



# **Awel y Môr Offshore Wind Farm**

## **Applicant's Marine Licence Relevant Response to Written Representation from NRW(A)**

### **Marine Licence Submission 1**

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# 1 Introduction

- 1 At Deadline 1 of the Development Consent Order (DCO) Examination of Awel y Môr Offshore Wind Farm ('AyM'), interested parties (IPs) were invited to submit Written Representations (WRs) into the DCO examination.
- 2 Natural Resources Wales (NRW(A)) submitted a WR at DCO Deadline 2 that covered both offshore and onshore matters and the Applicant responded to this in full, alongside WRs from other IPs at Deadline 2 of the DCO Examination (PINS reference REP2-002).
- 3 The Applicant has prepared this document for NRW's Marine Licence Team (NRW-MLT) to show its responses to the Marine Licence (ML) relevant sections of NRW's Advisory Team's (NRW-A) WR.
- 4 For ease of referencing and to facilitate future cross-referencing, the Applicant has included references for the WRs.
- 5 Where WRs were broken down into numbered paragraphs or sections by the respondent, the Applicant has retained the existing references (e.g. paragraph 2.1.8 from the NRW WR becomes REP1-080-2.1.8).

## 2 Applicant's response to Written Representations

### 2.1 REP1-080 – Natural Resources Wales (NRW)

6 The Applicant wishes to note that several paragraphs have been omitted from the table below as they relate to topics not relevant to the Marine Licence process.

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-1.1.31	-Physical Processes NRW advises that post-construction monitoring of secondary scour should be considered.	The Applicant has provided responses to the detailed comments raised in response to REP1-080-2.1.1 to 2.1.8 below.
REP1-080-1.1.32	Clarity is required about where the dredge arisings from the cable laying activities along the Export Cable Corridor will be disposed of and how this is captured in the DCO.	
REP1-080-1.1.33	-Marine Water and Sediment Quality NRW is satisfied that its previous concern relating to risk from sediment bound contaminants has now been addressed.	The Applicant has provided responses to the detailed comments raised in response to REP1-080-2.2.1 to 2.2.5 below.
REP1-080-1.1.34	NRW is satisfied that its previous concerns with respect to impact assessment approaches to phytoplankton and Dissolved Oxygen have now been resolved.	
REP1-080-1.1.35	-Benthic Subtidal and Intertidal Ecology NRW recommends that the marine biosecurity risk assessment and plan is a free-standing document and secured by both the DCO and the Marine Licence.	The Applicant has provided responses to the detailed comments raised in response to REP1-080-2.3.1 to 2.3.8 below.
REP1-080-1.1.36	Due to the presence of the highly invasive seasquirt <i>Didemnum vexillum</i> , further specific management measures may be required in addition to standard biosecurity risk assessment protocols, if the Port of Holyhead is used for vessel berthing.	
REP1-080-1.1.37	-Saltmarsh The onshore cable will intersect section 7 habitat - Atlantic salt meadow - at the Clwyd Estuary. NRW advises that confirmation of cable crossing techniques is provided and detailed in the Outline Construction Method Statement (CMS).	The Applicant has provided responses to the detailed comments raised in response to REP1-080-2.4.1 and 2.4.2 below.

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-1.1.38	Given the tidal nature of the Clwyd estuary, NRW advises that the Secretary of State and / or NRW Permitting Service (PS) will need to determine whether the detailed construction methods are to be agreed - with relevant signposting - in the ML or the DCO, or both.	
REP1-080-1.1.39	-Fish and Shellfish Ecology NRW is satisfied that previous concerns with respect to errors in the impact assessment on fish valued ecological receptors have been addressed.	The Applicant has provided responses to the detailed comments raised in response to REP1-080-2.5.1 to 2.5.9 below.
REP1-080-1.1.40	NRW notes the cumulative environmental assessment (CEA) undertaken for fish receptors but disagrees that there is no potential for simultaneous, partly overlapping, or sequential noise from planned offshore windfarms to adversely affect consecutive spawning seasons of fish species. NRW does not consider it appropriate for the cumulative effects assessment to rely on potential future regulations or mitigation that has no commitment or delivery mechanism attached to it.	
REP1-080-1.1.41	-Marine Ornithology NRW advises that a detailed assessment of the potential impacts of the project on the breeding seabird features of Pen-y-Gogarth / Great Orme's Head Site of Special Scientific Interest (SSSI) (guillemots, razorbills and kittiwakes) should be undertaken, as currently this has not been done sufficiently to assess effects on these features. We advise that the effects of displacement on auks and collision risk mortality of kittiwakes should be further assessed.	
REP1-080-1.1.42	NRW advises that comprehensive validation monitoring before, during, and after construction is needed to confirm that the supporting habitat for Red-Throated Diver (RTD) within the Liverpool Bay Special Protection Area (SPA) has not been lost.	The Applicant has provided responses to the detailed comments raised in response to REP-080-2.6.1 to 2.6.15 below.
REP1-080-1.1.43	NRW advises that a Vessel Traffic Management plan is needed in order to avoid or reduce disturbance and displacement to the RTD and Common Scoter features of Liverpool Bay SPA. The plan will need to be secured in the marine licence.	

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-1.1.44	<p>-Marine Mammals</p> <p>NRW advises that the proposal has the potential to impact marine mammals, a long list of cetaceans (dolphins, porpoises and whales) are protected pursuant to the list made under section 7 of the Environment (Wales) Act 2016, as well as being European Protected Species (EPS) protected by Schedule 2 of the Conservation of Habitats and Species Regulations 2017 ('the Regulations') as amended. It is an offence under Regulation 43 of the Regulations to inter alia deliberately capture, injure, kill, or disturb such species or to damage or destroy their breeding site. This reflects the system of strict protection afforded to such species under the provisions of the Habitats Regulations.</p>	The Applicant has provided responses to the detailed comments raised in response to REP1-080-2.7.1 to 2.7.13 below.
REP1-080-1.1.45	However, an EPS licence may be granted by NRW, as the relevant licensing body, for the purposes specified in Regulation 55(2) of the Regulations	
REP1-080-1.1.46	NRW previously advised that the assessment of the impacts of underwater noise on marine mammals, such as auditory injury and associated disturbance, was insufficient and should be improved in order to enable the risks to be fully and adequately assessed.	
REP1-080-1.1.47	NRW is satisfied that a number of the concerns relating to the assessment of impacts of underwater noise on marine mammals have now been addressed through additional modelling work undertaken by the Applicant.	
REP1-080-1.1.48	NRW advises that cumulative Permanent Threshold Shift (auditory injury) in harbour porpoise should be included in the Marine Mammal Mitigation Protocol (MMMP). We advise that mitigation is required for EPS protection and needs to be regulated by the marine licence and / or the European Protected Species licence (for which an application has not yet been submitted and which the Applicant is encouraged to do).	
REP1-080-1.1.49	We advise that the extent of the Marine Mammal Management Unit area disturbed from construction activities is presented (in the form of a clarification note) for harbour porpoise, bottlenose dolphin and grey seal, in order to enable NRW to assess the effect on functionally linked habitat against the Supporting Habitat conservation objective.	

