will be submitted at Deadline 8.</p>

Table 2 The Applicant's Comments on Marine Management Organisation Responses to the Examining Authority's Fourth Written Questions

ID	Question	Marine Management Organisation Responses	Applicant's Comment
3 Responses to the Examining Authority's Fourth Written Questions (WQ4)			
Q4.1.4.1	<p>Statements of Common Ground</p> <p>a) Applicant, submit final signed SoCG with electronic signatures at D8.</p> <p>b) Relevant parties, submit at D8 your confirmation that the final signed SoCG submitted by the Applicant is the version agreed with you. You may do so, by attaching to your submission the copy of the SoCG that is agreed with you.</p>	<p>The MMO can confirm that we will attach a copy of the agreed signed SoCG to our submission at D8.</p>	<p>n/a</p>
Q4.3.1.2	<p>Electro-Magnetic Fields</p> <p>The MMO [REP5-080] has stated that burial to 1.5m+ should prevent adverse impacts to benthic ecology receptors via electromagnetic field and/or heating. However, the Cable Burial Risk Assessment [APP-293] concludes with a recommendation that there should be a target depth of lowering of 1.0 m, with a proposed minimum of 0.6 m. What would be the consequences to benthic ecology where the depth of buried cable is less than 1m?</p>	<p>The MMO requested advice on this topic from both benthic ecology specialists and fish biology specialists. The advice varies depending on the topic being discussed.</p> <p>For benthic ecology and the receptors based in the benthic environment, such as invertebrates the MMO have the following advice:</p> <p>The potential impacts via electromagnetic fields (EMF) and/or heating of cables on benthic receptors are unlikely to change due to a decrease in cable burial depth from 1.5+ m to 0.6 m. There is limited evidence regarding the impact of EMF on benthic invertebrates. However, that which exists, concludes that, in experimental conditions the suite of taxa exposed to EMF do not adjust their behaviour in response to EMF (Bochert and Zettler 2006).</p>	<p>The Applicant notes that the MMO has confirmed that "<i>the potential impacts via EMF and/or heating of cables on benthic receptors are unlikely to change due to a decrease in cable burial depth from 1.5+ m to 0.6 m</i>". This confirms the Applicant's position – no further comments.</p>

ID	Question	Marine Management Organisation Responses	Applicant's Comment
		<p>There may be in impact to benthic ecology receptors because of the decrease in burial depth should the requirement for cable protection increase proportionally. However, this impact of altering of sedimentary habitat to hard structure (that may be readily colonised by a different benthic assemblage), is restricted to a relatively small area where mitigation may be required. Furthermore, it may be reasonably expected that the colonising assemblage will recruit from nearby habitats and therefore does not constitute a wholesale change in the benthic assemblage, rather a change in the mosaic of habitats in the immediate vicinity.</p>	
Q4.3.1.2		<p>For fish ecology and potential impacts, the MMO have the following advice:</p> <p>The MMO recommend a cable burial depth of >1.5m (subject to local geology) to reduce the potential effects of electro-magnetic fields (EMF) on electro-sensitive species that rely on benthic habitats e.g., elasmobranchs and European eel. Burial of cables does not reduce the level of energy or alter the frequency of the emitted field, but instead increases the distance between the electrical field (and heat) and the EMF-sensitive receptor. Thus, by increasing the distance between the cable and the electro-sensitive fish through adequate burial, the exposure of the fish to EMF will be lowered and their</p>	<p>Since effects on fish ecology have been raised, the Applicant notes that the MMO response includes that no significant adverse effects on elasmobranchs (and migratory fish) populations resulting from EMF have been recorded to date and that sediment heating from cables is expected to result only in localised effects within close proximity to the site of the cables.</p> <p>As set out in the Applicant's response to this question, the possibility of accepting a shallower minimum burial depth of 0.6m is a means of reducing the likelihood of needing to use external cable protection (and specifically within the MCZ). In this case, it is suggested that the benefit of reducing the likelihood of needing to use external cable protection within the MCZ outweighs the risks to the</p>

