Hornsea Project Four

Applicant's comments on Deadline 7 submissions

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Revision Summary

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Revision Change Log

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1 Introduction

1.1.1.1 At Deadline 7 the following 18 submissions were received from 12 stakeholders:

- CMS Cameron McKenna Nabarro Olswang LLP on behalf of Doggerbank Offshore Wind Farm Project 1 Projco Limited and Doggerbank Offshore Wind Farm Project 2 Projco Limited – Deadline 7 submission **(REP7-109)**
- East Riding of Yorkshire Council – Deadline 7 Submission **(REP7-095)**
- East Suffolk Council – Comments on any submissions received at Deadline 6 **(REP7-094)**
- Environment Agency – Further information requested by the ExA under Rule 17 of the Examination Procedure Rules **(REP7-097)**
- Harbour Energy – Comments on any submissions received at Deadline 6 **(REP7-100)**
- Marine Management Organisation – Comments on submissions received at Deadline 6, Further information requested by the Examining Authority (exA) under Rule 17, Comments on the ExA's proposed schedule of changes to the Development Consent Order, Final Statement of Common Ground (SoCG) and matters not agreed **(REP7-111)**
- Bryan Cave Leighton Paisner LLP on behalf of National Grid Electricity Transmission Plc (NGET) and National Grid Gas Plc (NGG) – Deadline 7 submission **(REP7-108)**
- Natural England – Natural England's End of Examination Position on Marine Processes **(REP7-103)**
- Natural England – Natural England's End of Examination Position on Offshore Ornithology **(REP7-104)**
- Natural England – Natural England's End of Examination Position on the Applicant's Proposed Compensatory Measures **(REP7-102)**
- Natural England – Cover Letter **(REP7-101)**
- Natural England – Risk and Issues Log **(REP7-105)**
- NEO Energy (SNS) Limited / NEO Energy Petroleum Limited – Proposed Protective Provisions and NEO Protective Provisions Plan. Submission on behalf of NEO Energy Petroleum Limited accepted at the discretion of the Examining Authority **(REP7-106)**
- NEO Energy (SNS) Limited / NEO Energy Petroleum Limited – Protective Provisions (tracked). Submission on behalf of NEO Energy Petroleum Limited accepted at the discretion of the Examining Authority. **(REP7-107)**
- Addleshaw Goddard LLP on behalf of Network Rail Infrastructure Limited – Withdrawal of Relevant Representation [RR-001] **(REP7-096)**
- Northern Gas Networks Limited – Withdrawal of Relevant Representation [RR-030] **(REP7-110)**
- Royal Society for the Protection of Birds (RSPB) – Comments on any submissions received at Deadline 6 **(REP7-068)**
- Royal Society of the Protection of Birds (RSPB) – Comments on Deadline 6 submissions and actions from the Examining Authority **(REP7-099)**

1.1.1.2 The Applicant has reviewed all Deadline 7 submissions and responded on an individual basis to the relevant comments from stakeholders in the following documents:

- G8.3 Applicant's comments on Deadline 6 Ornithology submissions
- G8.5 Applicant's comments n NEO's Deadline 7 submissions
- G8.6 Applicant's comments on Harbour Energy's Deadline 7 submissions
- G8.8 Applicant's comments on Natural England's Deadline 7 Ornithology submissions

1.1.1.3 This document provides a response to the comments raised by the MMO in **REP7-111**, Natural England's comments on Marine Processes in **REP7-103**, the RSPB in **REP7-098** and East Suffolk Council **(REP7-094)**.

1.1.1.4 Please see the Deadline 7 submission of **G1.1 Overarching Acronyms List (REP7-063)** and **G1.45 Overarching Glossary (REP7-074)** for overarching acronym and glossary lists.

2 Applicant's comments on East Suffolk Council (REP7-094)

2.1.1.1 The Applicant thanks East Suffolk Council for their response at Deadline 7 **(REP7-094)**. We are grateful for East Suffolk's continued engagement during Examination. The search area for onshore nesting compensation measure has been further refined through site selection and engagement with landowners and stakeholders. The areas that have been shortlisted as most suitable by the Applicant and are currently being progressed are located north of FFC SPA. Please note that we have updated the Compensation Project Description (please see Section 3.5 of the **A4.6.1 Compensation Project Description (REP7-007)**) to reflect our refined search areas and this is also detailed within the Roadmap **(B2.7.4 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Kittiwake Onshore Artificial Nesting Roadmap (REP7-023)**) and Compensation Plan (**B2.7 Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Kittiwake Compensation Plan (REP7-020)**). Due to the interested landowner sites being located within the Cayton Bay to Newbiggin by the Sea search area, the Applicant is focusing on these refined search areas north of FFC SPA. Please also see **G5.8 Orsted's approach to strategic ecological compensation (REP5-086)** and we will continue to engage with stakeholders following Examination.

