RWE Renewables UK Dogger Bank South (West) Limited

RWE Renewables UK Dogger Bank South (East) Limited

Dogger Bank South Offshore Wind Farms

Environmental Statement

Volume 7

Appendix 11-1 Marine Mammal Consultation Responses

May 2024

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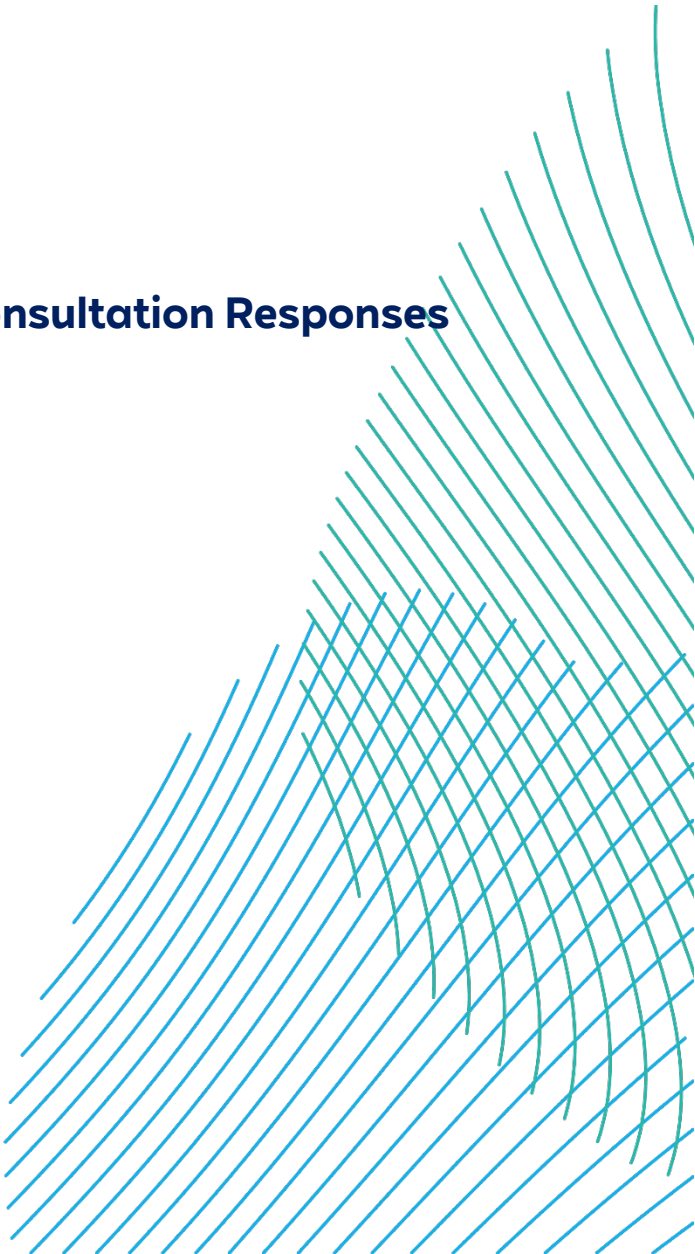

Unrestricted

Company:	**RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited**	Asset:	**Development**
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Glossary

Term	Definition
Array Areas	The DBS East and DBS West offshore Array Areas, where the wind turbines, offshore platforms and array cables will be located. The Array Areas do not include the Offshore Export Cable Corridor or that part of the Inter-Platform Cable Corridor within which no wind turbines are proposed. Each area is referred to separately as an Array Area.
Baseline	The existing conditions as represented by the latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of the Projects.
Collision	The act or process of colliding (crashing) between two moving objects.
Concurrent	Installation of monopiles or pin piles happening at the same time at the DBS Projects.
Cumulative effects	The combined effect of the Projects in combination with the effects of a number of different (defined cumulative) schemes, on the same single receptor/resource.
Cumulative Effects Assessment (CEA)	The assessment of the combined effect of the Projects in combination with the effects of a number of different (defined cumulative) schemes, on the same single receptor/resource.
Cumulative impact	The combined impact of the Projects in combination with the effects of a number of different [defined cumulative] schemes, on the same single receptor/resource.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Dogger Bank South (DBS) Offshore Wind Farms	The collective name for the two Projects, DBS East and DBS West.

Term	Definition
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the value, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Electrical Switching Platform (ESP)	The Electrical Switching Platform (ESP), if required would be located either within one of the Array Areas (alongside an Offshore Converter Platform (OCP)) or the Export Cable Platform Search Area.
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement (ES).
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach, and information to support, the Environmental Impact Assessment (EIA) and Habitats Regulations Assessment (HRA) for certain topics.
Expert Topic Group (ETG)	A forum for targeted engagement with regulators and interested stakeholders through the EPP.
Habitats Regulations Assessment (HRA)	The process that determines whether or not a plan or project many have an adverse effect on the integrity of a European Site or European Offshore Marine Site.
Impact	Used to describe a change resulting from an activity via the Projects, i.e. increased suspended sediments / increased noise.
Offshore Export Cable Corridor	This is the area which will contain the offshore export cables (and potentially the ESP) between the Offshore Converter Platforms and Transition Joint Bays at the landfall.

Term	Definition
Projects Design (or Rochdale) Envelope	A concept that ensures the EIA is based on assessing the realistic worst-case scenario where flexibility or a range of options is sought as part of the consent application.
Scoping opinion	The report adopted by the Planning Inspectorate on behalf of the Secretary of State.
Scoping report	The report that was produced in order to request a Scoping Opinion from the Secretary of State.
Sequential	Installation of monopiles or pin piles happening one after another at the DBS Projects.
The Applicants	The Applicants for the Projects are RWE Renewables UK Dogger Bank South (East) Limited and RWE Renewables UK Dogger Bank South (West) Limited. The Applicants are themselves jointly owned by the RWE Group of companies (51% stake) and Masdar (49% stake).
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South Offshore Wind Farms).

Acronyms

Term	Definition
ADD	Acoustic Deterrent Device
CEA	Cumulative Effects Assessment
Cefas	Centre for Environment, Fisheries and Aquaculture
DBS	Dogger Bank South
DCO	Development Consent Order
EDR	Effective Deterrence Range
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
EPP	Evidence Plan Process
EPS	European Protected Species
ES	Environmental Statement
ETG	Expert Topic Groups
HRA	Habitat Regulations Assessment
IAMMWG	Inter-Agency Marine Mammal Working Group
iPCoD	Interim Population Consequence of Disturbance
JNCC	Joint Nature Conservation Committee
km	Kilometres
LF	Low Frequency
ML	Marine Licence
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
MU	Management Unit
NAS	Noise Abatement Systems

Term	Definition
NMFS	National Marine and Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
O&M	Operation and Maintenance
OWF	Offshore Wind Farm
PEIR	Preliminary Environmental Information Report
PEMP	Project Environmental Management Plan
PTS	Permanent Threshold Shift
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SCANS	Small Cetaceans in the European Atlantic and North Sea
SEL	Sound Exposure Level
SEL_{cum}	Sound Exposure Level from cumulative exposure
SEL_{ss}	Sound Exposure Level from single strike
SIP	Site Integrity Plan
SNCBs	Statutory Nature Conservation Bodies
SNS	Southern North Sea
SPL	Sound Pressure Level
SPL_{peak}	peak Sound Pressure Level
TTS	Temporary Threshold Shift
UK	United Kingdom
UXO	Unexploded Ordnance
VHF	Very High Frequency

11.1 Consultation Reponses

11.1.1. Introduction

1. This appendix covers those statutory consultation responses that have been received as a response to the Scoping Report (2022), the Preliminary Environmental Information Report (PEIR) (2023) and Expect Topic Group (ETG) meetings.
2. Response from stakeholders and regard given by The Applicants have been captured in **Table 11-1-1**.
3. Consultation with regard to marine mammal ecology has been undertaken in line with the general process described in **Volume 7, Chapter 6 EIA Methodology (application ref: 7.6)**. The key elements of consultation to date have included scoping and the ongoing Evidence Plan Process (EPP) via the marine mammal ETG.
4. The first ETG meeting was held in September 2021, with attendees at some or all of the meetings including Natural England, The Wildlife Trusts and the Marine Management Organisation (MMO).
5. The feedback received has been considered in preparing the Environmental Statement (ES). **Table 11-1-1** provides a summary of how the consultation responses received to date have influenced the approach that has been taken.
6. **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** has been updated following consultation on PEIR in order to produce the final assessment that is submitted with the Development Consent Order (DCO) application. Full details of the consultation process is also presented in the Consultation Report alongside the DCO application.

Table 11-1-1 Consultation Responses Related to Volume 7, Chapter 11 Marine Mammals

Comment	Project Response
The Planning Inspectorate (PINS) Scoping Responses 02/09/2022	
Increased disturbance at seal haul out sites (all phases). This matter was proposed to be scoped out due to the distance of known haul-out sites from the Proposed Development. It is not clear if this reasoning includes landfall activities, particularly in relation to construction which the Inspectorate considers could give rise to significant effects. Paragraph 306 discusses the location of haul out sites briefly, stating that the Proposed Development is 60km from Donna Nook (grey seal), but no figures showing them in relation to the Proposed Development or detail on other sites is provided. Paragraph 322 states that this matter has been scoped out for operation but provides no reasoning for this conclusion. In the absence relevant baseline information and explanation of the anticipated extent of impacts from construction and operation activities, the Inspectorate cannot agree to scope this matter out. The Inspectorate expects the ES to provide an assessment of impacts and resulting effects on seal haul-out sites, or robust evidence to support the conclusion that significant effects are unlikely. The Applicant should make effort to agree the evidence required in the Environmental Statement (ES) with relevant consultation bodies.	Assessment of potential disturbance at seal haul-out sites is provided in section 11.6.1.9 and 11.6.2.8 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**, based on current information and worst-case scenario for port options available at this time.
Changes in water quality (all phases). The Inspectorate draws The Applicants attention to the comments above relating to remobilisation of contaminants and changes to sediment concentrations. The ES should assess the potential impacts on marine mammals or provide adequate evidence to demonstrate that significant effects are unlikely.	The potential changes to water quality are assessed in section 11.6.1.8 and 11.6.2.7 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**. This includes suspended sediments and the remobilisation of contaminants.
Barrier effects from the physical presence of the wind farm (all phases – applicable to operation only). Taking into account the information in Paragraph 323 the Inspectorate agrees that barrier effects from the physical presence of the Proposed Development are unlikely to give rise to significant effects. This matter can be scoped out of the ES subject to site-specific information on marine mammal movements and discussions with the relevant consultees.	Addition information has been provided to support scoping out of barrier effects from physical presence at PEIR. No further consultation response was received at PEIR and barrier effects from physical presence has not been considered further in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
Effects from Electromagnetic fields (EMF) (all project phases -applicable to operation only, see above). Paragraph 324 states that the potential for impacts from EMF has been scoped out, citing consistency with scoping opinions related to other wind farm projects. The evidence submitted into scoping for these previous wind farm projects is not presented in the Scoping Report. Nevertheless, the Inspectorate is aware of evidence from recent scoping exercises that the species known in the Proposed Development area are not sensitive to EMF.	Noted, and therefore EMF has not been considered further in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**. Further agreement was received to this approach in Natural England's scoping responses (02/09/2022).

