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THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES

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Sheringham Shoal Extension and Dudgeon Extension Offshore Wind Farms

**Appendix A1 to the Natural England's Deadline 1 Submission**

**Natural England's Comments on 9.5 SEP and DEP Offshore In-Principle Monitoring Plan  
[APP-289]**

For:

The construction and operation of the Sheringham Shoal Extension and Dudgeon Extension Offshore Wind Farms located approximately 16km and 27km respectively from the Norfolk Coast in the Southern North Sea.

Planning Inspectorate Reference: EN010109

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20th February 2023

# Natural England's Comments on Sheringham Shoal Offshore Wind Farm Extension Project (SEP) and Dudgeon Offshore Wind Farm Extension Project (DEP) Offshore In-Principle Monitoring Plan (IPMP) [APP-289]

## 1) Introduction

1. Natural England welcomes the submission of the SEP and DEP Offshore In-Principle Monitoring Plan as part of the application. Further, we welcome the Applicant's consideration of the advice provided by Natural England during the evidence plan process. Natural England's Best Practice Advice document sets out our expectations in terms of monitoring. This document is available at: [Environmental considerations for offshore wind and cable projects - Phase IV Best Practice Advice for Post-Consent Monitoring, Version 1.0, July 2022.pdf](#). Relevant sections are also included in Annex A for reference.
2. This document outlines Natural England's overarching concerns with the Offshore IPMP [APP-289], particularly in relation to the overall aim of ensuring adaptive monitoring is secured within the DCO. In addition, this document provides detailed advice on each of the main offshore nature conservation receptors: offshore ornithology, marine mammals, marine physical processes and benthic ecology.

## 2) Overarching Concerns with the IPMP

3. In recognition of the emphasis currently being placed by projects in the post consent phase on the IPMP when setting the monitoring requirements and parameters; Natural England highlights the importance of the IPMP. Natural England is therefore not supportive of the Applicant's proposal to postpone fundamental discussions regarding the scope and purpose of the monitoring to the post consent phase.
4. Overall, Natural England feels that much more detail is required than is provided in the IPMP in its current form. For example;
  - what are the hypotheses the monitoring will be testing?
  - how will the monitoring be designed to ensure that the desired outcomes can be achieved i.e. is the monitoring fit for purpose?

- What are the indicative timings of the surveys? How will the various build-out scenarios be considered when designing the monitoring and will a construction gap of 2-4 years warrant additional monitoring? Also, will the construction of the second project skew or impact on the monitoring of the first?
  - Can lessons be learnt from previous thematic surveys and how will modifications to surveys design be incorporated between survey campaigns?
  - What does 'success' look like to demonstrate that no further monitoring is required?
  - What happens if the results do not support the null hypothesis? Is further monitoring required (with/without modifications)? If impacts are greater than predicted, do actions need to be undertaken to address the impact? How will the further monitoring and actions be secured, is a change to the wording of the dML required? And if so, how will success of any action/s be monitored and what will be the success criteria before monitoring can cease?
5. To answer the above, Natural England considers the IPMP should consider what the uncertainties and evidence gaps of the EIA/HRA are, rather than repeating the outcomes of the EIA/HRA. We consider that establishing the uncertainties and evidence gaps of the EIA/HRA is necessary to inform what monitoring should be undertaken. We also note that this may be different depending on scale of development within any of the 3 areas included in the DCO boundary; and features present and/or utilising the area.
6. Similarly, Natural England wishes to highlight the importance that all relevant monitoring proposals for SEP and DEP and/or associated DCO/dML conditions consider the aim of securing a mechanism for **adaptive monitoring** when unforeseen impacts are detected. Thus, ensuring remedial measures (**i.e., adaptive management**) are triggered should the results of monitoring demonstrate impacts are significantly greater than predicted and/or incorrect assumptions were concluded following review of the environmental statement and supporting documents. We advise the bulleted list in paragraph 20 of the Offshore IPMP [App-289] omits this key consideration, and that the potential for certain monitoring to trigger the development of countermeasures (with associated monitoring of those measures) should be clearly stated in relevant tables of the IPMP and incorporated into the DCO conditions where relevant.
7. Natural England advises an approach mechanism in which the Applicant presents a clearly defined hypothesis or null hypothesis of no impact would be beneficial.