3 Applicant's comments on the Royal Society for the Protection of Birds (REP7-098)

3.1.1.1 The Applicant thanks the RSPB for their engagement throughout the Examination process and the submissions at Deadline 7. These have been reviewed, along with all other ornithological submissions from other stakeholders and comprehensive responses provided in **G8.3 Applicant's comments on Deadline 6 Ornithology Submissions** and **G8.8 Applicant's comments on Natural England's Deadline 7 Ornithology submissions**.

4 Applicant's comments on Natural England's end of Examination position on marine processes (REP7-103)

4.1.1.1 The Applicant has identified all the relevant marine processes receptors, agreed through a number of pre-application Evidence Plan Process meetings **(B1.1.1 Consultation Report - Volume B1 Annex 1.1: Evidence Plan (APP-130)**), and presented a proportionate assessment commensurate with the potential for likely significant effect both within **A2.1 Marine Geology Oceanography and Physical Processes (APP-013)** and Examination submissions (most notably **G4.9 Marine Processes Supplementary Report (REP4-043)**). The Applicant has assessed the potential for indirect effects upon seabirds and forage fish addressing the inferred productivity of the Flamborough Front **(G5.7 Indirect Effects of Forage Fish and Ornithology (REP5-085)**).

4.1.1.2 The Applicant would also highlight that Natural England's Risk and Issues Log on Marine Processes has remained relatively unchanged, despite significant efforts from the Applicant to progress the matters post-application via the submission of significant volumes of supplementary works to address the issues raised by Natural England, among others, coupled with additional commitments to monitoring and mitigation (**G5.33 Clarification Note on Marine Processes Mitigation and Monitoring (REP5a-017)** and **F2.7 Outline Marine Monitoring Plan (REP7-058)**). Natural England in Section 2.3 (Accounting for Uncertainty) of their DL7 submission **(REP7-103)** state "The applicant provided further information within **REP4-043.** Whilst this is welcome, and captures all the available information regarding these receptors, we consider that this uncertainty remains". The Applicant has exhausted all possible evidence gathering and presentational avenues open during the Examination to demonstrate sufficient understanding of the baseline environment and the predicted impacts upon relevant receptors, with monitoring and mitigation proposed for those areas where the Applicant considers any perceived uncertainty remains. The Applicant notes that the level of detail provided on this topic throughout the Examination, and the monitoring and mitigation proposed by the Applicant, far exceeds that

presented by projects on a similar scale, for projects in the vicinity of Hornsea Four as well as more widely in the UK.

4.1.1.3 Many instances of Prof. Elliott's report are drawn upon by Natural England as evidence that the correct identification of a physical process, a receptor, or a link between both is therefore attributed as a significant effect with no consideration of the evidence presented to the contrary throughout the Examination. An example of this approach is presented in section 2.4 of the Natural England DL7 submission (Natural England's End of Examination Position on Marine Processes **(REP7-103)**) which states Professor Mike Elliot's submission, notes that "It is accepted that sediment from the Holderness Coast enters the sediment pool for the south in the Humber Estuary, the Wash and areas in between". This identification of an agreed upon process and receptor is automatically concluded or inferred to result in a significant effect, in EIA and HRA terms, with no supporting evidence or analysis (e.g. consideration of magnitude, duration etc. of the impact in the context of naturally dynamic processes) and apparently disregarding the evidence based assessments provided by the Applicant or the professional opinion of Professor Mike Elliot or nationally recognised marine process consultants at Cooper Marine Advisors and RHDHV with vast experience in the field.

4.1.1.4 As noted by Prof. Elliott, "'certainty' in determining the changes... is rarely, if ever, possible in dynamic areas and even 'beyond reasonable doubt' is subjective – this relies on defining the accepted degree of change, the signal to noise ratio, etc" and "NE does not have to demonstrate an effect, the developer has to demonstrate no effect – scientifically demonstrating a negative effect is very difficult if not impossible". The Applicant considers that the assessment presented, and the conclusions thereof, provide a robust and proportionate consideration, beyond reasonable scientific doubt, of the potential impacts arising from Hornsea Four on marine process receptors.