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REP1-080-1.1.50	NRW is satisfied that previous concerns relating to vessel collision have been addressed.	
REP1-080-1.1.51	-Water Framework Directive – Offshore NRW is satisfied that previous concerns regarding the conclusions of the assessment with respect to phytoplankton and DO have been addressed.	The Applicant has provided responses to the detailed comments raised in response to REP1-080-2.8.1 to 2.8.11 below.
REP1-080-1.1.52	NRW is satisfied that concerns relating to the transposition of information from the Environmental Statement into the Compliance Assessment have now been addressed.	
REP1-080-1.1.53	-Decommissioning It is NRW's position that offshore renewable projects should produce decommissioning plans that retain all decommissioning options (maintain, full removal and partial removal); the options can then be assessed and refined closer to the time of decommissioning itself in consultation with NRW.	The Applicant has provided responses to the detailed comments raised in response to REP1-080-2.9.1 to 2.9.5 below.
REP1-080-1.1.54	- Mitigation measures There are a number of inconsistencies between the Schedule of Mitigation and the Marine Licence Principles document that require clarification. Such discrepancies may result in confusion and uncertainty as to the extent of measures that may be secured in respective consents. We advise that clarification regarding such inconsistencies should be provided and advise that both the Schedule of Mitigation and the Marine Licences Principles document are consistent and contain accurate reference to all proposed mitigation and plans as described in the application documents.	The Applicant provided updated versions of the Schedule of Mitigation and Marine Licence Principles within its Deadline 1 submission (REP1-018 and REP1-025, respectively).  Further to this, the Applicant has provided a revision of the Marine Licence Principles and Schedule of Mitigation at Document 2.22 and 2.24 of its Deadline 2 submission.
REP1-080-2.1.1	OFFSHORE Physical Processes NRW agrees that the baseline description of physical processes obtained through the desktop review of existing literature, project-specific surveys and existing data sources is sufficient to appropriately characterise the study area (Array and Export Cable Corridor (ECC) and landfall) for the Awel-y-Môr project.	These agreements are noted and welcomed by the Applicant, who expects these points to be included in the SoCG between the Applicant and NRW.



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REP1-080-2.1.2	NRW agrees with the numerical modelling approach and scenarios conducted in relation to hydrodynamics, waves and sediment transport to inform the potential changes to Constable Bank/Rhyl Flats, designated sites and the adjacent coast arising from the construction, operation and decommissioning of Awel-y-Môr.	
REP1-080-2.1.3	We agree with the assessment methodology and the conclusions of the assessment of the potential impacts on physical processes as outlined in the Environmental Statement (ES)	
REP1-080-2.1.4	We agree with the conclusions of the Report to Inform Appropriate Assessment (RIAA) with respect to physical processes.	
REP1-080-2.1.5	<p>-Secondary scour protection</p> <p>NRW notes (Volume 4: Annex 2.3 page 30: <i>Physical Processes Modelling Results</i> [APP077], that the local dimensions of secondary scour are highly dependent upon the specific shape, design and placement of the scour protection. These parameters are highly variable and so there is no clear quantitative method or evidence base for accurately predicting the dimensions of secondary scour. Given the uncertainty regarding the spatial extent and volume of secondary scour, we advise that post-construction monitoring should be considered. Post-construction monitoring and any potential mitigation measures should be agreed in writing with NRW and take the form of an environmental monitoring plan. Clarity is required on the most appropriate regulatory mechanism needed to secure it. We advise that a condition of the Marine Licence (ML) would be appropriate.</p>	<p>The Applicant anticipates that monitoring of secondary scour would be conducted as part of asset-protection surveys undertaken post-construction. The Applicant agrees that a monitoring plan would be conditioned within any Marine Licence granted by NRW as described within Condition 34 of the Marine Licence Principles (Document 2.22 of the Applicant's Deadline 2 submission).</p>
REP1-080-2.1.6	We acknowledge that the assessment of primary scour has been undertaken using recognised empirical equations, supported by knowledge of the foundation design dimensions, and we agree with the assessment as presented for primary scour.	
REP1-080-2.1.7	<p>-Dredge and Disposal of Dredge Material</p> <p>ES Volume 2: Chapter 2: Marine Geology, Oceanography and Physical Processes [APP048] states in Table 8 that "<i>The project array area and offshore ECC will be licenced as disposal sites for the deposition of dredgings and drill</i></p>	<p>The Applicant has sought to licence disposal of dredged material and drill arisings in the array within its Marine Licence application.</p> <p>With regard to the offshore ECC and GyM interlink areas, the Applicant has assessed the disposal of dredged material and drill arisings within the</p>

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	<p>arising". From the information provided, it is not clear if the ECC is to be licenced as a disposal site in the Marine Licence application associated with the array area. We note that only the array area is considered and has been characterised as a potential disposal site (please see document 8.9: Awel y Môr Disposal Site Characterisation Report [APP-309]). The disposal site report details at paragraph 122 that "...as a worst case, the total volume of natural material that may require disposal would be up to 12,920,356m<sup>3</sup>". We understand that this volume relates only to the volume of dredge material associated with the construction activities of the array site. It is currently unclear, therefore, where the dredge arisings from the cable laying activities along the ECC - amounting to a volume of 6,281,000m<sup>3</sup> (Volume 2: Chapter 1: Offshore Project Description, Table 22: Design Envelope for export cables [APP-047]) - will be disposed of. Further clarity should be provided in this regard and the relationship with the offshore design parameters, as presented in the draft DCO, explained (specifically Requirement 2 - <i>Offshore Design Parameters</i> – Table 3 [AS-014]). We note that only the maximum volume of material for disposal for the array area is assigned at Requirement 2.</p>	<p>ES as a worst-case in line with the Rochdale Envelope approach. However, the Applicant has not sought to licence the disposal activity at this stage as the methods that will be used during construction will not be finalised until the detailed design phase post-consent. If it should be determined at that time that disposal within the offshore ECC and GyM interlink area is required, the Applicant will apply for a further disposal licence(s) at that time.</p> <p>The Applicant has adopted a similar approach to the consideration of clearance of Unexploded Ordnance (UXO), where the activity has been assessed for the purposes of the EIA as a worst-case but is not sought to be licensed until further detail is known in the detailed design phase post-consent.</p>
REP1-080-2.1.8	<p>We acknowledge the intention that all dredged material from the seabed will be disposed of within these designated disposal sites in order to ensure that the material is retained within the local sediment transport system, and we recommend that retention of material in the local sediment transport system becomes a condition of the marine licence if granted.</p>	
REP1-080-2.2.1	<p>Marine Water &amp; Sediment Quality (MW&amp;SQ)</p> <p>NRW agrees that there is no impact on Bathing Waters from elevated suspended sediment, during the construction phase.</p>	<p>The Applicant notes and welcomes these agreements since the provision of further information in the Marine Water and Sediment Quality Clarification Note (REP1-015). It is expected that these points will form areas of agreement in the SoCG between the Applicant and NRW.</p>
REP1-080-2.2.2	<p>Since the submission of NRW's Relevant Representations [RR-015], NRW has met with the Applicant to further discuss the concerns pertaining to sediment bound contaminants. This has resulted in additional information being provided to NRW in the form of a clarification note titled <i>Marine Water and Sediment Quality Clarification Note</i> dated September 2022, which contains further detail regarding contaminated sediment. We advised in our Relevant Representations that the Applicant should report all data in the context of Centre for the Environment, Fisheries and Aquaculture Sciences (CEFAS) Action Levels (ALs). Specifically, polycyclic aromatic hydrocarbons should be presented against</p>	

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	<p>CEFAS ALs and where other data are not shown against CEFAS ALs (i.e., PCBs, Organotins, DDT and dieldrin), then reasoning should be given as to why. This information has now been provided in the Clarification Note, which we have reviewed again alongside the ES as submitted. NRW now agrees that there is no risk from contaminated sediment. We advise that the Applicant submits the Clarification Note into the DCO Examination at the next available deadline.</p>	
REP1-080-2.2.3	<p>NRW's Relevant Representations noted concerns about the approach to assessing impacts on phytoplankton and Dissolved Oxygen (DO). The assessments focussed on the impacts of nutrients on phytoplankton and DO, where we were not expecting any nutrients to be released. NRW advised that the assessment needed to consider impacts on phytoplankton and DO in light of suspended sediments not nutrients and that we could not therefore agree with the conclusions of the assessment presented. This issue has been discussed further with the Applicant and additional information has been provided to NRW within the <i>Marine Water and Sediment Quality Clarification Note</i>. A discussion around the interactions between DO and suspended sediment, and phytoplankton and suspended sediment has been provided, indicating there is no risk to these receptors. We agree there is no risk to DO and phytoplankton from the proposed development.</p>	
REP1-080-2.2.4	<p>In our Relevant Representations, NRW did not agree that the impact of accidental spills could be considered <i>negligible adverse</i>. The Applicant stated effects would be temporary, whereas contaminants, particularly sediments, can persist in the environment, for long periods of time. We advised that the impact should be considered <i>medium adverse</i> as the ability to meet Environmental Quality Standards (EQS) could be compromised (Chapter 3: Table 6, page 59 [APP-049]). Additionally, NRW advised that impacts will not be short-term as stated and considerable time would be needed to recover to baseline conditions. However, having reviewed the justifications provided within the Clarification Note, alongside further consideration of the assessment and mitigation measures outlined within the ES, we now agree that this impact can be considered <i>negligible adverse</i> provided that the mitigation commitments outlined in the ES (Chapter 3: Section 3.9, Table 16 [APP-049]) and the Marine Water and Sediment Quality Clarification Note, are incorporated into a Project Environmental Management Plan (PEMP) and Marine Pollution Contingency Plan (MPCP), and appropriately secured and delivered post-consent. We would</p>	<p>The Applicant notes and welcomes this point of agreement.</p> <p>With regard to the PEMP and MPCP, the Applicant notes that these have been included within Condition 12 of the Marine Licence Principles submitted at Deadline 1 (REP1-025; Document 2.22 of the Applicant's Deadline 2 submission) and are therefore expected to be secured as conditions of any Marine Licence granted by NRW.</p>