Comment	Project Response
On this basis, the Inspectorate agrees to scope effects from EMFs on marine mammals. However, the Inspectorate would expect The Applicant to ensure that the need to consider EMF sensitive species is ruled out in consultation with the relevant stakeholders.	
Physical and auditory injury resulting from underwater noise during operation. No discussion of the need for unexpected/ emergency Unexploded Ordinance (UXO) clearance during operation and the potential for effects on marine mammals is provided. The Inspectorate advises that the ES should provide an assessment of the likely significant effects which could arise, including details of any mitigation or control measures proposed to manage the risks to marine mammals from unexpected UXO clearance and how these are to be secured.	A separate Marine Licence (ML) application for Unexploded Ordnance (UXO) clearance would be submitted post-consent once detailed information on the locations and extent of UXO required to be cleared is known. An initial assessment of the potential impacts from UXO clearance at the Projects has been provided as an appendix in the ES, for information purposes only in **Volume 7**, **Appendix 11-6 UXO Marine Mammal Impact Assessment (application ref: 7.11.11.6)**. The potential cumulative effects from UXO clearance from other projects, in addition to the worst case from the DBS Projects during construction has also been taken into account in section 11.8.3.2.6 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
Project-specific surveys and data analysis. The Scoping Report does not explain if the proposed surveys will cover the export cable corridor area, and what rationale has been applied to the survey area chosen. The Inspectorate advises that the ES describes how the approach to data collection has been discussed with stakeholders and to what extent survey effort and methodologies for data analysis have been discussed and agreed. The Inspectorate understands that the completion of the aerial surveys (February 2023) may coincide or immediately precede the statutory consultation on the PEIR. This is likely to be an important consideration in ensuring that information is available to all relevant stakeholders so that their views can be captured in preparation of the ES. The ES should explain how stakeholder views have informed the project-specific surveys undertaken. This comment applies to all chapters where aerial surveys are noted as being required.	An overview of the site-specific surveys is provided in section 11.4.1 and 11.5 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**, with further information in **Volume 7**, **Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2)**. The scope of the aerial surveys was discussed with consultees during the EPP which presented the Dogger Bank South (DBS) Projects Baseline including a buffer. The approach to data collection was agreed by the MMO, Natural England and The Wildlife Trusts. Densities for the export cable corridor area have been calculated from the most up to date available data where possible, or the highest density for the Array Areas have been used (see section 11.5 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**) and will be applied to the assessment where appropriate.
Baseline characterisation, and connectivity with designations. The Applicant should make effort to agree the geographical context and population context of the marine mammal assessment with relevant consultation bodies, including any assumptions made in relation to connectivity to designated sites. The Inspectorate advises that connectivity to designations including the Southern North Sea (SNS) Special Area of Conservation (SAC) is relevant to the assessment in the ES as well as the Habitat Regulation Assessment (HRA) screening process as stated in Paragraph 313.	Information on the study area for marine mammals, including relevant Management Units (MUs) is provided in section 11.5 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**, with further information in **Volume 7**, **Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2)**. This has been presented, discussed and agreed at the Marine Mammal ETG meetings by the MMO, Natural England and The Wildlife Trusts.

Comment	Project Response
Cumulative effects. The Scoping Report indicates that only displacement effects due to underwater noise, operational displacement from vessels, and impacts on prey species will be considered cumulatively but does not provide any rationale for this approach as it relates to the scope of the cumulative assessment. The Inspectorate expects The Applicant to consider cumulative effects for all the potential impacts which may combine with those from other development, and which may result in significant effects.	The approach to the Cumulative Effects Assessment is presented in section 11.8 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** and the associated screening in **Volume 7, Appendix 11-5 CEA Screening (application ref: 7.11.11.5)**.
Marine Management Organisation (MMO) Scoping Responses 02/09/2022	
It is expected that the six most commonly occurring species within the Offshore Study Area, and therefore taken forward for assessment, will be the harbour porpoise, white-beaked dolphin; bottlenose dolphin; minke whale; grey seal; and harbour seal.	A desk-based review of marine mammals presence in the marine mammal study area has been conducted in section 11.5 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**, with further information in **Volume 7**, **Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2).**
The MMO expect any underwater UXO surveys to be completed before a marine licence application for the UXO disposal campaign is submitted.	A separate marine licence application for UXO clearance would be submitted post-consent once detailed information on the locations and extent of UXO required to be cleared is known.
The MMO expects the following impacts to be scoped into the (Environmental Impact Assessment) EIA: Auditory injury resulting from piling and UXO clearance (during construction) and Behavioural and disturbance impacts resulting from noise including vessels (during construction and operation)	Noted. In **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**, assessments have been undertaken for: • Piling of foundations for turbines and substations; • Other construction activities and maintenance activities, including seabed preparation (dredging), cable laying, trenching and rock placement; • Vessel disturbance; and • Operational turbine noise. The potential effects of underwater noise on marine mammals is assessed for noise sources and vessels during construction (section 11.6.1 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**) and operation and maintenance (section 11.6.2 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**). An indicative assessment of potential impacts for UXO clearance has been undertaken in **Volume 7**, **Appendix 11-6 UXO Marine Mammal Impact Assessment (application ref: 7.11.11.2)**. Potential UXO clearance from other developments has been considered in the CEA section 1.8 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.

Comment	Project Response
The MMO recommends that the risk of auditory injury (i.e. Permanent (PTS) and Temporary Threshold Shift (TTS) is also considered, using appropriate noise exposure criteria where relevant.	The potential effects of underwater noise on marine mammals is assessed in section 11.6 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** based on the latest guidance, research, and criteria from Southall *et al.* (2019) and National Oceanic and Atmospheric Administration (NOAA) (National Marine and Fisheries Service (NMFS), 2018).
The CEA will consider displacement due to cumulative underwater noise and impacts on prey species. The assessment will also consider displacement due to the presence of offshore vessels and maintenance activities during the operational phase. The MMO expects the potential for auditory injury to also be considered.	The CEA of underwater noise includes the assessment for the potential for auditory damage as well as disturbance in section 11.8.3.1 and 11.8.32 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
Natural England Scoping Responses 02/09/2022	
Natural England's comments provided in Annex C still stand.	Noted
Natural England are in agreement with the information presented here to characterise the existing environment but would expect a more thorough and complete assessment in the PEIR/ES.	A desk-based review of marine mammal presence in the marine mammal study area has been conducted in section 11.5 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**, with further information in **Volume 7**, **Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2).**
Natural England is broadly in agreement with the potential impacts identified and is in agreement that EMF can be scoped out for marine mammals. However, barrier effects from physical presence should be considered further in the context of what is known about animal movements and activities in and around the Array Areas, such as telemetry data that may show seals transit through the area when foraging, before it is scoped in or out.	Addition information has been provided to support scoping out of barrier effects from physical presence at PEIR. No further consultation response was received at PEIR and barrier effects from physical presence has not been considered further in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
Natural England are in agreement with the proposed approach to assessment presented here but would expect a more thorough approach to assessment to be outlined within the PEIR/ES.	The full approach to assessment has been provided in section 11.4 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** and **Volume 7**, **Chapter 6 EIA Methodology (application ref: 7.6).**
Marine Mammal Ecology ETG Responses – Pre-Scoping 17/09/2021	
Natural England is keen to ensure that UXO impacts are included in the ES but agrees with the approach that a separate ML would be applied for to cover the UXO clearance activities, post-consent.	An indicative assessment of potential impacts for UXO clearance has been provided in **Volume 7**, **Appendix 11-6 UXO Marine Mammals Impact Assessment (application ref: 7.11.11.6)**. Potential UXO clearance from other developments has been considered in the CEA in section 11.8.3.2 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
Marine Mammal ETG Responses – Pre-PEIR 20/02/2023	
The current best practice advice guidance states that the Wadden Sea MU shouldn't be used unless the population is included for seal density estimates.	Noted – population estimates for seals are based on the relevant UK MUs with connectivity further information is in **Volume 7**, **Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2)**.

Comment	Project Response
Natural England will confirm if the proposed approach of using the Greater North Sea MU in relation to bottlenose dolphin density estimates for the Preliminary Environmental Information Report (PEIR) is acceptable.	In response to Natural England's comments to the HRA Screening report the Moray Firth SAC has been assessed based on the Coastal East Scotland (CES) MU which has been used for population estimates. The use of the CES MU for the impact assessment has been considered in **Volume 7**, **Chapter 11 Marine Mammals (application ref: 7.11)** for potential impacts in the coastal region such as works in the Offshore Export Cable Corridor after Natural England's review of the current approach.
PEIR Consultation, Lincolnshire Wildlife Trust 15/07/2023	
Lincolnshire Wildlife Trust (LWT) appreciates the worst-case scenario parameters, which includes noise impacts and thresholds, that is provided for marine mammals. However, LWT was disappointed not to find noise propagation modelling in Chapter 11: Marine Mammals nor Chapter 25: Noise. We believe that this evaluation could be greatly improved by modelling species distributions based on current data in conjunction with noise propagation models based on the location and time of year of the construction phase. This type of investigation might be used to quantify potential risk to sensitive species based on the anticipated timing of construction and predicted habitat use, and therefore would be a valuable tool for avoiding/mitigating impacts (e.g., timing construction based on anticipated risk and interaction with sensitive species). This sort of exercise may also be applied for other important impacts, such as sediment redeposition and demersal spawning periods.	The underwater noise modelling has been updated for the ES and is presented in **Volume 7**, **Appendix 11-3 Underwater Noise Modelling Report (application ref: 7.11.11.3)** with assessments included in section 11.6 and 11.7 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**. The assessment in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** has included the application of population modelling (where appropriate) and Dose Response Curves for respective species.
LWT also highlight that there is significant potential for construction timelines to overlap with other noisy activities in the region, and therefore there is significant potential to exceed the area-based noise thresholds for the SNS SAC. These thresholds have already been close to being exceeded due to current, and much lower, levels of activity. We urge that collaboration between regulators and other developers (including those from other industries) will be paramount to ensuring that these thresholds are not exceeded, and no adverse impact on the harbour porpoise population of the SNS SAC occurs. Therefore, due to their likely requirement, the use of mitigation and noise abatement technologies should be explored as soon as possible.	A CEA has been carried out in section 11.8 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** and has included the latest information available for construction timelines to overlap with other noisy activities in the region. In relation to the SNS SAC the potential cumulative effects will be assessed in the **Volume 6, Report to Inform Appropriate Assessment (RIAA) (application ref: 6.1)**. As outlined in section 11.7 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**, a SNS SAC Site Integrity Plan (SIP) would be prepared which will set out the approach to deliver any project mitigation, such as the requirement for any noise abatement technologies, or management measures to reduce the potential for any significant disturbance of harbour porpoise in relation to the SNS SAC conservation objectives. The SIP would be an adaptive management tool, which can be used to ensure that the most adequate, effective and appropriate measures, if required, are put in place to reduce the significant disturbance of harbour porpoise in the SNS SAC. The **Volume 8**, **In Principle SIP (application ref: 8.26)** has been developed with the DCO application and is based upon the best available information and methodologies at the time of writing. Consultation will be undertaken during development of the **Volume 8**, **In Principle SIP (application ref: 8.26)** with relevant stakeholders, including regulators and other developers and would be finalised prior to construction.