Monitoring thereafter would aim to test this. We advise a review period during which SNCBs and regulatory bodies such as the Marine Management Organisation are consulted by the Applicant to assess the results of the first period of monitoring. For example, one mechanism that could be introduced for particular receptors would be a live document which is reflective of what the monitoring is observing.

8. We advise that monitoring should be effective in providing evidence on the effectiveness of mitigation measures, to ensure compliance with measures identified in assessments to mitigate significant impacts and provide evidence to assess the significance of adverse effects, evaluate the success of compensation measures and to help inform whether further remedial measures are required. Though we do recognise that in principle monitoring required for compensation packages may be set out in other documents and therefore this document should clearly signpost the sections of the relevant (DCO) named plans.
9. We draw the Applicants and other interested parties' attention to the fact that the MMO 2014 monitoring review is now 9 years old and based on evidence gathered from Round 1 and some Round 2 windfarms over 10 years ago. Since then, technology has progressed and the scale and number of offshore windfarm developments has considerably changed as has our understanding of the impacts. Therefore, we advise that the MMO review should be a starting place to understand potential monitoring, but more recent best practice guidance and lessons learnt should also be taken into account.

### **3) Thematic specific advice**

#### **3.1 Section 1.4.2 Marine Physical Processes**

10. It is unclear to Natural England what the purpose of the monitoring is. We request that further details are provided to answer the questions posed in our overarching comments.

#### **3.2 Section 1.4.3 Water and Sediment Quality**

11. In light of sediment disposal potentially across the construction area including Cromer Shoal MCZ, we consider pre-construction sediment contaminant monitoring will be

required for the purposes of suitability for sediment disposal. We advise this must be agreed with the MMO/CEFAS and secured within the DCO/DML.

### **3.3 Section 1.4.4 Benthic Ecology**

12. Natural England highlights that unlike the original Dudgeon and Sheringham Shoal Projects, the extension projects have included a requirement for cable protection within the Cromer Shoal Chalk Beds MCZ. Thereby, the results can't be fully extrapolated. Natural England advises that a monitoring plan for any cable protection within the MCZ is included with the IPMP and secured within the DCO.
13. Natural England also advises that monitoring of any areas of priority habitats is undertaken pre and post construction to inform any mitigation measures and ensure the effectiveness of those measures. If it is found that measures have been insufficient then further measures and/or remediation may be required to ensure the projects remain beneficial to the environment.

### **3.4 Section 1.4.5 Fish and Shellfish Ecology**

14. Natural England advises that the undertaking of fish surveys could be considered as a secondary compensation measure for North Norfolk Sandwich terns by filling evidence gaps in relation to prey (namely sandeel, herring) availability which are potentially limiting colony size. This data could then inform appropriate site management measures and would be considered to be beneficial for nature conservation
15. Natural England advises that should DEP North be taken forwards then monitoring of impacts to fish availability for Annex I bird species will be required as this area is currently located in a foraging area for Sandwich terns.

### **3.5 Section 1.4.6 Marine Mammals**

16. The Applicant has presented the conclusions of the Environmental Statement only. We advise that the Applications should also present:
  - a. The conclusions of the RIAA, include impacts that are approaching adverse effect;

b. Where there are areas of “high uncertainty or low confidence” in the data and/or assessment;

as these are also valid targets of post-consent monitoring.

17. We strongly advise that the IPMP is updated accordingly, to ensure that all current and residual concerns as outlined in our relevant and written representation [RR-63] are captured and can be considered for monitoring (see **Annex A** for best practice guidance on post consent monitoring).

18. Furthermore, the IPMP should be updated to reflect the conclusions of any impact assessment(s) that are revised in accordance with Appendix D to the Relevant Representations of Natural England [RR-063]. This will inform further potential targets for monitoring.