4.1.1.5 In **REP7-103** Natural England highlighted three key Marine Process Receptors, Flamborough Front, Smithic Bank and the Holderness Coast, which they consider to be of high ecological value in their own right. The Applicant's position is that this ecological treatment of physical environment processes and receptors is fundamental to the misunderstanding and position held by Natural England. Paragraph 1.8.1.4 of **Marine Geology, Oceanography and Physical Processes (APP-013)** states "..impact pathways, such as sediment plumes, may relate to other receptors. In these cases, the scales of pathways created by sources are considered within the marine processes impact assessment but the sensitivity on any associated receptor types is considered in Chapter 2: Benthic and Intertidal Ecology, Chapter 3: Fish and Shellfish Ecology, Chapter 4: Marine Mammals, Chapter 9: Marine Archaeology, and Chapter 11: Infrastructure and Other Users, as appropriate. This assessment on physical processes is further supported by paragraph 2.6.194 of National Policy Statement for Renewable Energy Infrastructure (EN-3) which states "The assessment should include predictions of the physical effect ...". Therefore, it is inappropriate to treat physical features as of high ecological value in their own right.

4.1.1.6 The Applicant maintains that all relevant marine process receptors have been identified and assessed proportionately, with considered mitigation and monitoring proposed. Where continued divergence in positions is maintained between the Applicant and Natural England, the Applicant defers to Cefas as the scientific advisors, on matters pertaining to marine physical process, to the MMO, in their role as the marine Regulator.

4.1.1.7 The Applicant would also draw the ExA's attention to inaccurate statements such as in Section 2.2 of **(REP7-103)** "Notably, the importance of the Flamborough Front to primary productivity and associated secondary productivity is widely agreed and often linked to the abundance of seabirds and mammals in the region, it is therefore perhaps of no surprise that this region supports a number of designated sites for such apex predators including the Flamborough Head SAC and SSSI, Flamborough and Filey Coast SPA and Southern North Sea SAC. Furthermore, the

Flamborough Front is known to define the northern and southern extents of a range of species, and it is for this reason that the littoral and sublittoral habitats at Flamborough Head are considered to be some of the most diverse in the UK, supporting an unusual range of marine species". This representation contains a number of unsubstantiated and/or unsupported statements that the Applicant would like to clarify:

- The concentration of designated sites is not solely attributable to, or a consequence of, the position of a frontal system (i.e. Flamborough Front). There are higher concentrations of designated sites within and peripheral to The Wash, The Thames Estuary, Cardigan Bay, The Celtic Sea and other area/regions of the UK.
- The Applicant is not aware of any mobile species (marine mammals, fish or ornithological features of a European designated site), whose range is defined by the location of the Flamborough Front.
- The littoral and sublittoral habitats at Flamborough Head are outside the zone of effect for the Hornsea Four development and therefore not a consideration.
- Flamborough Head, while ecologically diverse and important is not one of the most diverse in the UK and doesn't support an unusual range of marine species. Other areas of greater productivity and ecological value exist around much of the UK, particularly all of the Cornish coast, The Celtic Sea, Anglesey, Firth of Forth and Moray Firth, among many others (see Figure 29 of **G4.9 Marine Processes Supplementary Report** (**REP4-043**)).

4.1.1.8 Natural England in Section 2.2 (Pathways for indirect effects) of their DL7 submission (**REP7-103**) state "Although both the Humber Estuary SSSI and Flamborough Head SSSI underpin the corresponding SACs/SPAs, they also include features of national importance that are not captured within the SAC/SPA designation. Similarly, sites such as Dimlington Cliffs SSSI, which do not underpin an SAC/SPA would not have been fully considered within any component of the application.". The Applicant can confirm that the Humber Estuary SSSI, Flamborough Head SSSI and Dimlington Cliffs SSSI are outside the zone of effect of any potential impact associated with all phases of the proposed Hornsea Four development. By way of example, the paragraph 3.2.2.2 of Marine Processes Supplementary Report (**REP5-043**) states, in part "...Dimlington Cliffs SSSI..., immediately north of Easington Gas Terminal... is located approximately 40 km south of the landfall", the Humber Estuary SSSI is further to the south and Flamborough Head SSSI is to the north and counter to all sediment transport pathways (see Figure 1.4 of **APP-013**) thereby precluding any impact pathway. Additionally, where a national site such as a SSSI forms a component of an international site, but the latter designation does not list a qualifying feature that is present on the SSSI citation, the individual SSSI was taken forward for further assessment for that particular feature or the species. The Applicant can confirm that the assessments within the relevant offshore chapters of the Hornsea Four ES were undertaken on this basis. As such, the Applicant can confirm that both direct and indirect impact pathways have been considered for all features of SSSIs within the associated study areas and no SSSI features have been omitted from the assessments. The Applicant can also confirm that the onshore assessment of SSSI features explicitly considers all features of the relevant SSSIs.

4.1.1.9 The Applicant notes that NE makes various general comments in (**REP7-103**) relating to HRA and MCZ assessment processes. It is unclear what sites, features and/or indirect impacts relating to Hornsea Four that NE is referring to, through which pathways it is contended that such indirect effects could arise and, insofar as such effects could arise, why such effects are likely to be significant. Given the complete lack of specificity and absence of supporting analysis and evidence for contended significant effects, the Applicant suggests that no weight can be afforded to such general comments.