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	suggest a condition of the ML may be the appropriate regulatory mechanism to secure this.	
REP1-080-2.2.5	In our Relevant Representations we advised that a number of marine water quality interrelationships had been overlooked from Volume 2: Chapter 3: Section 3.14: Interrelationships [APP-049]. In our view, these include the following: the potential for elevated counts of bacteria at Bathing Waters which has the potential to impact human ("public") health; linkages between major disasters, Marine Water & Sediment Quality (MW&SQ) and other ecological receptors, and; the link with MW&SQ and onshore water quality. Further MW&SQ inter-relationships are missed from Volume 2: Chapter 14 [APP-060]. While the relationship between accidental spills and physical processes is included, the link between accidental spills and ecological receptors is not. Links between marine water quality and onshore works are made appropriately in Volume 3: Chapter 7 [APP-068] and we agree with the conclusions and mitigation proposed. Whilst some inter-relationship links have been missed, this does not alter the conclusions of the ES. We do not consider that there is a risk from these inter-relationships not being listed and we have informed the Applicant of this accordingly. The comments above are provided as points of clarification, and we are satisfied that they do not affect the overall conclusion with respect to MW&SQ.	Agreement that the overall conclusions remain valid is noted and welcomed by the Applicant.  As a point of further clarification, the Applicant responded to this point within its response to RR-015-2.7.6 (REP1-001) and considers that whilst the potential inter-relationships raised by NRW may not be explicit within the MWSQ chapter of the ES (APP-049), they are inherent components of the WFD Compliance Assessment (APP-094).
REP1-080-2.3.1	Benthic Subtidal and Intertidal Ecology  NRW agrees that the data collected through the site-specific surveys, through the desktop review of existing literature, and data sources are sufficient to appropriately characterise the benthic ecology throughout the array and ECC. We also agree with the assessment methodology and the conclusions of the assessment with respect to the potential impacts of the project on benthic receptors, as outlined in the ES.	The Applicant notes and welcomes agreement on these points.
REP1-080-2.3.2	We agree with the conclusion of the RIAA that, provided the mitigation measures outlined are adhered to, the project will not have an adverse effect on site integrity (AEOSI) and therefore will not undermine the conservation objectives of the benthic designated features of the Dee Estuary Special Area of Conservation (SAC) and the Menai Strait and Conwy Bay SAC, but please note paragraph 2.3.6 below.	

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REP1-080-2.3.3	<p>From the evidence presented (Volume 2: Chapter 5: Section 5.7.4, paragraph 95 [APP051]), the areas of low resemblance stony reef do not meet the strong justification criteria in terms of biological communities that NRW would expect within an Annex I stony reef feature. Stony reef can be categorised according to Irving (2009) with additional clarification provided by Golding et al. (2020). The criteria state that low resemblance stony reef can be included as an Annex 1 feature where there is "strong justification". NRW currently advise that any justification for inclusion of low resemblance stony reef should be based on the following:</p> <ul style="list-style-type: none"> <li>1. the associated biological community is composed of a diverse mix of epibiota, including erect and / or branching forms, and / or</li> <li>2. the substrate is relatively stable and allows longer lived or slow growing epibiota to persist. NRW therefore agrees with the conclusion presented in the project application that the discrete patches of stony habitats found in the ECC area would not qualify as Annex I stony reef.</li> </ul>	
REP1-080-2.3.4	<p>NRW considers that the magnitude of impact from the potential introduction of marine invasive non-native species (mINNS) should be presented as low and not negligible (Volume 2: Chapter 5: Section 5.11.4, paragraph 191[APP-051]) as there is a continuous risk of mINNS being introduced (please also see paragraph 2.3.6). Notwithstanding this, we consider that the significance of the impact would still be minor and therefore not significant in EIA terms.</p>	<p>The Applicant notes and welcomes agreement that the significance of effect would remain minor and therefore non-significant in EIA terms.</p>
REP1-080-2.3.5	<p>We acknowledge the commitment of the Applicant to produce a biosecurity risk assessment to be conditioned within the marine licence, as outlined in the Schedule of Mitigation [APP310] and the Marine Licence Principles document [AS-023]. NRW recommends that the marine biosecurity plan is a free-standing document kept separate to the terrestrial plan provided in the Outline INNS Management Plan [APP-323]. NRW should be consulted on the suitability of a marine biosecurity risk assessment and plan ahead of commencement of activities. Clarity is required on the most appropriate regulatory mechanism needed to secure it, but we advise it would need to be secured by both the marine licence and the DCO given jurisdictional overlap.</p>	<p>The Applicant provided a response to this point (RR-015-2.4.5 in REP1-001).</p> <p>This is proposed to be freestanding and separate to the onshore INNS Management Plan which is secured under R10(2)(k) of the draft DCO (REP1-008).</p>
REP1-080-2.3.6	<p>We note under Section 10.1.1, paragraph 130 [APP-051] that the Applicant discusses the introduction, in 2006, and subsequent eradication of slipper limpet to the mussel lays in the Menai Strait. Please be aware that slipper limpet has recently been found in the Menai Strait and Conwy Bay SAC (please refer to</p>	<p>This agreement is noted and welcomed by the Applicant.</p>



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	the NBN Atlas to view records). Notwithstanding, we agree with the conclusion of the RIAA that provided the mitigation measures are adhered to (production of a biosecurity risk assessment and management plan), there will be no adverse effect on site integrity (AEOSI) in the context of the conservation objectives of the Menai Strait and Conwy Bay SAC.	
REP1-080-2.3.7	Should the Port of Holyhead be used for the berthing of vessels during construction, operation and/or decommissioning, then we advise that specific management measures may be required in addition to standard biosecurity risk assessment protocols. This is due to the presence of the highly invasive carpet seasquirt <i>Didemnum vexillum</i> . Any specific measures that might be required should be managed via the marine biosecurity risk assessment and management plan, to be agreed in writing with NRW post-consent, once further details are known.	This is noted by the Applicant. As described above, the Applicant has proposed that a marine Biosecurity Plan be secured as a condition of any Marine Licence granted by NRW as part of the PEMP (Condition 16 of the Marine Licence Principles (REP1-025; Document 2.22 of the Applicant's Deadline 2 submission)).
REP1-080-2.3.8	We note that the following Section 7 habitats protected under the Environment (Wales) Act 2016 have been reported as being present within the development: <i>Sabellaria alveolata</i> and peat and clay exposures. Both the small patches of <i>Sabellaria alveolata</i> and the piddocks in clay are found in existing pipelines or in small patches on the boundary of the cable route and as noted by the Applicant, will remain in place and undisturbed. Therefore, there will be no potential impact on these Section 7 habitats from the development	This agreement is noted and welcomed by the Applicant.
REP1-080-2.4.1	<p>Saltmarsh</p> <p>-Clwyd Estuary</p> <p>Clwyd Estuary We note that the onshore cable will intersect Atlantic salt meadow at the Clwyd Estuary. Whilst the Clwyd Estuary is not designated as a SAC or Site of Special Scientific Interest (SSSI), saltmarsh is a Section 7 habitat (being a habitat type which in the opinion of the Welsh Ministers are of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales) under the Environment (Wales) Act 2016. We note that there is a commitment in the Crossing Schedule [APP-121] for the use of trenchless techniques (for example, Horizontal Directional Drilling (HDD)) underneath the Clwyd Estuary. Confirmation with respect to how the cable will cross the river if it is undergrounded, the techniques to be employed (being deep enough to avoid the saltmarsh and minimise cable exposure), and identification of</p>	As noted in the Applicant's response the NRW's RR on this point (RR-015-2.5.1 of REP1-001), the Applicant confirms that trenchless crossing techniques (such as HDD), will be used for the installation of cables beneath the River Clwyd with above ground construction works located to the east and west of the existing flood defence embankments (and therefore outside the area identified as saltmarsh within the Habitat and Hedgerow Survey Report (APP-125)). Although construction works within the saltmarsh area would be underground, there could be a requirement for personnel to access the saltmarsh area on foot in order to monitor and guide the HDD (or other underground equipment).