19. It is important to note that the underwater noise monitoring is aimed at validating the change in the marine environment (in terms of underwater noise levels); it does not monitor the response of animals to the noise. This monitoring is undertaken primarily to confirm that the mitigation measures in the MMMP are sufficient to minimise the risk of injury to animals. The relationship between underwater noise levels and the response of animals is still highly uncertain and could benefit from further monitoring. Natural England is concerned that no monitoring has been outlined that would evidence the impacts to marine mammals e.g., monitoring animal responses to impacts. Please note that if it is found that the mitigation measures are insufficient then it must be secured in the DCO or Marine Mammal Mitigation and Site Integrity plans that action must be taken to address the issues and further monitored.

20. Natural England does not consider that “compliance monitoring” in the MMMP e.g., monitoring of the mitigation zone prior to the commencement of noisy activities (piling) is monitoring for the purpose of the IPMP. Reference to this monitoring should be removed. If the Applicant is proposing additional monitoring to validate the effectiveness of mitigation measures in the MMMP, more details must be provided.

21. Similarly, reporting or recording that is done under the Site Integrity Plan does not constitute monitoring for the purpose of the IPMP. If the Applicant is proposing additional monitoring to validate the effectiveness of mitigation measures in the Site Integrity Plan, Natural England advises more details must be provided.

22. To our knowledge the Offshore Wind Strategic Monitoring Research Forum is focussed on ornithological receptors (<https://jncc.gov.uk/our-work/owsmrf/>). Therefore, the applicability of this forum to develop and co-ordinate strategic marine mammal monitoring remains uncertain.
23. Further information on strategic monitoring options is needed to understand whether it could be considered for post-consent monitoring.

### **3.6 Section 1.4.7 Offshore Ornithology**

24. Natural England notes that overall, the emphasis in the Offshore IPMP in relation to ornithology is focused on EIA rather than the HRA assessment. Natural England advises emphasis should be on species that have been at or close to adverse effect under HRA, or particular areas of uncertainty (e.g., apportioning, demographic parameters).
25. The offshore ornithology monitoring section of the IPMP focuses solely on Sandwich tern for which it is noted the Applicant has submitted derogation proposals. For, Sandwich tern specific monitoring we advise that links to derogations case documents are provided for transparency and ease of cross-referencing. Similarly for any other species where a derogations case is potentially required.
26. We advise that the IPMP should consider collision risk impacts from the operational windfarm to a wider set of key species. These include great black-backed gull at the EIA scale, and the predicted impacts presented for Flamborough Filey Coast SPA for kittiwake as well as Sandwich tern for the North Norfolk Coast SPA.
27. In addition, it is noted that other receptors of concern i.e., auks and red-throated diver, are not mentioned. Natural England seeks further information regarding the rationale for this omission and advises monitoring for these species should be included in the IPMP at this stage of its development.
28. As such, Natural England advises the following approach to offshore ornithology monitoring:
- a. Monitoring of species/impacts subject to compensation (kittiwake, Sandwich tern and potentially guillemots/razorbills and red-throated diver) should be conducted at the windfarm site as well as at the compensation sites.

b. Other species that are close to adverse effect (under HRA) or moderate adverse (under EIA) to be included as targets for monitoring. We believe that this is likely to include great black-backed gull, as identified by the Applicant, but might also include other species identified through the course of the Examination.

c. Any other key areas of uncertainty that feed into the impact assessment should be included, for example Sandwich tern flight speed/flight height, survival rates etc.

29. The above approach is subject to Natural England's final position regarding these species and their associated adverse impacts. We advise the detailed plan is subject to agreement with Natural England.



**Annex A: Natural England's Advice on an In-Principle Monitoring Plan (IPMP) extracted and summarised from: [Environmental considerations for offshore wind and cable projects - Phase IV Best Practice Advice for Post-Consent Monitoring, Version 1.0, July 2022.pdf](#) (Parker *et al* 2022).**

### **Purpose of the IPMP document**

The outcomes of monitoring are necessary to:

- validate the predictions that were made during the consenting phase;
- mitigate against unforeseen impacts;
- evidence the effectiveness/success of mitigation measures;
- inform adaptive management strategies

Therefore, it is important that the IPMP represents a useful document that ensures the monitoring commitments are detailed and can be referred back to throughout the monitoring process.