Comment	Project Response
PEIR Consultation, Orsted Hornsea Project Four Limited 15/07/2023	
Orsted Hornsea Project Four Limited commented that the background noise levels taken from the Hornsea Zone during 2020 would have been when construction activities were occurring in general. Therefore, this is not a non-construction baseline.	Noted. The background noise levels mentioned were sufficiently far from any construction activities that there was a negligible influence on the ambient noise at the monitoring location. These do not have any bearing on the assessment or its conclusions.
In particular Orsted will want to be consulted on the Marine Mammal Mitigation Protocol (MMMP) for piling and UXO and the respective SIPs.	Orsted have been provided with a copy of the respective **Volume 8**, **In Principle SIP (application ref: 8.26)** and the **Volume 8, Outline MMMP (application ref: 8.25)** for piling and UXO in advance of formal submission.
PEIR Consultation, MMO 15/07/2023	
MMO state that all relevant / applicable marine mammal functional hearing groups have been considered in the underwater noise modelling assessment. Furthermore, all fish groups have been considered as per Popper *et al.* (2014). The marine mammal species scoped into the PEIR assessment, which sit within these four hearing groups, are harbour porpoise, white-beaked dolphin, bottlenose dolphin, common dolphin, minke whale, grey seal and harbour seal. The MMO defers to Natural England to ensure that all relevant marine mammal species have been scoped in.	Acknowledged.
The MMO believes that all relevant impacts have been scoped in for assessment. Specifically, the potential effects of auditory injury (PTS and TTS) and disturbance resulting from the following activities, have been considered: • Piling, • Other construction activities including seabed preparations, rock placements and cable installation, • Construction vessels, • Noise from operational wind turbines and operation and maintenance (O&M) activities and vessels.	Acknowledged.
MMO comment that a MMMP for piling will be developed in the pre-construction period and based upon best available information, methodologies, industry best practice, latest scientific understanding, current guidance and detailed project design. The MMMP for piling will be developed in consultation with the relevant Statutory Nature Conservation Bodies (SNCBs) and the MMO, detailing the proposed mitigation to reduce the risk of any physical or PTS to marine mammals during all piling operations.	Acknowledged.
This will include details of the embedded mitigation, for the soft-start and ramp-up, as well as details of the proposed mitigation zone and any additional mitigation measures required in order to minimise potential impacts of any physical or PTS. A Draft MMMP will be submitted with the DCO application and the MMO welcomes early engagement of this document.	Acknowledged.

Comment	Project Response
The MMO notes Paragraph 239 states that 'the use of noise abatement technology will also be considered if required when taking into account wider cumulative effects in the wider North Sea area'.	Acknowledged.
The PTS and TTS predictions for a 7,000 kilojoule (kJ) hammer energy indicate that the standard mitigation measures which are typically employed for offshore wind farm developments (such as a monitoring zone, soft-start piling and Acoustic Deterrent devices (ADDs)) will not suffice. Given the availability of effective alternatives to unmitigated piling – i.e. measures to reduce noise at source, also known as noise abatement – it will be difficult for unmitigated pile driving to be justified on the basis that there are no realistic alternatives. It is therefore clear that noise abatement measures will be required for this development, in order to reduce the risk of potential impact on marine receptors.	Acknowledged. Changes in the Projects' Design Envelope have reduced the maximum hammer energy from 7000KJ to 6000KJ. Revised underwater noise modelling has been undertaken and is available in **Volume 7**, **Appendix 11-3 Underwater Noise Modelling Report (application ref: 7.11.11.3)** and included in the assessment in section 11.6 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**. In the **Volume 8, Outline MMMP (application ref: 8.25) all** suitable mitigation options have been considered, including the use of noise abatement measures.
The MMO would highlight that given the wider context of the current ramp up of offshore wind development at unprecedented scale in the North Sea it is vital that these discussions begin as soon as possible. To ensure adequate preparations are made and potential delays avoided, it is therefore in The Applicant's interest to plan for noise abatement measures at the earliest opportunity and to incorporate such measures into any future MMMP.	Acknowledged.
In addition to this the MMO supports the development of a document or similar to manage noise within the North Sea. For the SNS SAC, this could be in the form of a SIP for piling and UXO clearance. The document will set out the approach to deliver any project mitigation or management measures to reduce the potential for any significant disturbance from noise and specifically disturbance to harbour porpoise in relation to the SNS SAC conservation objectives. The MMO highlights there is a number of industry wide discussions in relation to noise management and any changes to the approach to noise management will be discussed with The Applicant to be taken into account within their application.	As outlined in section 11.7 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**, **Volume 8, In Principle SIP (application ref: 8.26)** has been prepared. Consultation has been undertaken and will continue during development of the final SIP with relevant stakeholders, including regulators and other developers. The Applicants welcome discussions with the MMO on the industry wide discussions in relation to noise management and any changes to the approach to noise management that would need to be taken into account with development of the final SIP and MMMP as required.
MMO ask for a review the reference to 1.53km for harbour porpoise in Paragraph 183. Table 11-20 suggests a maximum PTS range of 770m this will need to be updated in the ES.	Noted. This has been amended with new underwater noise modelling within the new PDE parameters, therefore updated estimated impact ranges **Table 11-21** section 11.6.1.1.2.1.1 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
In relation to Section 11.6.1.2.2.1 - The MMO appreciates that disturbance is difficult to assess, however, the MMO does not agree with using TTS thresholds as a proxy to assess the potential for disturbance, as this can underestimate the potential risk. In this instance, significant TTS ranges (particularly for minke whale) have been predicted for the 7,000kJ hammer.	Noted. The best approach for assessing disturbance (particularly minke whale) was discussed in the ETG with stakeholders in September 2023. As TTS was not accepted as a proxy for minke whale by the MMO, but was accepted by Natural England, another approach was to use the 30km disturbance range from Richardson *et al.* (1999)[1] presented in **Table 11-40**, section 11.6.1.2.2.13 **Volume 7, Chapter 11 Marine Mammals (application ref:**

[1] Richardson, W. J., Miller, G. W., & Greene, C. R., Jr. (1999). Displacement of migrating bowhead whales by sounds from seismic surveys in shallow waters of the Beaufort Sea. Journal of the Acoustical Society of America, 106, 2281.

Comment	Project Response
	7.11). The final approach to the assessment for disturbance was presented at the ETG held in January 2024 and no further comments on this topic have been received.
MMO state that Paragraph 368 states: *"It is important to note that PTS is unlikely to occur in marine mammals, as the modelling indicates that the marine mammal would have to remain less than 100m for 24 hours for any potential risk of PTS (Appendix 11-2). Therefore, PTS as a result of construction activity, other than piling, is highly unlikely and has not been assessed further"* This statement/conclusion is incorrect. The modelling is based on a fleeing receptor, and, therefore, the receptor is simply at risk if they are within 100 m of the source when they start to move away (fleeing is about the receptor starting position). Please correct this within the ES.	This has been amended in section 11.6.1.32 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** modelling indicates that the marine mammal would have to be within 100m of the activity at its onset to be at potential risk of PTS.
The MMO notes that there is quite a large variability in the predictions, based on the maximum, mean and minimum values presented in the results tables. With the assumed Source Levels (noting these are not particularly large, considering a hammer energy of 7,000kJ, and a 17m diameter monopile), the predictions look plausible / reasonable. For these kind of predictions (e.g., a PTS range of 20km, and a TTS range of 82km etc.) much depends on the Received Levels far beyond 750m. Therefore, monitoring at large ranges during the construction phase would be required to validate these predictions, otherwise it is rather speculative, and small changes in propagation assumptions can have large effects on these long-range predictions. This should be reflected within the ES.	Acknowledged, monitoring at large ranges during the construction phase would be required to validate any predictions from the underwater noise modelling in **Volume 7**, **Appendix 11-3 Underwater Noise Modelling Report (application ref: 7.11.11.3)**. The monopile sizes have reduced since the PEIR, from 17m to 15m and consider a reduced hammer energy of 6,000kJ. The proposed approach would be agreed and outlined, where relevant, in **Volume 8, Outline MMMP (application ref: 8.25)** and **Volume 8, Offshore In Principle Monitoring Plan (application ref: 8.23)**.
MMO make a reference to Table 5-2 in Section 5.1, while the single strike sound exposure levels (SEL_{ss}) at 750m seem reasonable, the corresponding peak sound pressure levels (SPL_{peak}) at 750m seem low (by 10-15dB), in the context of Lippert *et al.* (2015). For example, using the Lippert formula, 180 SELss translates to 180*1.4-40 = 212dB SPL_{peak}, while the assessment predicts less than 200dB. This should be reviewed and updated within the ES.	The method used for the underwater noise modelling has been described in **Volume 7**, **Appendix 11-3 Underwater Noise Modelling Report (application ref: 7.11.11.3)**. The most recent measured data from piling in the North Sea (2023, for pin piles ~2.4m diameter, max energy ~1900 kJ, OWF name redacted) showed a difference between the max SPL_{peak} and SEL_{ss} of ~21dB at 750m. The difference between the SPL_{peak} and SEL_{ss} prediction used in the underwater noise modelling for the Projects was ~19dB. The prediction presented in Lippert *et al.* 2015 of 32 dB have been deemed potentially excessive and therefore has not been used within the ES.
The MMO agrees with the report that at the time of writing, Southall *et al.* (2019) and Popper *et al.* (2014) represent the most up-to-date and authoritative criteria for marine mammals and fish respectively.	Acknowledged.
The MMO notes that Figure 4-1 shows a comparison between example measured impact piling data and modelled data using INSPIRE version 5.2. Firstly, the pile sizes used in this comparison are much smaller than the proposed 11 or 17 m diameter for the Projects (i.e., 6.0m, 1.8m, and 5.3m pile).	This is correct and has been noted by the MMO previously on other projects. The only possible direct validation for modelled data is against measurements of circumstances that have already occurred, and there are no available noise data for driving piles 11-15m in diameter, for which predictions must be based on extrapolation.
The MMO notes that providing the hammer energies as well as pile diameter would be helpful to present as it is very unlikely that the hammer energies will be close to the proposed 7,000kJ hammer energy for the Projects. In addition, further evidence is required in terms of the single strike sound exposure level (SEL_{ss}) and not just the SPL_{peak}. The MMO recommends these points should be addressed in the ES.	Acknowledged. Changes in the Projects' Design Envelope have reduced the maximum hammer energy from 7,000kJ to 6,000kJ. Revised underwater noise modelling has been undertaken and is available in **Volume 7**, **Appendix 11-3 Underwater Noise Modelling Report (application ref: 7.11.11.3)** and included in the assessment in section 11.6 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.