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	appropriate entry and exit sites (pits) is recommended. Such detail should be specified in the Outline CMS [APP-313].	
REP1-080-2.4.2	In addition, given that the Clwyd estuary is tidal, we advise that the Secretary of State and / or NRW Permitting Service (PS) will need to determine whether the detailed construction methods are to be agreed - with relevant signposting - in the ML or the DCO, or both. We are aware that the NRW PS has requested further information from the Applicant with regards to the cable laying works under the Clwyd estuary, as the activity will be licensable under section 67 of the Marine and Coastal Access Act 2009.	The request from NRW PS has been noted by the Applicant. The Applicant is providing the necessary information to NRW in response on 25 November 2022 as described within Document 2.21 of the Applicant's Deadline 2 submission. The Applicant has provided a revised version of the Marine Licence Principles (Document 2.22 of the Applicant's Deadline 2 submission) that includes this additional marine licensable area.
REP1-080-2.5.1	Fish and Shellfish Ecology NRW considers that a robust assessment has been carried out to support the overall conclusions of no significant impacts on fish and shellfish receptors.	The Applicant notes and welcomes agreement on these points following discussion with NRW and provision of the Fish and Shellfish Clarification Note (REP1-003).
REP1-080-2.5.2	NRW agrees that the data collected through the site-specific surveys, through the desktop review of existing literature, and data sources are sufficient to appropriately characterise the fish and shellfish ecology throughout the array and export cable corridor.	
REP1-080-2.5.3	NRW agrees with the conclusion of the RIAA that the project will not undermine the conservation objectives of the designated migratory fish features of the River Dee and Bala Lake SAC and Dee Estuary SAC.	
REP1-080-2.5.4	The assessment asserts that Atlantic salmon do not pass through the array area and are therefore unlikely to be exposed to potential impacts from noise. However, we note that evidence supporting this assertion is not available. However, NRW agrees that Atlantic salmon are not considered to be particularly sensitive to underwater noise impacts and furthermore, will only be transient in the array area. Therefore, NRW agrees with the overall conclusion of no AEOSI on the River Dee and Bala Lake SAC	
REP1-080-2.5.5	NRW raised two potential areas of concern in our Relevant Representations regarding the impact assessment of fish valued ecological receptor species (VERs) 1. The concerns related to: (1) errors and inaccuracies in the assessments of impact to sandeel from construction piling noise and that fish are modelled as fleeing rather than static receptors, and: (2) some of the assumptions made	

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
	in the cumulative environmental assessment. (1 - Valued Ecological Receptors (VER's) are the agreed list of fish species which are considered to be at risk from the development and therefore relevant to the assessments carried out in the ES.)	
REP1-080-2.5.6	"Following the submission of NRW's Relevant Representations, NRW has met with the Applicant (6/9/2022) to further discuss the concerns pertaining to the assessment of impacts to fish from piling noise. This has resulted in additional information being provided to NRW in the form of a clarification note <i>titled Fish and Shellfish Clarification Note</i> dated September 2022, which corrects the error for sandeel and presents impact scenarios based on modelling fish as static receptors. NRW are now satisfied that the revised impact figures presented in the note for sole, sandeel, plaice, mackerel, cod and whiting are realistic and that, in conjunction with the assessment, provide evidence for the conclusion of 'minor adverse' effects in the Fish and Shellfish Ecology Chapter (Volume 2: Chapter 6 [APP052]). We advise that the Applicant submits the Clarification Note into the DCO Examination at the next available deadline.	
REP1-080-2.5.7	NRW notes the CEA undertaken for fish receptors, in Section 6.13.2 (Volume 2: Chapter 6 [APP-052]) - the Applicant has undertaken an assessment of the potential cumulative effects from construction noise and vibration on fish receptors. NRW agrees with the projects identified as being in scope.	This is noted and welcomed by the Applicant.
REP1-080-2.5.8	However, some of the reasoning provided to support the conclusions of <i>minor adverse effect</i> are speculative. The Applicant states at paragraph 359 [APP-052]: " <i>It is noted that there is a broadscale push from regulators and Statutory Nature Conservation Bodies 1 Valued Ecological Receptors (VER's) are the agreed list of fish species which are considered to be at risk from the development and therefore relevant to the assessments carried out in the ES.(SNCBs) within the UK towards the use of technologies to reduce the noise emitted during offshore wind construction works. The method used or the mechanism by which this may be enforced is yet to be determined however it may comprise using non-piled structures (e.g.,GBS or suction bucket structures) or at source noise mitigation (e.g., bubble curtains or the BLUE piling system)</i> ". NRW does not consider it appropriate for the cumulative assessment to rely on potential future regulations or mitigation that has no commitment or delivery mechanism attached to it.	<p>The Applicant has provided a clarification note (Document 2.28 of the Applicant's Deadline 2 submission) in response to these points, in addition to a similar point raised in relation to Marine Mammals (REP1-080-2.7.13).</p> <p>The Applicant can confirm that the ES conclusions remain valid in light of this point.</p>



REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-2.5.9	<p>NRW recognises that future developments will need to take account of the Awel-y-Môr predicted noise impact in their cumulative assessments. We do not, however, agree that there is no potential for simultaneous, partly overlapping, or sequential construction noise from planned offshore windfarms projects to adversely affect consecutive spawning seasons of fish species. We note that the CEA has focussed on impacts to Herring, however other VERs such as Atlantic cod are amongst the most hearing sensitive fish, are sensitive to anthropogenic noise, masking or disrupting mating and spawning behaviour, and have high intensity spawning and nursery grounds throughout Liverpool Bay (Ellis et al 2012). It should be noted that this point does not relate to the omission of particular projects in the CEA, rather it relates to the consideration of how impacts from construction noise on VERs within the spawning grounds in Liverpool Bay, will be considered in the absence of speculative or potential future regulations acting to mitigate the effects. NRW advises that the Applicant confirms whether the conclusion of minor adverse effects remains in light of this point.</p>	
REP1-080-2.6.1	<p>Marine Ornithology</p> <p>In our Relevant Representations, NRW advised that a detailed assessment of the potential impacts of the Awel-y-Môr project on the breeding seabird features of Pen-y-Gogarth / Great Orme's Head Site of Special Scientific Interest (SSSI) should be undertaken, as this has not been carried out sufficiently to enable the effects on the features of the site to be assessed. The site is designated for breeding Black-legged Kittiwake <i>Rissa tridactyla</i> (hereafter referred to as Kittiwake), Common Guillemot <i>Uria aalge</i> (hereafter referred to as Guillemot) and Razorbill <i>Alca torda</i> (hereafter referred to as Razorbill).</p>	<p>The Applicant held a consultation meeting with NRW in relation to assessment of Pen-y-Gogarth / Great Orme's Head seabird features on 6th September 2022 to agree an approach to assessment. Following consultation, the Applicant has submitted an assessment clarification note at Deadline 1 (REP1-016) detailing the predicted impacts apportioned to Pen-y-Gogarth / Great Orme's Head seabird features following the agreed approach to assessment. The conclusions of which confirmed that potential for significant adverse effect in relation to impacts from AyM to Pen-y-Gogarth / Great Orme's Head kittiwake, guillemot and razorbill features can be ruled out.</p>
REP1-080-2.6.2	<p>In discussion with the Applicant, NRW has advised that the effects of displacement on auks (Guillemots and Razorbills) and collision risk mortality of Kittiwakes should be further assessed for the Pen-y-Gogarth / Great Orme's Head site. We advised that displacement and collision risk would then need to be apportioned using the Scottish Natural Heritage (now NatureScot) apportioning tool (SNH 2018) in order to understand the effects on the features of Pen-y-Gogarth / Great Orme's Head SSSI. If apportionment is greater than or equal to 1% then a Population Viability Analysis would also be required.</p>	<p>The Applicant welcomes further discussion with NRW on this matter following submission of the clarification note and will work to come to agreement via the SoCG between the Applicant and NRW.</p>