### **Advice relating to post-consent monitoring**

The process and structure of the planning system, including post-consent monitoring, is currently under review by Government, Defra, Natural England and other bodies (see Section 3.1). Options for how PCM can be improved to increase our understanding of the marine environment, the effects of offshore wind development and provide information-rich data over relevant spatial and temporal scales are being considered, such as the promotion of strategic or collaborative monitoring (see Section 4.4). The following section provides Natural England's advice and recommendations for the production and delivery of receptor-specific monitoring plans at the post-consent phase.

### **Natural England's recommendations**

- **Early and continued engagement with SNCBs** – engagement with the relevant SNCB(s) is recommended at the earliest possible opportunity to agree the focus of monitoring plans and to allow for continual engagement as plans evolve.
- **Clear aims, objectives and hypotheses** – post-consent monitoring plans should be targeted and have clear aims and hypotheses (Chambers et al. 2012; MMO, 2014; Lindeboom et al. 2015). Monitoring should be proportionate to the level of risk to biological receptors and

should not be delivered for the sake of monitoring, but instead focus on sensitive receptors and be driven by a clear understanding of what the monitoring is seeking to address (MMO, 2014). This helps to collect data that is information rich, as well as data rich (Wilding et al. 2017). Early engagement with NE or relevant SNCB is recommended to help agree monitoring plans.

- **Detection of unforeseen impacts** – post-consent monitoring should be targeted, with clear monitoring aims and objectives. Whilst PCM plans should not be designed to detect unforeseen impacts, the analysis of the results of PCM may identify unforeseen impacts which arise during offshore wind farm development across relevant spatial and temporal scales (MMO, 2014). If detected, unforeseen effects can be investigated through adaptive monitoring (see Section 4.3). Participation in collaborative or strategic-level monitoring projects may be also appropriate for identifying long term and lasting effects to marine receptors as a result of offshore wind development.

- **Statistical power** – the ability of a survey to collect a sufficiently large amount of data to make robust statistical inferences about changes is known as its power (Maclean et al. 2006). Where possible, power analyses should be undertaken before monitoring commences to inform the design of PCM to ensure sufficient statistical power in subsequent analyses to detect meaningful changes (Bennet et al. 2016). Projects should also aim to reduce dependence within or between sampling units and plan the statistical tests and/or modelling approach so that the nature and quantity of data collected is suited to conduct the required tests/modelling (Bennet et al. 2016; Noble-James et al. 2018). Early engagement with Natural England is recommended when considering the statistical power of analyses and how this is used to inform survey design, or if power analyses indicate that the expected statistical power may not be sufficient to draw meaningful conclusions.

- **Uncertainty and significance** – as set out within MMO (2014), uncertainty and significance are two important considerations when designing and implementing PCM plans. Uncertainty reflects the extent of error or assumptions that were made when predicting impacts. There is a greater need to monitor topics if there is higher uncertainty regarding the effects of an impact or resulting recovery of receptors. The significance of an impact is another important consideration for PCM and helps to inform whether further management or remedial measures are required (MMO, 2014).

- **Sufficient duration** – PCM should be of a suitable duration to capture lags in impacts to receptors being detected as some impacts may only be detectable after a duration of time, depending on the receptor and the monitoring objectives. In addition, PCM may be required to monitor the recovery of receptors after an impact has occurred (e.g., impacts from

construction) or a compensation measure has been put in place. Monitoring plans should be designed to incorporate long term or lasting impacts to validate predictions made within the ES and to improve our understanding of long-term effects and recovery of marine receptors. Monitoring plans should also have a clearly defined criteria for when and how decisions will be made on the conclusion of monitoring during the post-consent phase, for example when monitoring will be deemed to have met the objectives of the monitoring programme. Refer to the adaptive management approach principle below (Section 4.3).