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The MMO notes Section 4.1 states: *'The current version of INSPIRE (version 5.2) is the product of re-analysing all the impact piling noise measurements in Subacoustech Environmental's measurement database and cross-referencing it with blow energy data from piling logs…. the current version of INSPIRE attempts to calculate closer to the average fit of the measured noise levels at all ranges'.* The MMO welcomes this clarification, and acknowledges the drive for reducing unnecessary conservatism in modelling. Allegedly, the current version of INSPIRE should produce more realistic predictions.	Acknowledged.
The MMO note that the predicted ranges are similar to those predicted for a single monopile, although an increase in the predicted ranges can be seen in some cases. The time it takes to install one monopile is 5 hours 20 minutes. Therefore, by the time the subsequent pile is installed, the fleeing receptor is at such a distance that the additional exposure is minimum (assuming the animal continues to flee throughout the piling period). However, when considering a stationary animal (as in the case of fish), the ranges are increased because the receptor is receiving noise from double the number of strikes.	Acknowledged.
The MMO note that the predicted ranges for a single pin pile are smaller than those predicted for the monopile foundations, which is expected.	Acknowledged.
The MMO note for consecutive pin piles (4 piles in a 24-hour period). as with the monopile scenario, there is a slight increase in some of the predicted ranges for marine mammals. However, when considering a stationary animal (as in the case of fish), the ranges are significantly increased.	Acknowledged.
The assessment considers the cumulative exposure of simultaneous monopiles and jacket pin piles at the DBS East and DBS West and centre modelling locations. These locations were chosen as the have the potential for the largest 'spread' in terms of underwater noise propagation (as they are the two furthest apart locations). The modelling includes two monopiles being installed sequentially at DBS East and DBS West at each location and a single monopile at the centre location at the same time, and four jacket pin piles being installed sequentially at each of the three locations at the same time. The MMO recommend that the ES should contain detailed information on how this simultaneous piling assessment has been carried out, including fleeing animal assumptions.	Acknowledged. The underwater noise modelling assessment for calculation of noise exposure from multiple piling sources active simultaneously is undertaken by first generating a sound field surrounding the sources, combining noise radiating from each piling location. The animal noise exposure is calculated assuming the animal begins at each one of the piling locations in sequence. The radius of impact (whether for stationary or fleeing) is then calculated, in the same way as for single pile locations, but of course with a greater overall spread of noise, both spatially and, potentially, temporally. This process is repeated at the starting position of each noise source, representing all of the potentially worst case locations. This results in an output for each of the piling locations. For each assessment metric (e.g. LF cetacean SEL_{cum} PTS), these results are overlaid and a combined contour drawn around the perimeter to calculate the total maximum cumulative impact area.
This formula represents a statistical model that was used to assess the correlation between SPL and various parameters (distance, wind speed, turbine size) for the data in the Tougaard study. However, the MMO considers is that this is not suitable for estimation of the sound levels at 1m in a bespoke model, or as substitute for modelling the propagation loss to the far field. In particular, in terms of estimating propagation, the use of the formula would imply a loss of 23.7	Acknowledged. The concern here for operational underwater turbine noise is acknowledged and the potential weakness in estimation of the noise level at 1m and in the far field may well be reasonable. It is however important to note that the noise level at 1m and in the far field are not important in and of themselves: the noise level at 1m is only used as a means to calculate ranges of impact at a greater distance, and since the operational noise levels are relatively low, this never reaches distances that could be considered 'far-field'.

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log R, which is unrealistically large, and thus will lead to underestimation of the levels in the far field.	
The maximum equivalent charge weight for the potential UXO devices that could be present within the DBS site boundary has been estimated as 698kg + 0.5kg donor (which equates to 698.5kg). This has been modelled alongside a range of smaller devices. In addition, low-order clearance / deflagration has been assessed, intended to result in a 'low burn' of the explosive material in UXO, which destroys, but does not detonate, the internal explosive. A charge weight of 250g has been assumed for this assessment. 13.24. The MMO notes that this is a change from recent (previous) noise assessments where a charge weight of 0.5g for low-order clearance was assumed (rather than 0.25kg).	This has been reviewed and a net weight of 0.25g for low order clearance has been used to assess for any potential impacts to marine mammals along with a 698g + donor charger for high order as a worst case alongside the EDR approach for disturbance, which is presented in in **Volume 7**, **Appendix 11-6 UXO Marine Mammal Impact Assessment (application ref: 7.11.11.2)**. For calculation of the scenario using deflagration, it is anticipated that the initial shaped charge is the greatest source of noise (Cheong *et al.* 2020[2]). A prediction of this impact is based on a charge weight of 250g. The worst case scenario would of course be a high order detonation with maximum pressures from complete detonation of the UXO, and this has also been used in the calculation of impact for comparison. Further information has been provided in **Volume 7**, **Appendix 11-3 Underwater Noise Modelling Report (application ref: 7.11.11.3)**.
The MMO note low-yield clearance is also considered. Section 6.3.1.3 explains that the low-yield clearance is associated with the HYDRA UXO clearance system developed by EORCA UK. As with the low order deflagration technique, this involves the use of a small charge to initiate destruction of the UXO, avoiding a much louder detonation of the main explosive. Unlike deflagration, the HYDRA uses shaped charges to produce high pressure water jets that disintegrate the explosive material. The donor charge is predicted to be 750g.	Acknowledged.
To estimate the potential impact from UXO detonation, an attenuation correction has been added to the Soloway and Dahl (2014) equations for the absorption over long ranges (i.e., of the order of thousands of metres), based on measurements of high intensity noise propagation taken in the North Sea and Irish Sea. The maximum PTS range calculated (based on the worst-case UXO) is 13km for VHF cetaceans (SPL_{peak} criteria) (with a TTS range of 25km). For fish, the maximum range is 890m. The MMO has conducted a spot check of the worst-case predictions which look reasonable (a PTS prediction of ~14km for VHF cetaceans assuming the methodology from Soloway and Dahl and no attenuation correction).	Acknowledged.
Appendix 11.3 provides a helpful high-level summary of the underwater noise modelling (full details are in Appendix 11.2). An assessment of potential effects (and magnitude) has also been undertaken in this appendix, based on density estimates and reference populations, and the MMO defers to Natural England for comments on the suitability of the data presented for marine mammals.	Acknowledged. This document has been removed from the Appendices and the assessments in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** have been updated accordingly.

[2] Cheong S-H, Wang L., Lepper P, Robinson S (2020). Characterization of Acoustic Fields Generated by UXO Removal, Phase 2. NPL Report AC 19, National Physical Laboratory.

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The MMO notes for Table 11.14 - The magnitude of effect for TTS from the cumulative exposure of one monopile in a 24-hour period, has been assessed as Negligible or Low for all marine mammal species. As an example, for harbour porpoise, an estimated 0.974% of the North Sea MU reference population (based on the SCANS-III density estimate) is at risk. However, this equates to 3,374 individual harbour porpoises at risk, so the numbers are far from insignificant. It is vital that appropriate mitigation is put in place to reduce the risk of potential impact on sensitive marine receptors, especially considering the anticipated ramp up of offshore wind development across UK waters.	Acknowledged. **Volume 8, Outline MMMP (application ref: 8.25)** and **Volume 8, In Principle SIP (application ref: 8.26)** outline the proposed mitigation to reduce the risk of significant impacts to marine mammals and potential management measures.
The MMO note for Table 11-32 – There appears to be a minor discrepancy for White beaked dolphin in this table (12.57km²). Please review the table and ensure this reflects information throughout the document for the ES.	All impact ranges and impact assessments have been updated in the section 11.6 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** due to the changes in the PDE and the updates in the underwater noise modelling results.
The MMO note Paragraph 77 and 78 – There appears to be a discrepancy between this document and Appendix 11.2. Paragraph 77, for example, states that 'for the cumulative exposure ranges for these noise sources it has been assumed that the noise will be present for 12 hours within a 24 hour period'. However, Appendix 11.2 states that 'for SEL_{cum} calculations in this section, the duration the noise is present also needs to be considered, with all sources assumed to operate constantly for 24 hours to give a worst-case assessment of the noise'. This should be clarified in the ES.	This has been amended with the new underwater noise modelling results in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** and **Volume 7**, **Appendix 11-3 Underwater Noise Modelling Report (application ref: 7.11.11.3)**.
The MMO ask for an explanation on how the impact area of 3.32km² and 0.12km² was derived in Table 11-24.	The potential impact area for TTS from other construction activities when assessing all activities together, is based on the assumption all four activities occur at the same time and the impact area from each individual activity has been summed to provide the potential overall impact area.
The MMO ask for an explanation to be provided on how the impact areas were derived in km²? For example: Table 11-6, 11-7, 11-10, 11-11, 11-15, 11-19, 11-20.	The impact areas presented in the mentioned tables where derived from the underwater noise modelling for the relevant scenario.
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Natural England note that only 1 year of baseline characterisation surveys have been presented at this PEIR stage. Therefore, Natural England cannot agree with the density estimates derived from the digital aerial surveys presented at this stage. This also applies to total survey area, confidence scores and environmental conditions. Present 2 years of baseline characterisation surveys in order to update density and abundance estimates in the submitted ES.	Acknowledged. Two years of baseline characterisation surveys have been used to update density and abundance estimates in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**, further information is available in **Volume 7, Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2).**
When assessing the potential impacts during construction, the information presented by The Applicant indicates that the full injury ranges are not suitable to be mitigated by ADDs. As a result, there will be a residual impact i.e., an area where permanent loss of hearing sensitivity (PTS) can occur, beyond the area that is mitigated. Natural England has not yet had sight of the draft MMMP. Therefore, Natural England cannot agree at this stage that the measures in the MMMP will be sufficient to significantly reduce any potential for PTS injury.	The mitigation measures in **Volume 8, Outline MMMP (application ref: 8.25)** and **Volume 8, In Principle SIP (application ref: 8.26)** have been and will be further discussed and agreed with Natural England during development of these documents and prior to submission of the final versions. The proposed mitigation will reduce the risk of PTS in marine mammals for the full injury zone, this will include, if required, the options for using noise abatement measures.

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Should a residual injury risk remain, Natural England will recommend that a European Protected Species (EPS) licence to injure is sought. However, such a licence can only be granted if the authority is satisfied that there is no satisfactory alternative (the second test). This includes alternatives to minimise the risk of injury, such as mitigation like noise abatement systems. Provide the information needed to demonstrate that the full injury zone will be mitigated in the submitted ES. This information should demonstrate that The Applicant has considered all mitigation options to minimise the risk of injury. We advise that The Applicant engages with Natural England on the draft MMMP and SIP during the Evidence Plan Process.	It is proposed that a Marine Wildlife Licence application will be submitted, with adequate mitigation for injury.
For the concurrent piling scenarios modelling has been carried out for simultaneous piling at the Dogger Bank South (DBS) East: south location, DBS West: west location, and DBS East/West: central location, representing a worst case spread of locations. However, larger impact ranges have been modelled at the DBS East/West northern corner location compared to the DBS East/West central location. Natural England advise that The Applicant should consider whether the worst-case scenario has indeed been assessed and presented when considering concurrent piling operations, and if it has not, update the assessment accordingly.	With the change in Projects' Design Envelope, therefore an update in the underwater noise modelling (**Volume 7, Appendix 11-3 Underwater Noise Modelling Report (application ref: 7.11.11.3)**), the worst case locations have been used for the concurrent impact assessments. The greatest spread at the most easterly and westerly locations, in the deepest waters, leads to a greater total area than if one of these locations was much closer to a central point, even if the central location had a slightly greater area by itself.
Counts of unidentified species were not included in the density and abundance calculations for harbour porpoise, common dolphin, minke whale and grey seal but have been included for bottlenose dolphin, white beaked dolphin and harbour seal. There needs to be consistency on how unidentified species are attributed/apportioned and densities are calculated. Furthermore, there needs to be clarification and clear rationale on which unidentified species groups have been assigned, for example unidentified dolphins have been assigned to bottlenose dolphins, but unidentified dolphin / porpoise has not. When analysing the full survey data, The Applicant should clearly present the results and justification on how unidentified species have been apportioned. The approach to apportioning species should be undertaken in discussion with Natural England and in view of the best practice guidance (Parker *et al.* 2022a).	All counts of unidentified species were included in raw counts in **Volume 7**, **Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2)** section 11.4 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**. However, the recordings from the survey that were not attributed to a species, for example unidentified dolphin and porpoise, were not apportioned in the survey data analysis. Therefore, they were not included in the final density estimates.
There is a lack of clarity on whether predicted vessel movement is per year or the total number across the five-year period. (Section 11.6.1.6) Natural England notes that in the project description, the locations for the construction (and O&M) ports have not been confirmed. Provide clarification on the worst-case scenario for vessel movements and therefore collision risk. Natural England advises that the potential port options (or locations if known) are presented at the ES stage. Owing to the potential notable increase in vessel traffic, the impact on seal haul-out sites should be assessed once port options are known.	The number of vessel round trips have been clarified in, section 11.6.1.6.1 and in section 11.6.1.6.2 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** for construction. For operation and maintenance (O&M) this has been clarified in section 11.6.2.5.1 and section 11.6.2.5.2 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**. A list of potential ports has been provided in the section 11.6.1.4.3.1 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.