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		<p>behaviour/reactions such as attraction or avoidance will be lowered.</p> <p>There is a relationship between the distance of the EMF emitted and the reactions/behaviour exhibited by electro-sensitive species. For example, a study by Hutchison et al., (2020) found that individuals of the little skate species (<i>Leucoraja erinacea</i>) spent a greater amount of time in the 'high' (>52.6 μT) EMF zone of the enclosure than the low (<49.7 μT) EMF zone, with significant behavioural differences were observed. The study found that skates exposed to EMF also travelled further, but more slowly and for longer periods of time than skate not exposed to EMF, indicating that periods of rest were less frequent. Skates exposed to EMF generally remained closer to the seabed and exhibited a higher proportion of sharp turns. Hutchison et al. (2020) note that this behaviour collectively indicates increased exploratory and foraging behaviour when exposed to EMF.</p> <p>Thomsen et al., (2015) also highlighted that the most likely potential effects of EMF relate to attraction towards and avoidance of EMF sources, indicating potential ecological consequences for individuals and wider populations.</p> <p>In addition, burial of cables has the added benefit of minimising adverse effects of</p>	<p>environment from EMF which, whilst uncertain, are likely to be localised and not significant. The alternative would be to increase the quantity of external cable protection in the consent envelope.</p>

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		<p>sediment heating on bottom dwelling species such as sandeels, which burrow in the surface sediments and lay their eggs in sticky batches on the seabed. Again, the deeper the cable is buried, the further away the sensitive receptor will be from the source of heat. Herring are also benthic spawners that lay eggs on gravel and coarse gravelly sands substrates. Russel et al. (1976) and Oeberst et al. (2009) showed that egg and larval development in herring are temperature dependent – see Tables 1 & 2. So artificially heated sediments (i.e., emitted from cables) in areas of herring spawning habitat have the potential to speed up the egg hatching and larval development periods resulting in premature hatching times, and potentially premature yolk absorption periods by larvae before they become planktonic.</p> <p>Table 1 Herring egg development periods Table 2 Herring yolk absorption periods</p> <table border="1" data-bbox="907 991 1473 1090"> <thead> <tr> <th>Average temperature</th> <th>Days</th> <th>Average temperature</th> <th>Days</th> </tr> </thead> <tbody> <tr> <td>12 - 13° C</td> <td>7-9</td> <td>12.8° C</td> <td>3 & 9</td> </tr> <tr> <td>10 - 11° C</td> <td>10-12</td> <td>12.0° C</td> <td>5 & 14</td> </tr> <tr> <td>7 - 8° C</td> <td>14-18</td> <td>10.7° C</td> <td>7 & 16</td> </tr> <tr> <td>3 -4° C</td> <td>49</td> <td>10.3° C</td> <td>7 & 20</td> </tr> </tbody> </table> <p>From Russell, 1976.</p> <p>Whilst there is scientific evidence to confirm the effects of EMF and sediment heating on fish receptors, no significant adverse effects on elasmobranchs (and migratory fish) populations resulting from EMF have been recorded to date. However, conversely, given the limited number of studies of responses to EMF by fish in the</p>	Average temperature	Days	Average temperature	Days	12 - 13° C	7-9	12.8° C	3 & 9	10 - 11° C	10-12	12.0° C	5 & 14	7 - 8° C	14-18	10.7° C	7 & 16	3 -4° C	49	10.3° C	7 & 20	
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		<p>wild, there is also considered a lack of robust evidence to the contrary and the overall known effects of EMF on elasmobranchs remain inconclusive.</p> <p>Sediment heating from cables is expected to result in localised effects within close proximity to the site of the cables, so it is expected that any adverse impacts to fisheries and fish ecology will also be localised to the site of the cables.</p> <p>The MMO's recommendation for a minimum cable burial depth of 1.5m is taken from the National Policy for Renewable Energy Infrastructure (Department of Energy and Climate Change (2011). Adequate cable burial depth not only reduces the risk of snagging such anchors and bottom towed fishing gear, but also reduces the risk of cables being exposed, e.g., through scour, movement of mobile sediments etc. The reburial of exposed cables using burial techniques such as trenching and jetting causes further disturbance to benthic fish habitats, spawning and nursery grounds.</p> <p>The MMO are aware that the advice for burial depth varies depending on which receptor is being considered. The MMOs position when making licensing decisions is to take the</p>	