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-2.6.3	The proposed location for Awel-y-Môr is approximately 10km from Pen-y-Gogarth / Great Ormes Head Site SSSI (Figure 1; hereafter referred to as Pen-y-Gogarth SSSI). The cliffs host a large colony of breeding seabirds, and the site is designated for breeding Kittiwake, Guillemot and Razorbill. This is the second largest Kittiwake breeding colony in Wales and the largest in North Wales, supporting approximately 821 pairs each year (5-year mean of peak counts 2017-2022 = 821 pairs, excluding 2020 when no data were collected due to the COVID-19 pandemic). In addition, the site supports around 2149 breeding pairs of Guillemot and 236 breeding pairs of Razorbill each year (figures also based on 5-year mean peak 2017-2022 excluding 2020). (NRW provided a figure of the location of Great Ormes Head / Pen-y-Gogarth SSSI).	
REP1-080-2.6.4	"Displacement of seabirds, both during construction and operation, of offshore windfarms is widely recognised as one of the main impacts on biodiversity from offshore windfarms and can impact population dynamics (Dierschke et al., 2016; Welcker and Nehls, 2016). The construction, operation and decommissioning of windfarms have the potential to impact seabirds by displacing individuals from foraging habitats. The impact of displacement is particularly significant for breeding seabirds as they are constrained to obtaining food within a certain distance from the breeding colony. Displacement is likely to result in changes to daily energy and time budgets. Such changes may impact on the body condition of adult breeders which, in turn, can affect breeding success, adult survival and, ultimately, population size. Additionally, breeding success of seabirds may be affected directly if provisioning rates of food from adults to chicks reduce significantly. Research suggests that displacement in Guillemots and Razorbills can be variable. For example, Welcker and Nehls (2016) conducted a literature review of displacement studies, concluding that there was strong evidence that Guillemots and Razorbills are displaced by offshore windfarms. However Dierschke et al. (2016) concluded that these species 'weakly avoided' windfarms. It is possible that displacement of auks may be state-specific (breeding or non-breeding), or it may be due to habitat quality and/or availability (e.g. birds will be more easily displaced from poorer quality habitat or where habitat is not limiting). Sensitivity Indexes for Guillemot and Razorbill indicate that both species have a medium level of sensitivity to windfarm displacement, relative to other species (Garthe and Hüppop, 2004).	As detailed within the Offshore Ornithology chapter of the ES (APP-050), the Applicant undertook a detailed review of available information in relation to displacement effects from AyM. This included the most comprehensive review to date of displacement and mortality evidence undertaken for auk and gannet species for Hornsea Project Four (Orsted 2022a; Orsted 2022b), post consent monitoring data for GyM and the SNCB interim guidance on displacement (SNCBs, updated 2022). Prior to undertaking displacement assessments for AyM, the Applicant consulted with NRW on their preferred approach to displacement assessments as detailed in Volume 4, Annex 4.5 of the ES (Offshore Ornithology Scoping and Consultation Responses) (APP-099) and assessed accordingly.

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-2.6.5	<p>The collision of seabirds with the rotor blades of turbines is a known impact of offshore wind farms (Drewitt and Langston, 2006; Fox et al., 2006; Furness et al., 2013). This can cause direct mortality in adult birds, and indirect mortality for chicks and eggs if adults do not return to the breeding site. The resulting additional mortality may have a substantial impact at a population level because seabirds are long-lived species with a delayed maturity and small clutch size (Cairns, 1992). Estimates of the number of potential bird collisions with turbines reflect both the abundance of a species in the area concerned and flight behaviour, making some species more likely to collide than others (Furness et al., 2013). Models have been developed which estimate species-specific collision risk, accounting for characteristics including body length, wingspan, flight speed and level of nocturnal activity (Band and Hermansen, 2012). A key aspect of flight behaviour which contributes to estimates of collisions is the height at which birds fly (Chamberlain et al., 2006; Furness et al., 2013). Studies based on aerial survey data suggest that Kittiwake flight heights range from approximately 1-20m above sea level, with the majority recorded at approximately 8-12m (Johnston and Cook, 2016). Therefore, Kittiwakes are sensitive to collision with offshore turbines (Bradbury et al., 2014), and given the wide-ranging nature of this species, individuals may be at risk of collision with several windfarms both during a season and across their life cycle. We note that for Awel-y-Môr the minimum distance from Mean High Water Springs (MHWS) to the lowest point of the rotating blades for each turbine is 22m, however collision risk modelling is still needed to quantify the likely risk to this species from this development.</p>	<p>The Applicant consulted on and agreed with NRW the approach to collision risk assessment of kittiwake and other sensitive species as detailed in Volume 4, Annex 4.5 of the ES (Offshore Ornithology Scoping and Consultation Responses) (APP-099). The resulting impact assessment for kittiwake and other sensitive species in relation to collision risk from AyM alone and cumulatively with other projects is presented within the Offshore Ornithology chapter of the ES (APP-050).</p>
REP1-080-2.6.6	<p>We consider that it is possible that Awel-y-Môr could have a significant effect on the breeding seabird features of Pen-y-Gogarth SSSI, through displacement of birds or through bird collisions with the windfarm. Guillemots and Razorbills could be subject to displacement, whilst Kittiwakes could be subject to collision mortality.</p>	<p>Please see Applicant's response to REP1-080-2.6.1 above which summarises that the Applicant has submitted a clarification note at Deadline 1 (REP1-016) detailing the predicted impacts apportioned to Pen-y-Gogarth / Great Orme's Head seabird features following the agreed approach to assessment. The conclusions of which confirmed that potential for significant adverse effect in relation to impacts from AyM to Pen-y-Gogarth / Great Orme's Head kittiwake, guillemot and razorbill features can be ruled out.</p>
REP1-080-2.6.7	<p>The Applicant has not presented an assessment of the likely effects on the breeding seabird features of Pen-y-Gogarth SSSI, as such NRW are unable to conclude that there is no significant effect on the features of the site. We advise that the effects of displacement on Guillemots and Razorbills should be assessed, as well as collision risk mortality of Kittiwakes.</p>	

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-2.6.8	<p>NRW advise undertaking a displacement assessment for Guillemot and Razorbill using the Joint SNCB guidance and matrix SNCB (2022)<sup>2</sup>. Due to the uncertainty around specific displacement and mortality rates we advise the applicant to consider a range of rates for Guillemot and Razorbill as follows:</p> <ul style="list-style-type: none"> <li>➤ Buffer (km): 2km</li> <li>➤ Displacement rate range: 30-70%</li> <li>➤ Mortality rate range: 1-10%</li> </ul> <p>(2 - The use of the Joint SNCB guidance and matrix SNCB (2022) is the approach recommended by the Statutory Nature Conservation Bodies (SNCBs) to ensure a standard and consistent approach between different developments, according to the best available evidence.)</p>	
REP1-080-2.6.9	<p>Collision Risk Modelling (CRM) should be used to calculate the collision risk for Kittiwake. This uses mean monthly densities of birds recorded in flight only. We advise using either the Band model (Band and Hermansen, 2012) Excel spreadsheet or the stochastic model R shiny (sCRM) (which is based on the Band model). The sCRM Shiny app and associated user guide available from: <a href="https://www.gov.scot/publications/stochastic-collision-riskmodel-for-seabirds-in-flight/">https://www.gov.scot/publications/stochastic-collision-riskmodel-for-seabirds-in-flight/</a>. Avoidance rates for use in CRM are advised in the Joint SNCB response to the Marine Scotland Science Avoidance Rate Review (SNCB, 2014).</p>	
REP1-080-2.6.10	<p>To determine connectivity with breeding seabird sites, displacement and collision risk will then need to be apportioned using the Scottish Natural Heritage (now NatureScot) apportioning tool (SNH, 2018). If apportionment is greater than or equal to 1% of baseline mortality, then a Population Viability Analysis (PVA) will also be required. This will estimate the effects on these features over the 25-year life of the windfarm to see how the project is likely to affect Pen-y-Gogarth SSSI.</p>	
REP1-080-2.6.11	<p>NRW has discussed these issues with the Applicant, and it is our understanding that the above work is being undertaken. As such, NRW reserves its position on this matter until the results of the collision risk modelling and displacement assessments (and PVA if appropriate) for this site and features are submitted - at which point, we will provide further advice. Should this work not be submitted, we will be unable to conclude / determine or rule out, as the case may be, the</p>	