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	The assessment for potential disturbance to seal haul out sites is provided in section 11.6.1.9 and 11.6.2.8 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
Regarding the HRA and the potential increase in vessel traffic during these projects, Natural England does not agree to screening out of disturbance to seal haul-out sites until likely construction ports are identified and potential disturbance can be assessed. Screen in disturbance to seal haul-out sites until construction ports are confirmed and potential disturbance can be assessed.	Acknowledged. This has been reviewed and updated in **Volume 6, RIAA (application ref: 6.1)** to include potential impact on seal haul-out sites, taking in to account potential port locations known at this stage. Results from the assessments in **Volume 6, RIAA (application ref: 6.1)** show no adverse effect on site integrity when assessing for the potential distance to seal haul-out sites.
Natural England advise that a draft SIP should be submitted at the time of the DCO application.	**Volume 8, In Principal SIP (application ref: 8.26)** is submitted with the DCO application. The final version of the SIP will be developed with the final project design and submitted in the agreed time frame prior to construction.
Chapter 11, section 11.6.1.9.1, Natural England notes that the locations for the construction (and O&M) ports have not been confirmed. Natural England advises that the potential port options (or locations if known) are presented at the ES stage. Owing to the potential notable increase in vessel traffic, the impact on seal haul-out sites should be assessed once port options are known. At the ES stage, present potential port options (or exact locations if known) and review disturbance to seal haul-out sites.	A list of potential ports has been provided in section 11.6.1.4.3.1 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**. The assessment for potential disturbance to seal haul out sites is provided in section 11.6.1.9 and 11.6.2.8 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11).**
Noise modelling Report (Appendix 11.2) 5.4 For the concurrent piling scenarios modelling has been carried out for simultaneous piling at the DBS East: south location, DBS West: west location, and DBS East/West: central location, representing a worst case spread of locations. Natural England understand these locations have been used to show 'geographic spread' but larger impact ranges have been modelled at the DBS East/West north corner location compared to the DBS East/West: Central location. The Applicant should consider whether the worst-case scenario has indeed been assessed and if not, update the assessment accordingly. Natural England advise that the worst-case scenario should be presented and assessed when considering concurrent piling operations.	Acknowledged. The worst case for the combined area has been modelled in **Volume 7**, **Appendix 11-3 Underwater Noise Modelling Report (application ref: 7.11.11.3)**. The greatest spread at the most easterly and westerly locations, in the deepest waters, leads to a greater total area than if one of these locations was much closer to a central point, even if the central location had a slightly greater area by itself.
In Appendix 11.1, Natural England note only 1 year of baseline characterisation surveys has been presented at this PEIR stage. Therefore, Natural England cannot agree with the density estimates derived from the digital aerial surveys presented at this stage. Therefore Natural England recommended 2 years of baseline characterisation surveys to be submitted in the ES and update density and abundance estimates accordingly.	Two years of baseline characterisation surveys have been used to update density and abundance estimates in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** and **Volume 7**, **Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2)**.
In Appendix 11.1, section 11.5.1; Natural England note to update baseline site survey information to include total survey area. Present the total survey area in the submitted ES Appendix.	This has been included in **Volume 7**, **Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2)**, section 11.5.1 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.

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In Appendix 11.1, section 11.5.1; Natural England note that it would be advantageous to know the confidence score (number of definite, probable etc) for species identification and examples of each. Present the confidence scores for the surveys in the submitted ES Appendix.	All marine mammals attributed to a species are done so with high confidence and if there was any level of uncertainty the sighting would be classified in the relevant unidentified grouping. Therefore, confidence scores have not been included within the ES Appendices.
In Appendix 11.1, section 11.5.1; Natural England note it would be advantageous to know the environmental conditions (sea state, turbidity etc) for the surveys as these can impact the likelihood of seeing marine mammals. Present the environmental conditions for each survey in the submitted ES Appendix.	The environmental conditions during digital aerial surveys have been presented in **Volume 7, Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2)** section 11.4.
Natural England note in Appendix 11.1; Paragraphs 50, 73, 98, 118, 137, 153, 218, table 11-8/ Counts of unidentified species were not included in the density and abundance calculations for harbour porpoise, common dolphin, minke whale and grey seal but have been included for bottlenose dolphin, white beaked dolphin and harbour seal. There needs to be consistency on how unidentified species are attributed/apportioned and densities are calculated. Furthermore, there needs to be clarification and clear rationale on which unidentified species groups have been apportioned, for example unidentified dolphins have been apportioned to bottlenose dolphins, but unidentified dolphin / porpoise has not. When analysing the full survey data, The Applicant should clearly present the results and justification on how unidentified species have been apportioned. The approach to apportioning species should be undertaken in discussion with Natural England and in view of Phase I of the Natural England best practice advice.	The recordings from the digital aerial survey attributed to unidentified species was not apportioned in the survey data analysis. For example, the number of individuals recorded as 'Dolphin / porpoise species' equates to less than 10% of the number of harbour porpoise recorded, across either site. Due to the low number of unidentified dolphin and porpoise recorded, there would not be a significant difference to the individual densities if they were apportioned in the calculations, therefore the unidentified species were presented in the results but not used for any of the species density estimates. Justification on the approach has been presented in **Volume 7**, **Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2)**; section 11.5.
In Appendix 11.1, paragraphs 52 and 53; As noted by The Applicant, a correction factor, to account for animals beyond depth of visibility, should be applied. Natural England anticipate that this will be applied once the full survey data is analysed and will review it at that stage. Note that information on the correction factors should be clearly presented and justified. Present correction factor with justification alongside full survey data, referring to Phase I of the best practice advice guidance as required.	Correction factors have been applied to account for diving species which is presented in section 11.5 of **Volume 7**, **Appendix 11-2 (application ref: 7.11.11.2)**.
In Appendix 11.1 Natural England suggest adding marine mammal survey data to the Marine Data Exchange (MDE) and to the Joint Cetacean Data Programme (JCDP).	Acknowledged. The Applicants are submitting the aerial survey data to the MDE and would consider making survey data public accessible on the JCDP.
Natural England note in paragraph 181; The text says "…and medium for minke whale and harbour porpoise due to four sequential monopiles and jacket pin piles (Table 11-23)." However, this is inconsistent with Table 11-23 which refers to two sequential monopiles and four jacket pin piles. Revise text in the submitted ES.	All of the assessments and tables have been updated in response to the changes in the Projects' Design Envelope and updated results from the underwater noise modelling in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**, section 11.6.
Natural England query some of the density estimates proposed to be used by The Applicant in the impact assessment. Specifically: The Applicant has not used the worst-case density estimate for grey seals (Appendix 11.3, table 11-5); The Applicant has used Waggitt et al. (2019) to determine absolute density of several cetacean species. However, Waggitt et al. (2019) do not advise that their maps are used in this way: "Because of these caveats, outputs should not be used as a representation of absolute densities	The density estimates have all been updated with the second-year results from the baseline survey, the cetacean density estimate have been reviewed in line with the updated with SCAN-IV survey and the worst case presented for assessments. Additionally, density estimates for each cetacean has been derived from using the Waggitt *et al* (2019) density maps over the area of the SCANS survey block to allow for a more direct

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and fine-scale distributions at the present time. Instead, it is recommended that outputs be used as a general illustration of relative densities and broad-scale distribution over several decades". Natural England request further justification on why the densities for the impact assessment have been chosen. This should be presented for the final densities selected for the ES impact assessment, which in turn should be selected after the full 2 years of site-specific data have been analysed. Provide clear justification for why densities have been selected for impact assessment and/or use worst case estimate in the submitted ES.	and less fine scale comparison. This is presented in **Volume 7, Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2)**; section 11.5. The worst case density estimates (see section 11.5) have been used for the impact assessments of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
Natural England note in Appendix 11.1, section 11.5.4, table 11-6; The Inter-Agency Marine Mammal Working Group (IAMMWG) 2022 review has been used for information on Management Units. Use the 2023 update of Management Units: IAMMWG. 2023. Review of Management Unit boundaries for cetaceans in UK waters (2023). JNCC Report 734, JNCC, Peterborough, ISSN 0963-8091. https://hub.jncc.gov.uk/assets/b48b8332-349f-4358-b080-b4506384f4f7	Acknowledged. This was not available at the time of writing the PEIR but the updated information has been used in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** and are presented in **Volume 7, Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2)**.
In the Noise Modelling Report (Appendix 11.2); Natural England defer to Cefas as the underwater noise specialists on the plausibility of the piling Permanent Threshold Shift PTS/ TTS impact ranges and the UXO clearance PTS/TTS impact ranges presented in this report.	Acknowledged. The underwater noise modelling has been presented in **Volume 7, Appendix 11-3 Underwater Noise Modelling Report (application ref: 7.11.11.3)**.
Noise Modelling Report (Appendix 11.2) Section 6.3.1.1 Natural England ask for justification as to why a maximum 698kg weight has been used for the UXO modelling. The submitted ES should provide a justification for why a maximum of 698kg has been estimated.	Acknowledged. The modelling undertaken for potential UXO clearance (**Volume 7, Appendix 11-3 Underwater Noise Modelling Report (application ref: 7.11.11.3)**) takes in to account the worst case potential NEQ weight identified as possibly present in the preliminary review of ordinance at the Projects (**Volume 8, Unexploded Ordnance (UXO) Risk Management Report (application ref: 8.29)**). As noted in **Volume 7, Appendix 11-3 Underwater Noise Modelling Report (application ref: 7.11.11.3)**, should a 750 kg device be detected and require clearance, this will lead to a negligible increase in noise (<0.5 dB) and impact range.
Noise Modelling Report (Appendix 11.2) Section 6.3.1.3 Natural England considers that there is insufficient evidence to demonstrate noise reduction from 'low yield' clearance of UXOs at this time.	Acknowledged.
Noise Modelling Report (Appendix 11.20) Table 6-9 It is unclear why the Sound Exposure Level, single strike (SEL_{ss}) source level (276.6dB) for the Low yield charge is higher than the high order SEL_{ss} source level of a 698kg + donor charge (237.1dB). Natural England ask for clarification in the submitted ES.	Acknowledged. Natural England are correct, the "low yield" source levels were transferred to the report incorrectly. The correct source levels are 273.4dB SPL_{peak} and 218.2dB SEL_{ss} as presented in **Volume 7, Appendix 11-6 UXO Marine Mammal Impact Assessment (application ref: 7.11.11.6)**.
Natural England note in Section 11.6.1.1.11; The maximum Peak Sound Pressure Level (SPL_{peak}) PTS range for VHF cetaceans is greater than 500m for both monopiles and pin piles in certain locations. Therefore, the monitoring zone within the MMMP will need to reflect this. To note for when the MMMP is produced. The monitoring zone in the MMMP should encompass the maximum PTS range for a single strike of hammer.	Acknowledged. The monitoring zone in **Volume 8, Outline MMMP (application ref: 8.25)** and final MMMP will encompass the maximum PTS range for a single strike of hammer at maximum energy and would be agreed through consultation.