4.1.1.10 The Applicant is clear that all LSE have been considered for the purposes of the HRA and MCZ assessments – as set out in **B2.2: Report to Inform Appropriate Assessment Part 1**, **B2.2: Report**

to Inform Appropriate Assessment Part 2: Appendix A: Habitat Regulations Assessment Screening Report (REP2-005) and A5.2.3: Marine Conservation Zone Assessment (APP-070). It can confidently be concluded that there is no risk of an adverse effect on integrity on any designated site or feature from Hornsea Four alone or in-combination resulting from impacts to marine processes (including indirect effects). It can also be confidently concluded that there is no risk of the impacts of Hornsea Four significantly hindering the conservation objectives of any MCZ – as supported in the following submissions: G5.10 Professor Mike Elliot's Marine Processes Report Review (REP5-066), G4.9 Marine Processes Supplementary Report (REP4-043), G5.33 Clarification Note on, Marine Processes Mitigation and Monitoring (REP5a-017), G5.7 Indirect Effects of Forage Fish and Ornithology (REP5-085).

5 Applicant's comments on MMO's Deadline 7 submission (REP7-111)

Reference	Stakeholder's Written Representation	Applicant's Response
2. Outline Marine Mammal Mitigation Protocol Revision:2 [REP6-012]		
2.2	Table 1 of the Outline MMMP states that "there will only be a maximum installation of 2 piled foundations within a 24-hour period. 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. The two piled foundation locations may also be piled simultaneously". This statement is confusing as 'concurrently' and 'simultaneously' have the same meaning. Presumably, the Applicant means that consecutive piling is likely (i.e. up to two piles installed in a 24-hour period, one after the other) but simultaneous piling may also occur (two piles installed in different locations at the same time within either the HVAC area or within the array). The MMO advises that the Applicant clarifies this.	See response provided at Deadline 7 in **G7.2 Applicant's comments on other submissions received at Deadline 6 (REP7-083)** in relation to this query being raised through SoCG discussions with the MMO. The Applicant confirms the MMO's understanding is correct. Concurrent piling refers to up to two piles being installed within a 24-hour period, one after the other. Simultaneous piling, which may also occur, refers to two piles being installed at the same time within a 24-hour period. This could occur at the HVAC booster station or within the array area. The Applicant considers the text to be clear regarding concurrent piling. Nevertheless, to avoid any further ambiguity, the ExA could update the wording in the in the recommended DCO and DMLs as follows: "It is possible for installation of the two piled foundations to occur concurrently *or sequentially* i.e. within a 24-hour period at up to two locations within the area of Work No. 3(a) or up to two locations within the array."
2.6	Overall, the MMO believe that the outline MMMP has been appropriately updated/revised accordingly to make clear that the final MMMP will consider mitigation for both instantaneous and cumulative PTS (i.e. "The final MMMP will include mitigation of cumulative PTS impact ranges that will be modelled based on the latest research and methods available at the time of the final MMMP post-consent" (paragraph 4.2.1.3 of the outline MMMP)).	The Applicant welcomes the MMO's confirmation that the outline MMMP has been appropriately updated and as such, the Applicant considers all MMMP matters closed.
3. Dredging and Disposal Site Characterisation Revision:2 [REP6-004]		
3.5	In Chapter 6.2 of the report, the MMO notes that the Applicant has not provided a map of where samples were taken in the document but does refer to some of them by name in paragraphs 6.2.2.2 and 6.2.3.1-3. We recommend the Applicant provides a map of where samples have been taken. The MMO did notice that there were some footnote links provided after commenting on specific samples and would like the Applicant to verify if these links of the	The Applicant directs the MMO (and the Examining Authority following its Rule 17 letter) to Figure 2.2 of **A2.2 Benthic and Intertidal Ecology (REP7-004)** and Figure 3 of **A5.2.1 Benthic and Intertidal Ecology Technical Report (REP-013)** which present a map of the locations of where sediment samples were collected.