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
	likely damage to the special features of Pen-y-Gogarth SSSI. We advise the Applicant to submit these results as soon as possible.	
REP1-080-2.6.12	The proposed project location is adjacent to Liverpool Bay / Bae Lerpwl Special Protection Area (hereafter referred to as Liverpool Bay SPA). Liverpool Bay SPA encompasses marine areas supporting large aggregations of wintering Red-throated Diver <i>Gavia stellata</i> and Common Scoter <i>Melanitta nigra</i> .	This is noted by the Applicant, and the potential for LSE on this site has been considered in the RIAA (APP-027).
REP1-080-2.6.13	Red-Throated Diver (RTD) and Common Scoter are features of Liverpool Bay SPA, and Common Scoter are included as a priority species in the section 7 list made pursuant to the Environment (Wales) Act 2016. Both species are sensitive to anthropogenic disturbance and displacement (Fliebsbach et al., 2019; Kaiser et al., 2002). The Applicant has stated that they will produce a vessel traffic management plan (paragraph 47 of APP-050), and NRW welcomes this. We agree that this vessel traffic management plan is needed, and that it uses measures such as (but not limited to) restricting vessel movements to existing navigation routes. This is necessary to avoid or reduce disturbance, and therefore displacement. As requested by the Applicant, we will advise them in producing the plan. NRW would be provided with an outline plan for comment at the Applicant's earliest opportunity. Subject to an appropriate vessel traffic management plan being agreed, in writing by NRW, and secured as a condition of the ML, we consider it to be unlikely that there will be an adverse effect on Liverpool Bay SPA.	<p>The Applicant welcomes NRW's offer to work together to produce an outline vessel traffic management plan and concluding that subject to a condition in the marine licence for a vessel traffic management plan, an AEoI could be ruled out in relation to the red-throated diver and common scoter features of Liverpool Bay SPA with respect to disturbance and displacement.</p> <p>The Applicant expects this plan to be secured via a condition in any Marine Licence granted by NRW (see Condition 34 of the Marine Licence Principles (Document 2.22 of the Applicant's Deadline 2 submission)).</p>
REP1-080-2.6.14	"From the evidence provided by the Applicant, it does appear that the extent of the supporting habitat for RTD within Liverpool Bay SPA will be maintained if the project is constructed, and therefore there will be no adverse effect on the RTD feature of Liverpool Bay SPA from habitat loss. However, we note that the lack of displacement of RTD in this part of Liverpool Bay SPA is not consistent with what has been observed in other areas of Liverpool Bay SPA as well as in other areas of the UK and Europe where strong displacement of RTD by offshore windfarms have been observed. For example, research by Heinänen et al (2020) found that that RTD were strongly displaced within and up to 5km from offshore windfarms, with effects decreasing with distance away from the windfarm site. Heinänen et al (2020) found that displacement effects were very strong up to 5 km away, but a significant effect was still detected up to 10–15	<p>The Applicant welcomes NRW's agreement that the extent of the supporting habitat for RTD within Liverpool Bay SPA will be maintained if the project is constructed, and therefore there will be no adverse effect on the RTD feature of Liverpool Bay SPA from habitat loss.</p> <p>The Applicant also welcomes NRW's agreement that the evidence as presented in Section 4.12.1 of the Offshore Ornithology chapter of the ES (APP-050) suggests that RTD within Liverpool Bay SPA do show the same levels of strong displacement as other North Sea populations.</p> <p>The Applicant will engage with NRW (as part of the separate but parallel Marine Licensing process) on the need for, and the requirements of, any potential post-consent monitoring and/ or methods. The Applicant has</p>



REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
	km away. Given this anomaly between published research findings and the evidence submitted by the Applicant, we advise that comprehensive validation monitoring before, during, and after construction is needed to confirm that it is the case that supporting habitat (as identified in the sites conservation objectives) has not been lost. Such monitoring should comprise aerial surveys to look at RTD distribution pre, during and post construction. We recommend the Applicant produces a monitoring plan for this validation work. The monitoring plan should be agreed in writing with NRW and secured as a condition of the ML.	provided revisions to the Marine Licence Principles and Schedule of Mitigation (2.22 and 2.24 of the Applicant's Deadline 2 submission, respectively) which include provision of post-construction ornithology monitoring.
REP1-080-2.6.15	Guidance which aims to assist developers in designing and undertaking robust ornithological surveys to inform data collection, assessments and post-consent monitoring requirements has been developed by NRW and may be useful to consider in respect of the above. The guidance, titled " <i>At sea ornithological survey guidance</i> " is available here: ( <a href="https://cdn.cyfoethnaturiol.cymru/media/695080/at-sea-ornithological-guidance-checked-accessible.pdf">https://cdn.cyfoethnaturiol.cymru/media/695080/at-sea-ornithological-guidance-checked-accessible.pdf</a> ).	
REP1-080-2.7.1	Marine Mammals NRW have previously advised that the project proposal has the potential to impact marine mammals.	This is noted by the Applicant. Please see responses to detailed points raised in the rows below in response to REP1-080-2.7.a.i to REP1-080-2.7.12.
REP1-080-2.7.2	Cetacean species are identified in the list under section 7 of the Environment Wales Act 2016. In addition, they are also identified as European Protected Species (EPS) in Schedule 2 of the Conservation of Habitats and Species Regulations 2017 ('the Regulations') as amended. It is an offence under Regulation 43 of the Regulations to <i>inter alia</i> deliberately capture, injure, kill, or disturb such species or to damage or destroy their breeding site. This reflects the system of strict protection afforded to such species under the provisions of the Habitats Directive.	
REP1-080-2.7.3	However, an EPS licence may be granted by NRW, as the relevant licensing body, for the purposes specified in Regulation 55(2) of the Regulations.	