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In Appendix 11.3 Table 11-3; Natural England note the pin pile SEL_{ss} source level used in the impact assessment is 222.2dB re 1 μPa^2s @1m however in the noise modelling report a higher source level of 222.5dB re 1 μPa^2s @1m is reported for pin piles at DBS East: South and DBS West: West. The worst-case scenario source levels should be used in the noise impact assessment.	The worst case scenarios have been presented in section 11.6 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
In Appendix 11.3 Natural England comment for the underwater noise assessment, the Natural England best practice advice recommends that 'Figures should be used to visually present this information wherever they can add value. For example, maps should be provided with overlaying noise level contours and important receptors, such as designated site boundaries, known areas of importance for focal marine mammal species, hotspots of abundance or known migration routes'. Add in figures where visual representation of the noise contours would improve the clarity of the assessment. Refer to Phase III of the Natural England Best Practice Advice.	Noise contours are presented in section 11.6 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** for dose response curve assessments and **Volume 7, Figure 11-1 to 11-9 (application ref: 7.11.1)**.
In Table 11-1, Table 11-18; Appendix 11.1, section 11.6.2; Natural England advised during the ETG meeting on 21st February 2023, that for any impacts that are associated with the offshore array area itself, it is acceptable to use the Greater North Sea Management Unit (MU) for bottlenose dolphin density estimates in the PEIR. However, any project related activities on the coast have the potential to overlap with an area of increased bottlenose dolphin presence, of individuals that are associated with the Coastal East Scotland (CES) MU and Moray Firth SAC population. Natural England acknowledge that The Applicant intends to consider the CES MU for the impact assessment during the ES for potential impacts in the coastal region such as works in the Export Cable Corridor. Natural England advise that the Coastal East Scotland MU is included (alongside the estimates for the Greater North Sea MU) at the ES level to assess the potential impacts on this inshore population of bottlenose dolphin. Please reference updated review of Management Units for more information on this bottlenose dolphin population.	Any activities occurring near the coast in the Offshore Export Cable Corridor that could potentially impact the coastal bottlenose dolphin population would include the CES population in the assessments and has been presented in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** section 11.6.
In Chapter 11, Table 11-1; An assessment of the impacts of UXO clearance has not been included at the PEIR stage. Natural England note that a separate licence will be submitted for UXO activities and that an initial assessment of the potential impacts from UXO clearance (including the potential cumulative effects) will be provided during the ES, for information purposes only. Natural England will comment on this assessment when it is provided.	An indicative assessment for UXO clearance and potential effects have been presented in **Volume 7**, **Appendix 11-6 UXO Marine Mammal Impact Assessment (application ref: 7.11.11.6)**.
Natural England note in Appendix 11.3, Table 11-23; The impact range for rock placement is incorrectly listed as 0.23 km; it should be 0.99km, based on Table 6-4 in the Underwater Noise Modelling. Correct the value and re-calculate the assessment of effect.	Potential impact ranges for rock placement and other construction activities have been updated and presented in section 11.6.1.3 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
In Table 11-4; Table 11-90; Natural England support The Applicant's commitment to submit Draft MMMPs for piling activities and UXO clearance at the DCO stage.	Acknowledged. Refer to **Volume 8, Outline MMMP (application ref: 8.25)** for further information.
Natural England note in Table 11-4 that a SIP should be submitted with the draft MMMP with the DCO application.	As outlined in section 11.7 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** the **Volume 8, In Principal SIP (application ref: 8.26)** is submitted with the DCO application. Consultation with Natural England was undertaken during development of the In

Comment	Project Response
	Principal SIP. The final version of the SIP will be developed and submitted prior to construction.
In Section 11.6.1.2; Natural England supports the use of Effective Deterrent Ranges (EDRs) and Dose Response Curves to assess disturbance for harbour porpoise and the two seal species. Natural England note the lack of literature/disturbance studies for the other species, and that TTS thresholds have been used to infer a fleeing response/behavioural disturbance in the absence of species-specific disturbance information. However, TTS can occur at higher thresholds and therefore this may underestimate the behavioural response. The Applicant should keep the evidence base on disturbance under review and utilise more appropriate methods should they become available. Keep the evidence base on disturbance under review and utilise more appropriate methods (than TTS) should they become available.	Acknowledged. All available and current information has been presented in section 11.6 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
In Section 11.6.1.2.2.4; Natural England note that the use of ADDs and their duration will be discussed with regulators and their advisors post consent, during finalisation of the MMMP. Therefore, we agree that the assessment of ADD disturbance is illustrative and will not comment on the outcomes of the assessment at this time.	Acknowledged. The use of ADDs and their duration will be discussed with regulators and their advisors post consent, during finalisation of **Volume 8, Outline MMMP (application ref: 8.25)**. Therefore, the assessment of ADD disturbance would be illustrative (section 11.6.1.2.2.5 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**).
In The PEIR, Section 11.6.1.2.2.4; The Applicant outlines that the full PTS impact ranges (11km for harbour porpoise, 20km for minke whale) are greater than the range that can be mitigated by ADDs with certainty. The Applicant notes that the ADD duration needed to theoretically displace animals beyond the full PTS range, 123 minutes, has the potential to cause disturbance and may be deemed as excessive. Hence, they have used an ADD activation duration of 80 minutes. The information presented by The Applicant therefore indicates that the full injury ranges are not suitable to be mitigated by ADDs. As a result, there will likely be a residual impact i.e. an area where PTS can occur, beyond the area that is mitigated. We highlight that The Applicant will be recommended to apply for an EPS Licence for disturbance and/or injury post-consent for the piling works, so that an offence does not occur. As part of the EPS application, The Applicant will be required to demonstrate that all mitigation options have been considered. Indeed, a licence can only be granted if the authority is satisfied that there is no satisfactory alternative (the second test). This includes alternatives to minimise the risk of injury, such as mitigation like noise abatement systems (NAS). If Natural England does not have confidence that an EPS licence could be issued, then we query the implications for the DCO Application. We highlight that disturbance mitigation will also need to be considered in the final application with respect to the SNS SAC Natural England advise that, following the mitigation hierarchy, impacts should be minimised as far as possible, and we therefore recommend that the use of NAS is committed to in the draft MMMP/SIP, with the option to demonstrate that it is not needed post-consent. Provide information to demonstrate that injury and disturbance impacts will be sufficiently mitigated in the draft MMMP and SIP at the time of application.	With the reduction in monopile diameter size and hammer energy, PTS impact ranges can now be mitigation with 80 minutes ADD activation time. Information will be provided to demonstrate that injury and disturbance impacts will be sufficiently mitigated in **Volume 8, Outline MMMP (application ref: 8.25)** and **Volume 8, In Principle SIP (application ref: 8.26)** prior and at the time of application. In addition, Natural England will be consulted during the development of the final MMMP and SIP to ensure adequate mitigation measures are agreed prior to construction.

Comment	Project Response
In Section 11.6.1.4.2, Natural England notes that all TTS impact ranges are <100m for large and medium vessels but in the noise modelling report (Appendix 11-2) the TTS ranges are >100m for large vessels (VHF) and large and medium vessels (LF) respectively. Correct this and update assessment in the submitted ES.	TTS impact ranges have been updated in section 11.6.1.4.2 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** with results from the recent underwater noise modelling. The TTS ranges that would be >100m were based on a model assuming a stationary marine mammal with all sources assumed to operate constantly for 24 hours, both of which are highly unlike scenarios and therefore not carried forward as the realistic worst case.
In Section 11.6.1.4.11; Natural England advise that a vessel management plan is included within the Project Environmental Management Plan (PEMP) and best practice measures are followed in order to mitigate the impacts of increased vessel presence on marine mammals at all stages of the project (including operation/maintenance stage). Ensure vessel management plan is included in PEMP to cover all stages of the project.	Acknowledged. The vessel management plan is included in **Volume 8, Outline PEMP (application ref: 8.21)** submitted alongside the DCO, to cover all stages of the Projects.
In Section 11.6.1.4.6; Natural England supports the use of a 4km distance being used to assess disturbance during construction activities other than piling/UXO clearance. Based on the Benhemma- Le Gall et al. (2021) study, Natural England advise that a 4km distance is used to assess disturbance for construction vessels and operational/maintenance vessels also. Use 4km for assessing disturbance for construction activities, and vessel disturbance (for both construction and operational/maintenance stages).	Noted. A 4km buffer has been incorporated to assess for potential disturbance from the presence of vessels in the Projects' Array Areas in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**. In addition, a 4km disturbance range has been assessed for a transiting vessel in sections 11.6.1.4.3 and 11.6.2.3.2 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
In Section 11.6.1.6, Natural England notes in Table 11-2 (Page 22) it states that there will be 5,745 round trips to port (for DBS East or DBS West in isolation) and 11,489 round trips (for both projects concurrently). Clarity is needed on whether this is per year or the total number across the five-year period. In section 11.6.1.6.2 it states that this is over the five years of construction however in section 11.6.1.9.2 it states that 'for the construction of DBS East and DBS West together, up to 11,489 round trips to port from the array areas each year for five years'. The submitted ES should provide clarification on the worst-case scenario for vessel movements and so collision risk.	Noted. The number of round trips to port is described in section 11.6.1.6 and 11.6.2.5 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** where the worst case scenario has been presented for vessel movements and collision risk**.**
Natural England note in Table 11-95; Natural England has not yet had sight of the draft MMMP. Therefore, we cannot agree at this stage that the measures in the MMMP will be sufficient to significantly reduce any potential for PTS injury. Please also see our earlier comment regarding the need to consider all mitigation measures that can minimise the risk of injury. Engage with Natural England on the draft MMMP through the Evidence Plan process.	The Applicants have engaged with Natural England on **Volume 8, Outline MMMP (application ref: 8.25)** and development of the final MMMP through the Evidence Plan process. The mitigation measures in the MMMP will be sufficient to mitigate any potential for PTS injury, all mitigation measures that can minimise the risk of injury will be considered.
In Section 11.12; Natural England request to be consulted on any geophysical survey applications for the project.	Acknowledged. There is currently no formal licencing process that would include Natural England's consultation. However, The Applicants would ensure the statutory guidance for mitigation is adhered to during all potential geophysical survey.