	footnote do show a map of where all the samples were taken. If this is not the case, our initial request for the provision of a map remains.	
Benthic comments		
3.9	The Applicant has proposed to undertake pre- and post- construction monitoring along the cable route. Specifically, bathymetric survey(s) and sediment sample collection (and subsequent particle size distribution analysis) will be carried out to assess the impact of dredge disposal within the ECC, and to determine if the drill arisings increase the percentage contribution of large granular material. The MMO further reiterates the request for a minimum of 10% of the total amount of turbines proposed for construction should be monitored for benthic impacts.	The Applicant can confirm that **F2.7: Outline Marine Monitoring Plan (REP7-058)** has been updated at Deadline 7 to include provision for the following monitoring of relevance to benthic ecology: • Undertake monitoring of the benthic communities comprising grab samples in the form of a cruciform design at one of each GBS foundation type. • The location of the monitored GBS would be identified following the post-construction geophysical survey and would be the location with the greatest level of scour for each foundation type. • Analysis of sample data to determine potential changes to the benthic community structure from before and after construction. The same foundation locations will be used to consider non-native invasive species (grab samples and video to determine species composition and presence of any marine non-native species). The Applicant considers that the monitoring approach outlined above is more appropriate than monitoring an arbitrary 10% of foundations in relation to the impact of GBS on benthic communities. The Applicant considers that the locations exhibiting the greatest level of scour will be the locations more likely to show change and produce more meaningful results.
3.12	The MMO advises that pre-construction monitoring is used to identify different particle size regimes along and within the disposal area. This would then allow dredged sediment to be deposited on similar sediments (wherever possible).	At Deadline 6, the Applicant provided confirmation within **A1.4: Project Description (REP6-002)** that the project will deposit spoil material as close to the site of production where possible following best practice guidance. Additionally, the Applicant confirms that a Trailer Suction Hopper Dredger (TSHD) will not be deployed within Smithic Bank in order to retain sediment within the system.
3.13	Table 2 of the report shows the spoil volumes for various activities reach a total of approximately 5.5 million m^3 and 7.1 million m^3 for piled and non-piled options respectively. The MMO advises that clarity is sought as to whether these volumes are to be disposed of in an even manner, or will a series of cells be needed to manage the thickness?	The Applicant can confirm that all material associated with Hornsea Four that requires disposal will be disposed of within the limits of the licensed disposal site(s). As the impact from disposal activities is not significant in EIA terms, no further controls on where this material will be deposited within these disposal sites is deemed appropriate. Additionally, the Applicant would like to highlight that of the two total spoil volumes (array and ECC), a large proportion of these values relate to trenching of cables (62.4% in relation to array area disposal site and 86.3% in relation to cable corridor disposal site). Possible cable installation methods include jetting, vertical injection, cutting, ploughing, Controlled Flow

		Excavation (CFE), and pre-trenching (using a pre-trenching draghead mounted on a TSHD). The Applicant notes that for all of these cable installation methodologies, the disturbed material will naturally settle behind the burial tool, updrift of the cable route, to facilitate infill of the cable trench as soon as possible. This should give comfort that the total volumes will deposited in an even manner with no need to use a series of cells to manage the thickness.
3.14	Regarding section 7.1.2.4 of the report, the MMO notes the potential for Chalk plumes to be generated. As known, chalk plumes can travel considerable distance due to their low settling velocity. Chalk arising should be deposited as close to the seabed as possible to minimise this. We request that if surface plumes are observed, photographs should be taken and reported to the MMO.	The Applicant notes that the fate of sediment plumes has been modelled in Appendix C of **A5.1.1: Marine Processes Technical Report (APP-067)** and assessed in the relevant ES assessments (**A2.2: Benthic and Intertidal Ecology (REP7-004)** and **A2.3: Fish and Shellfish Ecology (APP-015)**). The Maximum Design Scenario (MDS) parameters for the modelling is set out in Section 5.2 – 5.4 of Appendix C of **A5.1.1: Marine Processes Technical Report (APP-067)**, with this modelling based on a precautionary worst-case assumption of spoil release at the water surface at mean spring and neap tides. Additional context has been provided on the fate of disposed sediments in the Deadline 5 submission of **G5.5 Clarification Note on Drill Arisings and Deposited Sediments (REP5-083).** To summarise, finer sediment could remain suspended for a period in the order of hours to days. Modelling of spoil disposal (Appendix C of **A5.1.1: Marine Processes Technical Report (APP-067)**) demonstrated that the scale of tidal advection, where the silt fraction determines the material held in suspension to form a plume, would be approximately 6 km within the array area, and 10 km in the offshore ECC (although conservative estimates of 10 km and 15 km representing a full spring tidal excursion have been assumed, respectively). Away from the point of release, concentrations are predicted to be around 10 mg/l but are expected to dissipate within a short timeframe (in the order of hours to days) from the point of release. In terms of bed-level changes, if the total volume of dredged material were deposited within the disposal site (array or offshore ECC), the increase in bed level height for light smothering (<5 cm as defined by the Marlin MarESA assessment), would result in a total maximum footprint of 26 km^2 in the export cable and 48 km^2 in the array area. This equates to approximately 10% of the total seabed area within the Hornsea Four array area and 9% within the Hornsea Four ECC / temporary works area. In practice, the bed-level change will compromise a series of discrete deposits (smaller overlapping or non-overlapping deposits, potentially from multiple dredging cycles around each dredged area), distributed throughout the parts of the array area and ECC where works are required. Away from the point of release, silts are not expected to settle to a discernible thickness.