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-2.7.4	<p>Exposure of marine mammals to loud sounds, such as those generated by pile driving, can lead to reductions in hearing sensitivity known as "threshold shifts" (TS). These can either be temporary (TTS), or permanent (PTS). In the UK, PTS is considered an injury (JNCC 2010). Threshold shifts are assessed using the most recent set of auditory injury criteria (currently Southall et al 2019). For impulsive noise (i.e., noise that has almost instantaneous spikes in the sound level), two metrics are used: the sound pressure level (SPL, i.e., the maximum sound level at any point) and the sound exposure level (SEL, i.e., the sound an animal is exposed to over a period of time). These two metrics account for the different aspects of impulsive noise from piling, that is: (1) exposure to sound level, and (2) duration. SEL can be used as a measure of the sound energy released over a single pile strike, a metric known as single strike SEL (<math>SEL_{ss}</math>) or summed over multiple pile strikes using a metric known as cumulative SEL (<math>SEL_{cum}</math>)<sup>3</sup>.</p> <p>When carrying out impact assessments, we often refer to instantaneous PTS (from SPL) and cumulative PTS (from <math>SEL_{cum}</math>), and the spatial extent or range (m to km) that can elicit PTS in marine mammal species from instantaneous and cumulative noise respectively.</p> <p>(3 - If a graph of sound level (dB) vs time for sound from a pile is plotted, the highest point on the graph would be SPL, <math>SEL_{ss}</math> is "the area under the graph", and <math>SEL_{cum}</math> is roughly <math>SEL_{ss}</math> x the number of pile strikes.)</p>	
REP1-080-2.7.5.a.i	<p>In our Relevant Representations and subsequent correspondence with the Applicant, NRW advised that the assessment (in the ES and RIAA) of the impacts of underwater noise on marine mammals, such as auditory injury and associated disturbance, was insufficient and should be improved in order to enable the risks to be fully and adequately assessed. The reasons for this are as follows:</p> <p>a. NRW advised that additional modelling should be carried out and additional model details provided to inform assessments of underwater noise and PTS onset, to include carrying out Interim Population Consequences of Disturbance (iPCoD) modelling for harbour porpoise disturbance and PTS injury, including detail of the modelling parameters used which, unlike for other species, is not included in the ES.</p> <p>i. Since the production of our Relevant Representation, NRW have conducted in-house iPCoD modelling for harbour porpoise (using the beta (unpublished)</p>	<p>The Applicant is pleased to note that NRW is satisfied that AEOSI can be ruled out. As requested, for each of the disturbance thresholds presented in the Marine Mammal Clarification Note (REP1-002), the % of the CIS MU has also been presented.</p> <p>The Applicant provided the Marine Mammal Clarification Note at Deadline 1 (REP1-002) in relation to this matter.</p> <p>The Applicant confirms that cumulative PTS will be mitigated in the final MMMP unless guidance and evidence at the time suggest that it is not appropriate to do so. Therefore, the magnitude of PTS impact is mitigated to negligible levels to all marine mammal species by the MMMP which is expected to be conditioned in any Marine Licence granted by NRW (Condition 35 of the Marine Licence Principles (REP1-025)).</p>

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
	<p>Cumulative Effects Framework project web-based portal [CEF (ceh.ac.uk)] – this is a web based interface that allows iPCOD v5.2 to be used in a more 'user-friendly' way). The population input parameters used were those from Sinclair et al (2020) and Evans &amp; Cordes (in prep) (the latter being Welsh / regionally relevant population demographics) and the development parameters were as presented in the Awel-yMôr ES. A piling schedule was created by randomising 201 piling days through a single year. The worst-case PTS SEL (83) and disturbance prediction (2112: Sea Watch density scenario) (see Volume 2: Chapter 7: Tables 20 and 28 (p131 and 137) [AS-026]) were modelled. The results indicate negligible effect from the combination of PTS and disturbance to the population which indicates AEOSI can be ruled out for all harbour porpoise SACs in the Celtic and Irish Seas (CIS) Marine Mammal Management Unit (MMMU). We advised the Applicant that they should provide their own full modelling to support the conclusion of minor / negligible effect (in EIA terms) and no AEOSI on North Anglesey Marine SAC - this being in view of Conservation Objective 1: Population viability conservation objective. We advised the Applicant that until this modelling is undertaken the evidence submitted could not be relied upon to rule out AEOSI.</p>	<p>Population modelling for disturbance has already been included in the marine mammals ES chapter (AS-026)) for all species where the proportion of the MU disturbed was &gt;1%. For completeness, the Marine Mammal Clarification Note (REP1-002) presents the iPCoD modelling results using the highly precautionary SWF density estimate for harbour porpoise. This did not change the conclusion of the impact assessment for harbour porpoise (AS-026) and therefore the assessment conclusion of AEol in the RIAA (APP-027) remains valid.</p> <p>Following provision of the clarification note to NRW, the Applicant understands this matter to be agreed.</p> <p>The Marine Mammal Clarification Note (REP1-002) presents the 140 dB re 1 µPa<sub>2s</sub> SELss (ASCOBANS, 2014) and the 145 dB re 1 µPa<sub>2s</sub> SELss (Lucke et al 2009) thresholds for disturbance. As requested, for each of these, the % of the CIS MU has been presented (4.93 and 3.44% MU respectively). While the 143 dB re 1µPa<sub>2s</sub> threshold has not been specifically modelled and presented, it lies between the 140 and the 145 thresholds. Therefore, the conclusion of no AEol presented in the RIAA (APP-027) remains valid.</p>
REP1-080-2.7.5.a.ii	<p>ii. Additionally for harbour porpoise, we advised that the maximum area ensonified out to a behavioural threshold (e.g., 143 dB re 1µPa<sub>2s</sub> or similar (see d below)) should be modelled (at the furthest corners/nodes of the array footprint) and to express this maximal area as a proportion of the CIS MMMU area. In other words, the area covered by the 143dB contour should be calculated and expressed as a percentage of the CIS MMMU area. This would provide an indication of the area of habitat within the MMMU that could be potentially disturbed (i.e., causing displacement to marine mammals). The area is functionally linked to the harbour porpoise features of the SACs in the MMMU and the impact pathway (disturbance from underwater noise) manifests as displacement (albeit temporary – 1 year) from functionally linked habitat. NRW accordingly advised the Applicant that AEOSI could not be ruled out in the absence of such information, and we advised that such information should be presented by the Applicant to demonstrate no AEOSI.</p>	<p>Following provision of the clarification note to NRW, the Applicant understands this matter to be agreed.</p> <p>The Applicant is pleased to note that NRW is satisfied that the results demonstrate there is no significant effect at the population level and can be relied upon to rule out AEOSI to North Anglesey Marine SAC and all other SACs with harbour porpoise feature in the MMMU in relation to auditory injury (PTS). The Applicant now understands this matter to be agreed.</p>
REP1-080-2.7.5.a.iii	<p>iii. Following on from a meeting with the Applicant on 6/9/2022, a clarification note – <i>Marine Mammal Clarification Note</i> - dated September 2022 was issued to NRW with respect to the above issues. The Applicant conducted modelling in</p>	



REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
	<p>iPCOD as requested. NRW is satisfied that the results demonstrate there is no significant effect at the population level and can be relied upon to rule out AEOSI to North Anglesey Marine SAC and all other SACs with harbour porpoise feature in the MMMU in relation to auditory injury (PTS) (see NRW's Position Statement (<a href="https://naturalresources.wales/guidance-and-advice/business-sectors/marine/marine-mammal-management-units-in-habitat-regulations-assessments/?lang=en">https://naturalresources.wales/guidance-and-advice/business-sectors/marine/marine-mammal-management-units-in-habitat-regulations-assessments/?lang=en</a>) on use of MMMUs in HRA for map of relevant SACs).</p>	
REP1-080-2.7.5.a.iv	<p>iv. For the underwater noise disturbance impact pathway for harbour porpoise, various behavioural thresholds and a 26km Effective Deterrent Radius were explored by the Applicant in the clarification note and the predicted areas ensonified that overlapped with North Anglesey Marine SAC were quantified. All approaches indicated that less than 4% of the area of the SAC were disturbed. On this basis, NRW is satisfied that AEOSI can be ruled out (see d below for further details). However, as described above at 2.7.5a.ii, the total area ensonified and the proportion of the CIS MMMU habitat disturbed has not been described. NRW request that this further information be included in Table 2 (page 11) of the clarification note to establish the extent of noise disturbance in relation to supporting/functionally linked habitat.</p>	
REP1-080-2.7.5.b.i	<p>b. NRW advised that there was insufficient justification for the absence of assessment of cumulative PTS in the Habitats Regulations Assessment (HRA); and as a result that the HRA was incomplete.</p> <p>i. Cumulative PTS (<math>SEL_{cum}</math>) has been modelled in the ES but results were not included in the HRA. This information is required for the purposes of Appropriate Assessment and in order to rule out AEOSI. Using the values in the ES (Volume 2: Chapter 7: Table 20 (p127), 21 (p128), and 23 (p131) [AS-026]) for harbour porpoise, bottlenose dolphin and grey seal respectively, NRW has subsequently modelled the effect of cumulative PTS on the relevant MMMU population for each species of relevance (bottlenose dolphin, grey seal, harbour porpoise) using iPCOD (via the CEF webbased portal: CEF (<a href="http://ceh.ac.uk">ceh.ac.uk</a>) - see section a for further modelling details). The modelling results indicated that cumulative PTS (<math>SEL_{cum}</math>) on its own is highly unlikely to result in a significant adverse effect on the population of the MMMU and therefore no AEOSI in the context of the population viability conservation objectives of any of the relevant SACs (see NRW's Position Statement on use of MMMUs in HRA for map of relevant SACs). Nevertheless, we advised the Applicant that they would need to conduct and</p>	<p>The Applicant is pleased to note that NRW is now satisfied that the information provided addresses their concerns and supports the conclusion of no AEOSI from this pathway and no further information is required in this regard.</p> <p>Please see the Marine Mammal Clarification Note (REP1-002). The Applicant confirms that cumulative PTS will be mitigated in the final MMMP unless guidance and evidence at the time suggest that it is not appropriate to do so. Therefore, the magnitude of PTS impact is negligible to all marine mammal species with provision of a MMMP which is secured under Condition 35 of the Marine Licence Principles (REP1-025; Document 2.22 of the Applicant's Deadline 2 submission).</p> <p>Population modelling for disturbance has already been included in the marine mammals ES chapter (AS-026) for all species where the proportion of the MU disturbed was &gt;1% and therefore the AEol conclusion remains valid.</p>