Comment	Project Response
In Section 11.4.4; Natural England request clarification on what the cut-off period will be for the cumulative screening process.	The cut off period for the cumulative screening process would be six months prior to DCO submission as discussed during the EPP process. The cumulative screening for marine mammals is presented in **Volume 7**, **Appendix 11-5 CEA Screening (application ref: 7.11.11.5)**.
In Section 11.7.1; Table-89 Natural England note that 'No Potential for cumulative effect' has been assigned to all impacts at the operational and maintenance stage, despite the text in rationale column stating that impacts could result in a cumulative effect on marine mammal receptors. The approach to screening impacts in the Cumulative Effects Assessment should be reviewed and full (and consistent) justification be provided for the screening decision. Ensure screening decisions are consistent and well-justified in the submitted ES.	Acknowledged. The relevant information for screening of cumulative effects included in the assessment is presented in **Volume 7, Appendix 11-5 CEA Screening (application ref: 7.11.11.5).**
In the HRA screening, section 4.3.2.1; due to the potential increase in vessel traffic during these Projects, Natural England does not agree to screening out of disturbance to seal haul-out sites until likely construction ports are identified and potential disturbance can be assessed. Screen in disturbance to seal haul-out sites until construction ports are identified and potential disturbance can be assessed.	In **Volume 6, RIAA (application ref: 6.1)** disturbance to seal haul outs have been scoped in and is presented in sections 7.3.6 for grey seal in the Humber Estuary SAC; sections 7.3.7 for harbour seal in the Wash and Norfolk Coast SAC, and sections 7.3.8 for the Berwickshire North Northumberland Coast SAC.
In the HRA screening, section 4.3.3.3; Figure 4-5 displays the MUs for bottlenose dolphins from the 2015 review. There have been updates and changes to the bottlenose dolphin MUs since then. Natural England request an update to the latest review (2023). Update figure to the latest review: IAMMWG. 2023. Review of Management Unit boundaries for cetaceans in UK waters (2023). JNCC Report 734, JNCC, Peterborough, ISSN 0963-8091. https://hub.jncc.gov.uk/assets/b48b8332-349f-4358-b080-b4506384f4f7	Acknowledged. This has been reviewed and updated in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** and **Volume 6, RIAA (application ref: 6.1)**.
Marine Mammals ETG Responses – Post PEIR 24/09/2023 Response received 24/10/23	
Natural England advise that regarding the reductions in array area, it would be useful to see marine mammal and ornithology data sets used to inform this decision, in terms of the mitigation hierarchy.	Ornithology and marine mammal data sets were considered during this process, but neither data set highlighted any significant "hot spot" areas within The Crown Estate Lease Areas and so these were given limited weight in the final Array Area refinements for ES. More information about the refinement of the Array Areas is provided in **Volume 7, Chapter 4 Site selection and Assessment of Alternatives (application ref: 7.4)**.
Natural England acknowledges the reduction in maximum hammer energy from 7,000 kJ to 6,000 kJ and that updated noise modelling is in progress. Natural England will comment further once the updated modelling is provided.	Noted.
Regarding baseline information, Natural England recommends that all unidentified species are apportioned to species. We advise that information should be provided on the number of unidentified animals recorded with justification on how they were used or not used in final density and abundance calculations	The survey data received for unidentified species such as seals and porpoise/dolphin species was not apportioned. This data has been presented in **Volume 7, Appendix 11-2 Marine Mammal Impact Assessment (application ref: 7.11.11.2)** along with further justification as to why this data has or has not been applied to the finial assessment in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.

Comment	Project Response
When estimating density for White beaked dolphin, we note that the Project is not proposing to use the most conservative estimate despite it being from the site-specific survey. We advise that following the precautionary principle the most conservative estimate should be used instead of Waggitt *et al* (2019), as stated in the best practice guidance: "The most precautionary density Page 2 of 3 estimate (i.e., highest) should then be selected for use within the assessment. If a density estimate is selected which is not the highest, robust evidence is required to justify why it is the most appropriate option." Environmental considerations for offshore wind and cable projects - Phase III Best Practice for Data Analysis and Presentation at Examination, Version 1.2, August 2022.pdf - All Documents (sharepoint.com)	Noted, the highest density from all data sources has been used in the assessments in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** as the worst case. Therefore, if the site-specific density estimates are the highest, these have been applied. All marine mammal density estimates are presented in **Volume 7, Appendix 11-2 Marine Mammal Information Report (application ref: 7.11.11.2)**, section 11.5 and the density estimates used for the assessment is presented in section 11.5.8 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.
Natural England were asked about EDR for minke whales. EDR distances were originally developed to assess the range at which harbour porpoise are displaced by impulsive noise in a SAC designated for harbour porpoise. The applicability of these ranges to other species and locations is unknown. Therefore, we recommend a range for displacement for minke whales is based on literature and underwater noise modelling of the project area. Please provide a full justification of your range of displacement in the ES.	Acknowledged, in section 11.6.1.2.2.1.3 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** a disturbance range has been assessed for minke whale based on a literature review.
Natural England requested further information be provided regarding the methodology and data used for the presented assessment. We will provide further comment once this has been received.	Further information was issued on 30/10/2023 and Natural England commented on the method of approach of assessment used in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** (response on 18/12/2023)**.**
Natural England advise that mitigation measures including Noise Abatement Systems (NAS) are committed to in the draft SIP at the point of application, with a view to amend in the future if not needed, as was done for the Hornsea Four and DEP & SEP applications. Given the number of prospective offshore wind farms likely to be constructing at the same time, impact reduction will be essential to ensure in-combination impacts do not exceed the thresholds for the Southern North Sea Special Area of Conservation (SNS SAC). We recommend that the draft SIP if provided for review during the Evidence Plan Process.	Acknowledged. The use of Noise Abatement Systems (NAS) was considered in **Volume 8, In Principle SIP (application ref: 8.26)**.
Natural England comment that, since the project is within the SNS SAC, post consent marine mammal monitoring will be required. We advise that an In-Principle Monitoring Plan is submitted at the time of application and provided for consultation during the Evidence Plan Process	Acknowledged.
Natural England request that a method statement for the CEA and magnitude of disturbance is provided, considering how the conclusions presented in the meeting were made. Natural England will be unable to agree with the approach until this is provided	A technical note to Natural England was submitted 30/10/2023
Natural England welcomes that the next ETG will focus on draft assessment findings and advise that materials including assessment outputs and methodologies/analyses are provided for review at least two weeks prior to the meeting to enable informed discussion.	Acknowledged and noted, **Volume 8, In Principle SIP (application ref: 8.26)** and the **Volume 8, Outline MMMP (application ref: 8.25)** was sent out at least two weeks prior to the following ETG on the 15th January, 2024, to discuss the key findings of the assessment.
Marine Mammals ETG Responses – Post PEIR 24/09/2023 Response received 18/12/2023	
Natural England agrees that the methodology of adding a 4km buffer around the Array Areas is sufficient to calculate vessel disturbance, however as this methodology does not assess the	Acknowledged and has been included in - section 11.6.1.4.3 of **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.

Comment	Project Response
increased disturbance caused by an increase in the number of vessels in the area, a review of literature on this matter needs to be included in the ES	
As stated in the ETG minutes, the coastal East Coast Scotland bottlenose dolphin MU should be included in the assessment for activities close to the coast.	Acknowledged and this has been carried out through **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)** where relevant.
Natural England agrees to the use of iPCoD modelling where required and we support the consideration at this early stage in development. When conducting the iPCoD modelling, clearly present the parameters used in the modelling. Natural England recommend outputs are assessed over the relevant international reporting period (i.e. Habitat Regulations - at least 6 years). Furthermore, it is important to include in the assessment any projects that will be constructing over this time frame.	Acknowledged, the method for the iPCoD modelling for potential disturbance impacts is presented in **Volume 7, Appendix 11-4 iPCoD Modelling (application ref: 7.11.11.4)** and the results from the population modelling is presented in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**, sections 11.6.1.2.2.3, 11.6.1.2.3.3 and 11.7.3.1.1.2.2 for cumulative impacts.
Natural England is in broad agreement with the proposed threshold of 1% annual decline from population modelling.	Acknowledged.
Marine Mammals ETG Responses – ETG 4, 15/01/2024	
Natural England maintains our advice that mitigation measures including Noise Abatement Systems (NAS) are committed to in the draft Site Integrity Plan (SIP) at the point of application. Given the number of prospective offshore wind farms likely to be constructing at the same time as Dogger Bank South, noise impact reduction will be essential to ensure in-combination impacts do not exceed the thresholds for the Southern North Sea Special Area of Conservation (SNS SAC).	**Volume 8, Outline MMMP (application ref: 8.25)** includes NAS, and provision for any new technologies or methods not currently on the market, to be considered at the point of agreeing the final MMMP. Updates as needed will be made to the MMMP and SIP, where relevant, for agreement prior to construction. The Applicants have sought to retain flexibility in the application in order to ensure the most effective noise mitigation option(s) can be selected prior to construction. Procurement for construction contractors has not yet commenced, however it is intended that noise mitigation be included within the competitive tender process in order to ensure that the most effective option(s) at the time are being considered. The following text has been added to **Volume 8, In Principle SIP (application ref: 8.26)** in regard to the application of NAS: "The mitigation measure(s) (or suite of measures including Noise Abatement Systems) that may be implemented during the construction of the Projects will be determined in consultation with the regulator and relevant statutory nature conservation bodies. Any requirement for noise mitigation, or not as the case may be, shall be determined following confirmation of final hammer energies and foundation types, collection of additional survey data (e.g. geophysical data), and/or acquisition of noise monitoring data, the update of the project and location specific noise model(s) including information on maturation of emerging technologies."
Natural England recommended that consideration is given to other mitigation commitments that could be made pre-application, such as limits on the number of piles installed in a 24 hour period within or across the arrays, and on concurrent piling across the arrays.	Minimisation of underwater noise during piling has been considered following comments received at PEIR, with the following amendments carried through to the Projects' Design Envelope for DCO application submission:

Comment	Project Response
	• The Array Area boundaries for both Projects have been reduced by approximately 30%; • The maximum monopile diameter, and therefore maximum hammer energy required, has been reduced; • The maximum number of simultaneous monopile installations has been reduced from three to two monopiles; and • The potential for simultaneous pile installation at the Electrical Switching Platform and within the Array Areas has been removed. Once the final Projects' design and construction methodologies are known, there may be potential for further commitments to be made to minimise underwater noise, post consent.
Natural England commented in regard to UXO clearance modelling, any evidence would be welcome to support that the Project is able to provide of successful low order campaigns to inform the Worst Case Scenario modelled. If evidence cannot be provided, high order clearance will need to be included in the assessment.	Acknowledged. In regard to UXO clearance, high order clearance has been included as the worst case scenario in the modelling and in the indicative assessment submitted to support the application in **Volume 7, Appendix 11-6 UXO Marine Mammal Impact Assessment (application ref: 7.11.11.6).** This has been based on the worst case potential NEQ weight identified as possibly present in the preliminary review of ordinance at the Projects at this time and will be reviewed and updated if required, for the Marine Licence application.
Natural England and the MMO commented on the MMMP that a pause in piling between 10 minutes and 2 hours with intention to continue without marine mammal checks, soft start or ramp up is against current JNCC guidelines. Natural England does not recommend commencing piling or continuing after a break of more than 10 minutes in these conditions, as it is against JNCC guidelines.	Improvements in scientific understanding and the development of a better knowledge base of the efficacy of certain mitigation measures recommended in the JNCC (2010) protocol has been established since their development and release. Further discussion regarding breaks in piling, the recovery rates of marine mammals will be undertaken post consent before the finalisation of the MMMP. The **Volume 8, Outline MMMP (application ref: 8.25)** has been updated to include a commitment to MMOb and / or PAM operators to maintain a watch throughout any break in piling operations to ensure no marine mammals are present
Natural England does not agree with the use of PAM as an alternative to MMObs during times of poor visibility or at night. PAM is not in the JNCC guidelines, therefore if the project is deviating from the guidelines, formal justification, with supporting evidence, is required	This will be further discussed, as using the right PAM equipment is a useful tool for marine mammal monitoring, i.e. harbour porpoise. If PAM is to be used during hours of darkness or poor visibility, and increased sea state instead of MMObs, a formal justification with supporting evidence to give the best possible chance for detecting marine mammals will be provided. The use of Passive Acoustic Monitoring (PAM) as an efficient mitigation tool (as now recognised for seismic and geophysical surveys (JNCC guidance 2017) and for UXO clearance (JNCC guidance 2023)) will be considered post consent before the finalisation of the MMMP.
Further information on the use of Acoustic Deterrent Devices (ADD) if Marine Mammals are in the mitigation zone is needed. We will provide further comment following receipt of this information.	Further information and clarification have been provided in the **Volume 8, Outline MMMP (application ref: 8.25)**.