		No significant effects were concluded in relation to deposition from construction activities using a worst case of sea surface spoil release. As such, the Applicant considers that monitoring of plumes is neither necessary nor proportionate.
Fisheries		
3.28	The MMO continues to engage with the Applicant regarding a refinement over the seasonal restriction and believe that the restriction should be applied spatially in those areas which cross the herring spawning ground (e.g. by kilometre point distance along the ECC route), as is the case for Dogger Bank A and B (Creyke Beck) ECC, which has restrictions applied to construction works in the ECC owing to a similar inshore route that transects the Banks herring spawning ground. The MMO is currently reviewing the Applicant's updated G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction due to be submitted at Deadline 7 and will provide a final decision on whether this satisfies the MMO's outstanding concerns before or at Deadline 8.	The Applicant requested MMO and Cefas availability for a meeting to discuss herring seasonal restrictions with a view to reaching agreement prior to the end of Examination on the timeframe associated with this restriction. This meeting was requested on 16/06/22 and to date, no availability has been provided by the MMO and Cefas despite several attempts by the Applicant to get this meeting secured. In the absence of this discussion, the Applicant has proposed a compromise position to the MMO (prior to Deadline 7) as set out below and the Applicant awaits a response from the MMO on this matter. In order to provide the MMO with comfort around impacts from increased suspended sediment concentrations and smothering on spawning herring, the Applicant has proposed a restriction on seabed preparation activities using either dredgers or control flow excavator (CFE) tools seaward of Mean High Water Springs (MHWS) out to the westernmost extent of the HVAC Booster Station Works Area between 21st August and 23rd October. The updated restriction on seabed preparation activities has been incorporated into **F2.15 Outline Cable Specification and Installation Plan (REP7-056)** (updated and submitted at Deadline 7).
Shellfisheries		
3.30	Whilst we agree with the Applicant's approach to use MMO fisheries data to identify shellfish fisheries. We advise that the Applicant may want to consider including 2020-2022 data, although landings and values should be carefully interpreted as the last three years may have been impacted by Covid-19. A table presenting the average value and landings by species for the key fisheries would be beneficial.	The Applicant notes the MMO's recommendation to include 2020-2022 data but confirms that the consideration of this data at this stage of the Examination process is not possible and in any event is unnecessary. The Applicant would like to highlight that within the Deadline 7 Statement of Common Ground (SoCG) between the Applicant and the MMO (**REP7-070**), it has been agreed that the fish and shellfish ecology baseline environment has been appropriately characterised (MMO-FSE-01). The shellfish baseline within **A4.4.4 Dredging and Disposal Site Characterisation (REP6-004)** is drawn from the fish and shellfish ecology baseline and as such, the baseline within **A4.4.4 Dredging and Disposal Site Characterisation (REP6-004)** should also be considered appropriate.
4. Herring Spawning and Piling restriction		
4.1	The MMO notes that the Applicant has proposed amending the timing restriction from '01 September to 16 October' to '21 August to 23 October'. The MMO is currently reviewing the proposal with our advisors at CEFAS	The Applicant strongly maintains its position that that the originally proposed restriction period of 1st September to 16th October each year utilises a sufficiently precautionary approach and as a result, provides a robust mitigation of the potential effects of piling of the HVAC booster station on herring spawning.