- **Strategy for consequence** – a key role of post-consent monitoring is to validate the predictions of the ES, HRA, EIA or MCZ Assessment (Section 4). Monitoring plans should therefore have a clear strategy for subsequent remedial action if the monitoring shows that the original conclusions are incorrect, such as the significance of an impact upon a receptor or the timeframe for its recovery (MMO, 2014). Thresholds can be used to set acceptable levels of change for some environmental indicators, which if exceeded, can trigger additional monitoring or the implementation of mitigation or management measures to avoid adverse effects (Bennet et al. 2016; Wilding et al. 2017).
- **Sharing of data** – in order to maximise the usefulness of post-consent monitoring, data and reports should be made publicly available and provided to the relevant data repositories, such as the Marine Data Exchange (MDE) and the Marine Environmental Data and Information Network (MEDIN). All reports should be supported by the source/raw data and provide a description of the collection methodology and protocols followed (MMO, 2014). Metadata and environmental metadata should also be made publicly available (Chambers et al. 2012). Natural England advise that PCM data should be shared within the relevant data repositories as a matter of best practice. This could be secured as a licence condition for projects.
- **Maximise use of baseline characterisation data and existing data** – where possible, data collected at the pre-application phase should be used to supplement post-consent monitoring data. The results of baseline characterisation surveys may also be useful to inform the design of post-consent monitoring plans (e.g., the key areas or receptors for monitoring to focus upon). There may also be suitable existing datasets which can be used to provide context or supplement site-specific monitoring data. However, the validity and suitability of existing datasets must be carefully considered if used beyond providing a historical context for subsequent monitoring data (Noble-James et al. 2018). Parker et al. (2022a) provides advice and principles for the use of existing data to inform baseline characterisation surveys.

- **Comparable and standardised data** – data should be collected and presented in a consistent format which, where possible, enables effective comparisons with other datasets and other monitoring programmes. Consistent data standards may also allow for backwards/forwards compatibility of monitoring methods over time. Data collection should follow the MEDIN data standards and guidelines as a matter of best practice. A consistent naming convention should also be followed. Species should be recorded using the World Register of Marine Species (WoRMS) list of accepted scientific names and biotopes should be recorded using the EUNIS classification system (EEA, 2019). A consistent and comparable approach also enables effective cumulative and in-combination assessments and improves the functionality of data repositories.
- **Follow industry standards, methodologies and protocols** – monitoring programmes should follow the current industry standards, methodologies and protocols as a matter of best practice. This may apply to data collection, handling or analysis (Chambers et al. 2012). Receptor-specific advice is provided within the relevant sections below. Whilst this document will be periodically updated to reflect evolving best practice for industry standards and survey methodologies, Natural England would welcome the opportunity to discuss proposals to use the latest industry monitoring methods, standards or protocols.
- **Novel and emerging monitoring methods** – Natural England acknowledges the role of offshore wind farm developers in exploring and testing new monitoring methods. Natural England supports innovation and welcomes the exploration of novel and emerging monitoring methods, such as environmental DNA (eDNA), or passive monitoring methods. Although there can be challenges presented by the relative novelty of some techniques in early stages, collaborative working can unlock many wider benefits if planned carefully. Early engagement with Natural England is recommended if novel approaches are proposed.
- **Strategic / joined up approach** – a strategic, collaborative or joined up approach can deliver monitoring programmes of a greater scale and scope, thereby providing a greater understanding of ecological impacts, sensitivity or recovery (see Section 4.4). Natural England strongly supports strategic or collaborative monitoring proposals and can provide bespoke advice on a case-by-case basis.