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		precautionary approach. The MMO expect to have further clarification for this at deadline 8.	
Q4.3.1.3	<p>Outline Benthic Mitigation Plan/Scheme</p> <p>The Applicant has stated that “Details of the benthic mitigation that applies are provided in Tables 8-3 and 8-4 of the ES [APP-094]. No other forms of mitigation are proposed by the Applicant”.</p> <p>a) For MMO and NE, does the proposed mitigation within these ES tables sufficiently cover the types and form of mitigation that would likely form part of a final mitigation scheme for any benthic habitats, or is there further mitigation that should be incorporated?</p> <p>b) Applicant, explain with reasons what further mitigation might be needed in a final mitigation scheme for any benthic habitats.</p>	The schemes proposed embedded mitigation, summarised in Table 8-3, and the additional mitigation measures, in Table 8-4 of the ES appear suitable to reduce the potential impacts to sensitive and ecologically important benthic receptors.	The Applicant is pleased to note that the MMO has confirmed that it considers the proposed embedded and additional mitigation to be suitable – no further comments.
Q4.3.3.4	<p>Micro-siting around sand waves and megaripples</p> <p>The ES [APP-092, Table 6-3] states that “Route selection and micro-siting of the cables will be used to avoid areas of sea bed that pose a significant challenge to their installation, including for example areas of sand waves and megaripples. This will minimise the requirement for sea bed preparation (levelling) and the associated sea bed disturbance.”</p> <p>a) Applicant, explain how this is secured through the dDCO?</p>	The MMO will confirm our position at D8, following the applicant’s explanation of how it will be secured through the dDCO.	Details of how this would be secured were provided by the Applicant in its response to this question – no further comments.

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	b) NE and MMO, are you satisfied that this mitigation would be secured based on the dDCO?		
Q4.3.3.6	<p>Post-Consent Sampling</p> <p>The Applicant has committed to further contaminants sampling and analysis is being undertaken post-consent.</p> <p>a) Applicant, how this is secured post-consent?</p> <p>b) MMO, are you satisfied with how this is secured through the dDCO?</p>	<p>The MMO have reviewed the wording of the condition for post-consent sampling and are satisfied that condition 22 contained within the dDCO (REP6-002) covers all requirements for post-consent sampling.</p>	<p>Noted – no further comments</p>
Q4.3.4.2	<p>MEEB and the dDCO</p> <p>The Applicant has submitted the Proposal Without Prejudice DCO Drafting (Revision C) [REP5-008], which at Part 4 includes a section setting out the Measures of Equivalent Environmental Benefit. Consider the wording as set out and respond as to its adequacy if the MEEB is required, particularly with regards to:</p> <p>a) The timings as set out, such as the provision under paragraph 33 that there should be no external cable protection works may be commenced within the Cromer Shoal Chalk Beds MCZ until the MEEB implementation and monitoring plan has been approved by the SoS.</p> <p>b) And, whether it is appropriate that there would be no requirement to implement the MEEB implementation and monitoring plan if no external cable protection works are required within the Cromer Shoal Chalk Beds MCZ?</p>	<p>The MMO defer to Natural England on whether any external cable protection works may commence within the Cromer Shoal Chalk Beds MCZ until the MEEB implementation and monitoring plan has been approved by the SoS.</p> <p>Additionally, the MMO defer to Natural England on whether it is appropriate for there to be no requirement to implement the MEEB implantation and monitoring plan if no external cable protection works are required within the Cromer Shoal Chalk Beds MCZ.</p>	<p>With respect to the first point the Applicant clarifies that it is its existing position that the MIMP must be approved by the SoS prior to the commencement of external cable protection works. The justification for this is clearly set out in the Applicant's response to this question at Deadline 7.</p> <p>With respect to the second point, the Applicant refers to its comments on Natural England's responses to Fourth Written Questions in The Applicant's Comments on Natural England Deadline 7 Submission [document reference 22.16]. Further to this the Applicant considers that the comparison with the Norfolk projects is a poor one given the differences in both the impacts being 'compensated' for (Annex I <i>Sabellaria</i> reef in the case of the Norfolk projects, broadscale habitats in the case of SEP and DEP) and the nature of the measures (debris removal for the former and native</p>