	however due to the limited time available we will be unable to provide a response until Deadline 8.	The Applicant requested MMO and Cefas availability for a meeting to discuss the peak spawning period with a view to reaching agreement prior to the end of Examination on the timeframe associated with this restriction. This meeting was requested on 16/06/22 and to date, no availability has been provided by the MMO and Cefas despite several attempts by the Applicant to get this meeting secured. In the absence of this discussion, the Applicant has proposed a compromise position to the MMO (prior to Deadline 7) as set out below and the Applicant awaits a response from the MMO on this matter. Whilst the Applicant believes it has presented a scientifically accurate and robust justification for the proposed 'peak' herring spawning period throughout this Examination, in response to the MMO's ongoing concerns, the Applicant has submitted its final position as Appendix D of G1.10 Clarification Note on Peak Herring Spawning Period and Seasonal Piling Restriction at Deadline 7 (**REP7-065**). This Appendix sets out a compromise piling restriction period for the HVAC booster stations commencing 21st August (10 days earlier than originally proposed) to 23rd October (7 days later than originally proposed). Further, in order to provide the MMO with comfort around impacts from increased suspended sediment concentrations and smothering on spawning herring, the Applicant proposes a restriction on seabed preparation activities using either dredgers or control flow excavator (CFE) tools seaward of Mean High Water Springs (MHWS) out to the westernmost extent of the HVAC Booster Station Works Area during the same time period above. The updated piling restriction period is updated in the draft DCO at Deadline 7 (**REP7-039**). The updated restriction on seabed preparation activities has been incorporated into **F2.15 Outline Cable Specification and Installation Plan (REP7-056)** (updated and submitted at Deadline 7).
5. Sediment Contaminants Analysis		
5.1	Following our comments at Deadline 6 [REP6-050] regarding the Particle Size Analysis (PSA), and that the contractor was not a laboratory validated by the MMO to conduct this analysis. The MMO and Cefas have agreed to review the PSA information and supply comments on the full suite of sample analysis on the provision that a condition is included within the Deemed Marine Licences (DML) that either the samples will be re-analysed by a validated laboratory or that the Applicant provides evidence that Thomson Ecology has been validated for the MMO's approval.	The Applicant confirms the samples in question (array area PSA) have been reanalysed by a laboratory validated by the MMO and the results made available to the MMO on 10/08/2022. Notwithstanding this, in response to the MMO's request for a condition securing the submission of PSA results to the MMO ahead of construction, the Applicant at Deadline 7 included a new requirement in **F2.7: Outline Marine Monitoring Plan (REP7-058)** to commit Hornsea Four to this provision.

5.2	Through previous consultations, and in the documents presented for review, three different laboratories have been named as having conducted the PSA, namely: Bibby Hydromap Solutions / Benthic Solutions Ltd, SOCOTEC, and Thomson Ecology. Typically, when a non-validated laboratory is contracted for analysis, we would advise that the analysis is re-conducted by a validated laboratory. However, as outlined in 5.1 we would have no objections to this concern being resolved post-consent, rather than pre-consent, so long as a respective condition is worded such that no works relevant to sediment disturbance would start until said condition is discharged in consultation with the MMO. Whether the matter is resolved pre- or post-consent is more so a matter of administrative process rather than relevant to evidence-based risk, in our opinion.	The Applicant welcomes the explanation of the process for this issue to be resolved and has made best efforts in order to get the samples reanalysed and provided to the MMO as soon as possible to allow for resolution prior to the end of the Hornsea Four Examination process. The Applicant appreciates the similar levels of effort and engagement from the MMO on this issue.
5.4	Concerning the Array Area (document listed in point 5), the metals data show exceedances of the Action Level 1 (AL1) for arsenic only. These are present within four of the 21 samples and constitute minor exceedances relative to the gap between AL1 and AL2. The MMO confirms that the metals results overall do not lead us to recommend the preclusion of any licensable activities.	The Applicant welcomes the MMO's confirmation of the acceptability of the array area metals results.
5.5	The organotins data are shown to be "<LOD". This does not relay any numerical information as the limit of detection (LOD) for organotins is not provided. We consider this to be a technicality which can be resolved through the Applicant filling in the LOD cells at the bottom of the respective table for organotins data within the 'MMO Results Table'. This is under the caveat that the LOD is within an appropriate range (e.g. 0.002 or 0.005), but as the contracting laboratory – SOCOTEC – is validated by the MMO for organotins, the we do not think it likely that this would be an issue. Organotin levels being below the LOD for offshore sediments is not surprising and does not lead us to recommend the preclusion of any licensable activities.	The Applicant can confirm that the Limits of Detection (LOD) for organotins (0.001 mg/kg dry weight) have been added to the relevant tab in the MMO's spreadsheet which has been submitted into Examination at Deadline 8 (G8.9 Hornsea Four Sediment Sampling MMO Template). Since this LOD is below the appropriate range given by the MMO, the Applicant welcomes the confirmation of the acceptability of the array area organotins results.
5.6	The polycyclic aromatic hydrocarbons (PAHs) data are shown to be "<1". We presume this to be the LOD but cannot verify this due to the LOD cells not being filled in, as with the organotins data. It is surprising to see that all PAH congeners are below the LOD in every sample, because PAHs can be present in the marine environment due to natural occurrences, as with trace metals, and to diffuse pollution (e.g. atmospheric deposition, combustion). As such, we would have expected some levels to be above the LOD. Nonetheless, it is indeed possible that all PAH levels could be below the LOD. We also note that	The Applicant can confirm that the polycyclic aromatic hydrocarbons (PAHs) tab in the MMO's spreadsheet (array area) has been updated to include LODs and this spreadsheet has been submitted into Examination at Deadline 8 (G8.9 Hornsea Four Sediment Sampling MMO Template). The Applicant would like to highlight that there was a unit conversion error in the previous iteration of the PAH tab and as such, all values have been checked and updated accordingly. The updated results have been verified against the SOCOTEC certificates of analysis. The Applicant now considers this matter to be closed.