### **Adaptive monitoring and discharge of conditions**

Adaptive monitoring is the process of evaluating data collected to date, to help inform the duration and/or design of further monitoring (Bennet et al. 2016). It can also be used to assess

whether monitoring should continue or if the relevant licence conditions can be discharged (MMO, 2014). Adaptive monitoring can also inform on the requirement for further mitigation, compensation or restoration measures. Adaptive monitoring is of particular importance for where there is scientific uncertainty regarding lasting impacts or recovery of receptors (Bennet et al. 2016) or where monitoring is seeking to validate predictions of the ES, EIA, HRA or MCZ Assessment. Adaptive monitoring is relevant during the post-construction phase where monitoring is investigating changes to the natural environment and ecological receptors over an undefined timescale, such as until a receptor recovers. Licence conditions should incorporate flexibility over the duration of monitoring plans, to allow the results of monitoring surveys to inform the requirement for future surveys or the implementation of management measures (MMO, 2014). This helps to ensure monitoring programmes are delivering the agreed aims and objectives set out by the monitoring plans and ensure monitoring is proportionate to the level of data required. For example, if the ES predicted a full recovery of an MPA feature within a certain timeframe, monitoring may be required until full recovery has occurred and can be agreed between the applicant, SNCB and MMO as the relevant regulator. Conversely, if a receptor has demonstrated the predicted level of recovery, and if agreed by all parties, the requirement for additional post-construction surveys may be discharged early. In addition, another aspect of adaptive monitoring is the flexibility of the monitoring plan. Due to the long timeframe between projects obtaining consent and completing PCM surveys after construction, monitoring plans need to capture the scope for changes to the methodology or focus of surveys over time. This may be due to new evidence or understanding of impacts to marine receptors, or due to new technology becoming available which enables more ambitious studies. For example, seabird tagging projects should allow for flexibility in methods as new tracking devices become available. Natural England can provide advice on a case-by-case basis.

### **Collaborative / strategic monitoring**

Delivering monitoring projects collaboratively could have many benefits for the collection of post-consent monitoring data and can help to answer key evidence gaps or research priorities. Collaborative monitoring could include joint monitoring programmes across zones or regions where projects pool resources to achieve monitoring aims, or where key research questions are divided between projects within a zone or region to allow sufficient time and resources to be dedicated to each question. Collaborative monitoring could also comprise individual offshore wind projects contributing data, money or resources to a strategic research project led by another organisation, such as by ORJIP or ORSMRF, to address shared research

questions or evidence gaps. Working collaboratively allows for the pooling of resources and/or division of labour, which enables monitoring programmes to be of a greater scale and scope than possible on a project-specific basis. This enables data collection to produce useful and information-rich data over sufficient spatial and temporal scales to enhance our understanding of the marine environment and the effect of offshore wind development upon ecological receptors (Wilding et al. 2017). In addition, collaborative monitoring could be undertaken over larger spatial and temporal scales than project-specific monitoring plans, which could enable the detection of wider community changes, unforeseen or long-term effects, and allow for greater statistical power in subsequent analyses. Some projects have worked collaboratively to address key shared questions of mutual interest at the post-consent phase (e.g., see Section 6.3.1). If implemented effectively, this allows for the division of labour and allows multiple projects to undertake more insightful monitoring programmes than possible on an individual project-level. Whilst there is widespread agreement of the benefits of collaborative monitoring across sector groups, a framework is required to facilitate strategic monitoring programmes at the government level. Facilitating strategic monitoring is a key objective of Natural England's Approach to Offshore Wind (Natural England, 2021) and Natural England supports the implementation of strategic monitoring as a mechanism to address key evidence gaps and to deliver monitoring projects at scale. Natural England are also leading the Planning Offshore Wind Strategic Environmental Impact Decisions (POSEIDON) project. This is a multi-year project, funded through the Crown Estate's Offshore Wind Evidence and Change (OWEC) programme, which is seeking to address strategic data collection for offshore wind projects. The outputs of the POSEIDON project will be incorporated into this advice when available. Projects should consider whether data collection for some aspects of post-consent monitoring could be undertaken collaboratively with other regional projects in order to answer specific monitoring aims and priorities. Natural England strongly supports the implementation of collaborative monitoring programmes across projects, zones or regions, and can provide advice on a case-by-case basis.