ID	Question	Marine Management Organisation Responses	Applicant's Comment
			<p>oyster restoration for the latter). The Applicant therefore disagrees that the circumstances are similar and that this should act as a precedent in any way for SEP and DEP. The Applicant also notes that its approach is in line with the best practice guidance for developing compensatory measures in relation to Marine Protected Areas (Defra 2021) which states that: <i>"Defra recognises that in some cases and for certain habitats and species this could take several years and therefore it may not be feasible for the compensatory measures to be complete before the impact takes place. Where this is not possible, it is important that necessary licences are in place, finances are secured, and realistic implementation plans have been agreed with the appropriate bodies to demonstrate that the compensatory measure is secured. It is the applicant's responsibility to set out clear timings, deliverables and rationale for meeting this requirement."</i></p>
Q4.11.4.1	<p>The role of MMO and other drafting edits proposed in the dDCO</p> <p>a) MMO, provide the update as indicated [REP6-026, paragraph 3].</p> <p>b) Applicant and MMO, indicate either in the draft SoCG or here if matters are subsequently agreed with the Applicant, or remain in dispute.</p>	<p>Please find the MMO's deferred comments regarding the proposed changes to the dDCO within section 4 of this response.</p>	n/a
Q4.11.8.2	<p>Post construction monitoring and subsequent remediation</p>	<p>The dDML post construction monitoring conditions do not bind the undertaker to take action should the post construction monitoring</p>	<p>The Applicant updated Condition 20 of Schedules 10 and 11 and Condition 19 of Schedules 12 and 13 of the draft DCO</p>

ID	Question	Marine Management Organisation Responses	Applicant's Comment
	<p>a) Do the dDML post construction monitoring conditions (Schedule 10, Part 2, Condition 20; Schedule 11, Part 2, Condition 20; Schedule 12, Part 2, Condition 19; and Schedule 13, Part 2, Condition 19) [REP6-002] or any other part of the dDCO bind the undertaker to take action should this post construction monitoring highlight any particular impacts that need remediation or further mitigation works?</p> <p>b) Highlight is any further provisions or drafting edits that could be required in the dDCO to ensure remediation or further mitigation works are undertaken on the basis of findings in the post construction monitoring.</p>	<p>highlight any particular impacts that need remediation or further mitigation works. In order for this to be secured in the dDML this would need to be included within the wording of each relevant condition. The MMO will aim to provide suggested wording for the dDML prior to deadline 8.</p>	<p>(Revision J) [document reference 3.1] at Deadline 7 to include an additional sub-paragraph (6) for additional monitoring.</p> <p>The Applicant does not consider that any further amendments or drafting edits are necessary or appropriate, as explained in its response to this question at Deadline 7. In particular, the NPS EN-1 at paragraph 4.1.7 (draft EN-1 para. 4.1.16) does note that the Secretary of State should only impose requirements/conditions that are <i>necessary, relevant to planning, relevant to the development to be consented, enforceable, precise, and reasonable in all other respects</i>. The Applicant considers that a condition of the type suggested relating to remediation or further mitigation works would not meet those tests. This is also consistent with other recent Orders made for similar projects.</p>
Q4.11.8.3	<p>Deemed Marine Licences and Marine Mammals and Monitoring</p> <p>Detail any remaining concerns regarding the dDMLs and the management of marine mammals.</p>	<p>The MMO have no further concerns to raise regarding the dDMLs and management of marine mammals.</p>	<p>Noted – no further comments.</p>
Q4.11.8.4	<p>Deemed Marine Licences and Benthic Ecology</p> <p>Are you satisfied that the mitigation relevant to benthic ecology (including offshore physical processes/ marine geology) are all included with appropriate wording within the dDCO and</p>	<p>The MMO are satisfied that the mitigation relevant to benthic ecology (including offshore physical processes/ marine geology) are all included with appropriate wording within the dDCO and dDMLs, including through the Requirements and Conditions.</p>	<p>The Applicant is pleased to note that the MMO has confirmed that the mitigation relevant to benthic ecology (including offshore physical processes/ marine geology) is all included with appropriate wording within the dDCO and dDMLs, including through the Requirements and Conditions – no further comments.</p>