	the levels of dibenz[a,h]anthracene ("DBENZAH") are listed as "<1" as with all other PAHs. This raises some level of uncertainty because DBENZAH has a lower relative toxicity than other PAHs (denoted by its AL1 being 0.01 mg/kg compared to all others being 0.1 mg/kg) and often can have a lower LOD value accordingly.	
5.7	The Applicant may wish to verify the PAH results against the original certificates of analysis from SOCOTEC for additional certainty. We do not view this as a major concern as it is technically possible for PAH levels to all be below the LOD, it is just unlikely. As with our recommendation for the PSA issue in point 5.2 of this submission, we are content for this to be resolved post-consent. If the data is correct, then we are not inclined to recommend the preclusion of any licensable activities.	
5.8	Concerning the ECC Area, the metals data show exceedances of the AL1 for arsenic in seven samples and nickel in one sample. As with the array area samples, these exceedances are closer to the AL1 than AL2, and so do not lead us to recommend the preclusion of licensable activities.	The Applicant welcomes the MMO's confirmation of the acceptability of the ECC metals results.
5.9	The organotins data for the ECC exhibit the same issues that we have with those for the array area, in that data are shown to be "<LOD", but no LOD is defined. As such, our conclusions for the ECC organotins data are the same as for the array.	The Applicant can confirm that the Limits of Detection (LOD) for organotins (0.001 mg/kg dry weight) have been added to the relevant tab in the MMO's spreadsheet which has been submitted into Examination at Deadline 8 (G8.9 Hornsea Four Sediment Sampling MMO Template). Since this LOD is below the appropriate range given by the MMO, the Applicant welcomes the confirmation of the acceptability of the ECC organotins results.
5.10	The PAH data for the ECC show a more typical characterisation of what would be expected for PAH levels in offshore marine sediments, i.e., some congeners being below the LOD, but most being above the LOD at low levels (relative to AL1). The levels reported do not lead us to recommend the preclusion of licensable activities.	The Applicant can confirm that the polycyclic aromatic hydrocarbons (PAHs) tab in the MMO's spreadsheet (ECC) has been updated to include LODs and this spreadsheet has been submitted into Examination at Deadline 8 (G8.9 Hornsea Four Sediment Sampling MMO Template). The Applicant would like to highlight that there was a unit conversion error in the previous iteration of the PAH tab and as such, all values have been checked and updated accordingly. The updated results have been verified against the SOCOTEC certificates of analysis. The Applicant now considers this matter to be closed.
5.11	Both results templates are insufficiently completed to enable annual reporting under OSPAR. Whilst this is an issue which can delay or impede annual reporting, it is not, essential to be resolved prior to the determination of a licence. Details of the insufficient completion of the template comprise: • Application number is not filled out in the "Application Info" tab. • Dredge area tonnages are not filled out in the "Application Info" tab (this should be filled out even if there is only one dredge area for each template).	The Applicant can confirm that the following amendments have been made to the MMO's spreadsheet for both the array area and the ECC and this spreadsheet has been submitted into Examination at Deadline 8 (G8.9 Hornsea Four Sediment Sampling MMO Template): • The PINS application number added to the 'Application Info' tab.

	• Dredge area column is not filled out in the "Trace metals", "Organotins" and "PAHs" tabs. • Total solids (%) data are not entered in any tab.	• Dredge area tonnes added to 'Application Info' tab, with these volumes corresponding to the maximum permitted disposal volumes as set out in the DCO and **A4.4.4 Dredging and Disposal Site Characterisation (REP6-004)**. • Dredge area column filled out in all relevant tabs. • Total solids (%) data added to all relevant tabs
5.12	The data for trace metals, organotins and PAHs mostly indicate levels to be acceptable for licensable activities in the array and ECC areas. However, there are some points with the PAH data in the array area which we believe could benefit from the provision of the original certificates of analysis. We also note the outstanding issue of the contracting laboratory/ies for PSA, which is/are not validated by the MMO, which we confirm we are content to have resolved through post-consent stipulations, rather than precluding or delaying any licence determination. This would be acceptable under the important caveat that works relevant to dredge and disposal do not take place until said stipulations are discharged.	The Applicant considers that all outstanding queries have been resolved, as set out in the Applicant responses to 5.1 – 5.11 above. In relation to the PSA analysis, the Applicant at Deadline 7 included a new requirement in **F2.7: Outline Marine Monitoring Plan (REP7-058)** to commit Hornsea Four to the following: *'In the event that the preapplication Particle Size Analysis (PSA) results have not been approved by the MMO prior to DCO award, no disposal activities associated with Hornsea Four will take place until the MMO have provided this approval in writing.'*