Comment	Project Response
Natural England recommends that MMObs are dedicated and experienced. If trained vessel crew are used, it is important to consider all the requirements of the MMObs and how that would fit into other duties.	Agreed that MMObs would be dedicated and at least one experienced MMOb (as defined under the JNCC guidance definition) would be present in line with the **Volume 8, Outline MMMP (application ref: 8.25)**.
Natural England advise that more detail is included in the Marine Mammal chapter of the ES on impacts the proposal may have on sandeels and therefore harbour porpoise prey availability and interrelated effects. As the arrays are potential sandeel spawning sites, the whole ecological impact should be assessed in relation to conservation objective 3 for the SNS SAC. We refer the Project to measures undertaken by Hornsea 4, which straddles the Flamborough Front and impacts on overlapping SAC designation for Harbour Porpoise and Sandeel spawning sites, with a specific focus on a source pathway receptor approach.	This has been reviewed and addressed where relevant in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**. Impacts on sandeel are assessed within the Fish and Shellfish Chapter of the ES **(Volume 7, Chapter 10 Fish and Shellfish (application ref: 7.10)** and cross-referenced within the Marine Mammals Chapter where impacts on prey availability are considered. and the **Volume 6, RIAA (application ref: 6.1).**
MMO commented on the SIP; stating there has been two summers now working on process where we have been pretty close to thresholds so although you may think this is precautionary, thresholds are close to getting breached. Levels of activity are only likely to increase. By time SIPs are coming to MMO it is too late for offshore windfarms to commit to things like NAS. MMO feels current approach not going to hold for next Summer, approach NE is backing is for developers to commit to NAS upfront rather than to a menu of options. Test is to rule out adverse effects rather than risk based judgement and if measures in the SIP not needed that is fine, can remove. This is likely to be our advice going forward.	**Volume 8, Outline MMMP (application ref: 8.25)** includes NAS, and provision for any new technologies or methods not currently on the market, to be considered at the point of agreeing the final MMMP. Updates as needed will be made to the MMMP and SIP, where relevant, for agreement prior to construction. The Applicants have sought to retain flexibility in the application in order to ensure the most effective noise mitigation option(s) can be selected prior to construction. Procurement for construction contractors has not yet commenced, however it is intended that noise mitigation be included within the competitive tender process in order to ensure that the most effective option(s) at the time are being considered. The following text has been added to the **Volume 8, In Principle SIP (application ref: 8.26)** in regard to the application of NAS: "The mitigation measure(s) (or suite of measures including Noise Abatement Systems) that may be implemented during the construction of the Projects will be determined in consultation with the regulator and relevant statutory nature conservation bodies. Any requirement for noise mitigation, or not as the case may be, shall be determined following confirmation of final hammer energies and foundation types, collection of additional survey data (e.g. geophysical data), and/or acquisition of noise monitoring data, the update of the project and location specific noise model(s) including information on maturation of emerging technologies."
Section 1 and 2 of the daft Marine Mammal Mitigation Protocol (MMMP) note that a separate Marine Licence Application will be submitted for any required Unexploded Ordnance (UXO) clearance. It would be helpful to confirm within these sections if a corresponding European Protected Species (EPS) licence application will additionally be sought for both piling and UXO works, as is proposed within Table 1-2, page 16.	Noted. This has been updated accordingly. An EPS Risk Assessment would be undertaken in order to ascertain whether an EPS licence would be required, and an application made if necessary.

Comment	Project Response
The MMO Marine Conservation Team welcome engagement with The Applicants as they develop and submit any required EPS applications. Due to the mitigation proposed (yet to be finalised) RWE do not anticipate any marine mammal injury impacts caused by permanent threshold shift (PTS). We would advise further engagement with Natural England on this matter to ensure that mitigation will be sufficient to mitigate injury. If there is a residual risk of injury following mitigation, we would advise that any EPS licence application additionally includes this offence.	Consultation with the MMO and Natural England will be undertaken alongside the development and finalisation of the MMMP to ensure that mitigation is sufficient to ensure there would be no injury to marine mammals (and therefore ensure there is no requirement for an EPS licence for injury).
We welcome the proposal for the final MMMP to include full consideration of all available mitigation measures, including consideration of noise abatement systems (NAS). The Applicants should be aware that in determining any EPS licence application, the MMO as the regulator must be satisfied that there is no other satisfactory alternative to the project as proposed, which would include consideration of all available mitigation measures.	In addition to NAS, the Draft Outline MMMP also includes provision for any new technologies or methods not currently on the market to be considered during the development of the final MMMP. Updates as needed will be made to the MMMP, SIP and EPS Licence application, where relevant, for agreement prior to construction. The Applicants acknowledge that in order to obtain an EPS licence, the MMO must be satisfied that there is no other satisfactory alternative to the project as proposed and has sought to retain flexibility in the DCO application in order to ensure the most effective option can be selected prior to construction.
It is noted on page 34 of the daft MMMP (paragraph 144 of section 3.1.6) that: *"for any breaks in piling of more than 10 minutes but less than two hours, then piling can recommence with an altered soft-start procedure (e.g. five to six blows of the hammer at starting hammer energy) before continuing as required, provided there are no marine mammals within the Monitoring Area".* The Joint Nature Conservation Committee (JNCC) (2010) guidance recommends that if there is a pause in piling operations for a period of greater than 10 minutes, then the pre-piling search and soft-start procedure should be repeated before piling recommences. If a watch has been kept during the piling operation, the Marine Mammal Observer (MMOb) or Passive Acoustic Monitoring (PAM) operative should be able to confirm the presence or absence of marine mammals, and it may be possible to commence the soft-start immediately. However, **if there has been no watch,** the complete pre-piling search and soft-start procedure should be undertaken. The guidance recommends that the soft-start duration should be a period of not less than 20 minutes. Any requested variation from a 20-minute soft-start needs to be agreed with the regulator and any statutory nature body. The MMO requires that the guidance is adhered to, and the full soft start of 20 minutes is implemented (not 5 to 6 blows at the starting hammer energy as is proposed in the MMMP) and this is updated in the MMMP.	MMOb and / or PAM operators will maintain a watch throughout any break in piling operations to ensure no marine mammals are present within the mitigation zone before piling recommences (where possible) and this commitment has been added to the **Volume 8, Outline MMMP (application ref: 8.25)**. Regarding breaks in piling and restarting of installation, this is a method that has been previously applied and approved at other offshore windfarm projects successfully. Due to the improvements in scientific understanding and the development of a better knowledge base of the efficacy of certain mitigation measures recommended in the JNCC (2010) protocol, further discussion regarding breaks in piling, the recovery rates of marine mammals will be undertaken post consent before the finalisation of the MMMP.
Bubble curtains would be required for all high-order detonations and not just for Unexploded Ordnance (UXOs) that are larger than 50kg charge weight. The MMO requests the MMMP is updated to confirm (with the specific UXO contractor) what parameters will be appropriate for the safe deployment of bubble curtains. The draft MMMP notes that array water depths vary between 10.68 metres (m) and 38.16 m.	Acknowledged and amended accordingly

Comment	Project Response
The MMO does not consider the use of TTS thresholds to be an appropriate proxy for assessing disturbances. For quantifying the risk of behavioural responses, we recommend that assessments apply dose-response curves for proximity to the sound source and received sound level. Approaches based directly on the "distance of effect" reported for in-situ behavioural studies can be referenced. Similarly, the SNCB guidance (JNCC 2020) lays out advice on the assessment of significant disturbance in UK Special Areas of Conservation (SACs) for harbour porpoise. The advice is to use fixed disturbance distances (in the form of EDRs for different activities, based on empirical evidence. These EDRs could also be used in impact assessments in the absence of more bespoke scientific evidence for the species and noise source concerned.	TTS has been used as a proxy for disturbance for potential UXO clearance and assessed alongside the EDR for the indicative assessment to support the DCO application. Dose response curves for piling have been used for harbour porpoise, grey seal and harbour seal. Behavioural studies (such as 30km disturbance range for minke whale, and 25km for seals) have been used to inform the assessment for disturbance from piling, alongside the relevant harbour porpoise EDRs in this chapter. However, there is no dose response studies for piling sounds for any dolphin species, and no behavioural/disturbance thresholds have been established for species other than harbour porpoise, therefore, TTS for dolphin species, alongside a qualitative assessment, was used as a proxy for disturbance as agreed through the Evidence Plan Process and Expert Topic Group meetings.
Due to the increased activity within the SNS SAC along with a number of ongoing policy discussions on noise, a number of mitigation measures are likely to be required. The MMO would strongly recommend including NAS as a feasible solution and including this within your programming and financial planning.	The Applicants acknowledge the MMO's advice and confirm that NAS (and any new technologies or methods not currently on the market) are included within the Outline MMMP for future consideration. The following text has been added to **Volume 8, In Principle SIP (application ref: 8.26)** in regard to the application of NAS: "The mitigation measure(s) (or suite of measures, including Noise Abatement Systems), that may be implemented during the construction of the Projects will be determined in consultation with the regulator and relevant statutory nature conservation bodies during the pre-construction phase. Any requirement for noise mitigation, or not as the case may be, shall be determined following confirmation of final hammer energies and foundation types, collection of additional survey data (e.g. geophysical data), and/or acquisition of noise monitoring data, updates of the project design and location specific noise model(s) including information on maturation of emerging technologies."
The MMO state that two separate MMMPs and SIPs for the UXO clearance and piling activities as these are taking place at different times.	Acknowledged. **Volume 8, Outline MMMP (application ref: 8.25)** and **Volume 8, In Principle SIP (application ref: 8.26)** present the approach of The Applicant and stipulate that these documents would be split post consent to support the DCO conditions and the application for the UXO clearance Marine Licence.

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