ID	Question	Marine Management Organisation Responses	Applicant's Comment
	dDMLs, including through the Requirements and Conditions		
Q4.12.2.5	<p>Cockles and brown shrimp</p> <p>State the final positions of the parties on the issues on cockles and brown shrimp [REP6-026].</p>	The MMO have no further concerns to raise regarding cockles and brown shrimp.	Noted – no further comments.

Table 3 The Applicant's Comments on Marine Management Organisation's Response to the Examining Authority's Commentary on or Proposed Schedule of Changes to the Draft Development Consent Order

ID	Question	Marine Management Organisation Response	Applicant's Comment
4 Responses Deferred from The MMOs Deadline 6 Response (REP6-026)			
4.1 Responses to the Examining Authority's proposed changes to the draft Development Consent Order (DC1)			
DC1.3.1.1	<p>The role of MMO</p> <p>The ExA notes the amendments proposed by the Applicant to Article 5, particularly sub paragraphs 2, 6 and the addition of sub-paragraph 3, to ensure that MMO is consulted by the SoS should the SoS consider a transfer of benefit of a DML, and only the whole of the DML could be transferred, not allowing a transfer of part of a DML. The ExA finds it reasonable that where a transfer of a DML would be proposed, the SoS would be required to look at the proposed transfer in the context of all the provisions of the dDCO, including some Articles and Requirements relating to offshore matters which overlap with the DMLs. In that context, the ExA finds it is reasonable that the SoS would have the ability to approve the transfer of a dDML, in consultation with MMO [RR-053] [REP1-036, Q1.11.3.2] [REP3-112] [REP3-133] [REP4-028] [REP4-037] [REP4-048]. However, the ExA proposes the following edits:</p> <p>A) Applicant, provide edits to Article 5 (or signpost if already included) to ensure that the provision only provides for the transfer of the benefit of the dDML and not a lease.</p>	<p>The MMO note that points (a) and (b) are directed at the applicant.</p> <p>The MMO are still in discussion regarding the ExA's suggestion. Whilst the MMO was aiming to provide an update for this deadline we have been unable to finalise our response, however, we are confident that a response can be provided for Deadline 8.</p>	No further comments.

ID	Question	Marine Management Organisation Response	Applicant's Comment
	<p>b) Applicant, provide corresponding justification and any other relevant updates in the EM.</p> <p>c) MMO, provide further justification if you find that the provision in Article 5(6) would not enable you to ensure compliance with the provisions of the MACAA2009, when responding to the SoS.</p>		
DC1.8.2.1	<p>Activities Authorised under the DMLs.</p> <p>The Marine Management Organisation continue to raise objection to the use of the phrase “materially” within the context of the DMLs [REP2-059, Paragraph 8.9] [REP4-037]. While the ExA awaits further discussion on this matter and resolution on this issue, the following alternative suggestions are proposed. Applicant and MMO to comment:</p> <p>a) Consider a fuller explanation in the EM which sets out that the undertaker would be restricted to carrying out works that do not give rise to any new or different environmental effects to those assessed in the EIA; or</p> <p>b) Consider and adding a provision in the dDML to restrict activities that do not give rise to any new or different environmental effects to those assessed in the EIA.</p>	<p>The MMO are still in discussion regarding the ExA’s suggestion. Whilst the MMO was aiming to provide an update for this deadline we have been unable to finalise our response, however, we are confident that a response can be provided for Deadline 8 .</p>	<p>No further comments.</p>