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
	present such information to be able to consider cumulative PTS in the HRA and rule out AEOSI.	
REP1-080-2.7.5.b.ii	ii. Following on from a meeting with the applicant on 6th September 2022, a clarification note – <i>Marine Mammal Clarification Note</i> - dated September 2022 was issued by the Applicant to NRW with respect to the above issues. The Applicant conducted modelling of cumulative PTS in iPCOD as requested by NRW (as described in 2.7.5b.i above). Results indicate, as concluded above, that there is no AEOSI to any of the relevant SACs (see NRW's Position Statement on use of MMMUs in HRA for map of relevant SACs) in Wales with marine mammal features. We are now satisfied that the information provided addresses our concerns and supports the conclusion of no AEOSI from this pathway and no further information is required in this regard.	
REP1-080-2.7.5.c.i	<p>c. NRW advised that there were insufficient grounds to conclude that PTS-onset risk has a negligible impact on harbour porpoise because cumulative PTS onset had been excluded from the Marine Mammal Mitigation Protocol (MMMP)</p> <p>i. It is NRW's understanding that cumulative PTS was not included in the MMMP [APP107] because the Applicant argued that the assumptions that underpin the PTS SEL<sub>cum</sub> metric (i.e. the equal energy hypothesis) lead to precautionary ranges, and that SEL<sub>cum</sub> is therefore not valid. While there has been research to try to find an alternative to the equal energy hypothesis, the general scientific consensus is that there are not enough data yet to support a departure from this model. The Southall et al (2019) thresholds recommend the use of dual metric criteria (i.e., SPL and SEL) so even though in its current form, SEL<sub>cum</sub> gives precautionary results it is the best way there is of assessing multiple consecutive instances of impulsive noise. We therefore advised that the Applicant continues to use the Southall et al 2019 thresholds and includes instantaneous PTS (SPL) and cumulative PTS (SEL) in the assessments (EIA, HRA) and the MMMP.</p>	<p>Please see the Marine Mammal Clarification Note (REP1-002).</p> <p>The Applicant confirms that cumulative PTS will be mitigated in the final MMMP unless guidance and evidence at the time suggest that it is not appropriate to do so. Therefore, the magnitude of PTS impact is negligible to all marine mammal species with provision of a MMMP which is secured under Condition 35 of the Marine Licence Principles (REP1-025; Document 2.22 of the Applicant's Deadline 2 submission).</p> <p>The Applicant also confirms that the EPS licensing process will be followed in the post-consent phase as described in Application Document 5.4 Consents and Licences Required Under Other Legislation (APP-037).</p>
REP1-080-2.7.5.c.ii	ii. The MMMP (Volume 4: Annex 7.2 [APP-107] states: "The primary aim of this draft Outline MMMP is to set out the measures proposed to reduce the risk of Permanent Threshold Shift (PTS) auditory injury to any marine mammal species in close proximity to the pile driving for the installation of AyM foundation structures to negligible (as defined in Section 1.5 [sic – should be section 7.5] in Volume 2, Chapter 5 [sic – should be chapter 7]: Marine Mammals)."	

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-2.7.5.c.iii	<p>iii. The Applicant proposes the use of the industry standard protocol for minimising the risk of injury (PTS) to marine mammals (JNCC (2010): Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise   JNCC Resource Hub) i.e. 'standard mitigation' (with a slightly enhanced observation zone of 640m (cf the usual 500m)). However, this would not 'mitigate' against cumulative PTS for harbour porpoise when considering the proposed Worst Case Scenario (WCS) (Multileg 2 at 1 location: NW [see Volume 2: Chapter 7 (Table 20 p127 of ES)] [AS-026]), which suggests cumulative PTS will extend to 6.3km (and for the next Worst Case [monopiles at NW location] suggests cumulative PTS extends to 4.3km). Cumulative PTS for other Annex II (bottlenose dolphin and grey seal) species is predicted to extend to less than 100m and, as such, standard mitigation is sufficient.</p>	
REP1-080-2.7.5.c.iv	<p>iv. However, our in-house modelling using iPCOD (on Annex II species only – see a above) suggests there would not be an AEOSI, or a likely significant effect on the environment in EIA terms as a result of cumulative PTS (with or without the additional pathway of disturbance). Thus, the protocols for minimising injury (i.e., 'mitigation') would not be formally required for the purposes of removing AEOSI in HRA or reducing significant effects in EIA. Nevertheless, the 'mitigation' should be incorporated in accordance with industry best practice to reduce effects in relation to EPS protection (deliberate injury i.e. PTS). The industry standard mitigation would adequately mitigate against instantaneous PTS but not cumulative PTS in harbour porpoise. Therefore, although mitigation for cumulative PTS may not be a requirement for AA / EIA in this case the use of the mitigation protocols is generally required to minimise risk of injury in relation to EPS and the Applicant is advised to apply for an EPS licence for injury (to individuals).</p>	
REP1-080-2.7.5.c.v	<p>v. One of the tests for EPS licensing is that of "<i>no satisfactory alternatives</i>" (alternative solutions). Mitigation such as Acoustic Deterrent Devices (ADDs) and Noise Abatement Systems (such as bubble curtains) will be a consideration when considering this test. It should be noted that one of the other tests for EPS licensing is to assess whether "<i>...the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status (FCS) in their natural range</i>".</p>	

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-2.7.5.c.vi	vi. NRW advise the Applicant that results and interpretation from modelling cumulative PTS in harbour porpoise using iPCOD (as described in a above) should be included in the MMMP to allow NRW PS to confirm no effect (or otherwise) in relation to HRA or EIA and evaluate mitigation options in relation to EPS licensing.	
REP1-080-2.7.5.c.vii	vii. We note that the Applicant's intention is that "...The MMMP will be secured as a condition within the Marine Licence". EPS mitigation and industry best practice mitigation may be a consideration and an actionable condition in the Marine Licence and/or the EPS licence but the licensing for EPS would be the responsibility of the Species Licensing team within NRW.	
REP1-080-2.7.5.c.viii	viii. Following on from a meeting with the applicant on 6/9/2022 a clarification note – <i>Marine Mammal Clarification Note</i> - dated September 2022 was issued to NRW with respect to the above issues. The Applicant has confirmed (on page 7) that "...cumulative PTS will be mitigated in the final MMMP if guidance and evidence at the time suggest that it is appropriate to do so. This will ensure that the potential risk of PTS is reduced to negligible levels for all species".	The Applicant confirms that this sentence has been updated in the clarification note (REP1-002) to state that cumulative PTS will be mitigated in the final MMMP unless guidance and evidence at the time suggest that it is not appropriate to do so.
REP1-080-2.7.5.c.ix	ix. NRW suggests editing this sentence to: "... the Applicant can confirm that cumulative PTS will be mitigated <u>as outlined</u> in the final MMMP <u>unless</u> guidance and evidence at the time suggest that it is not appropriate to do so...". In other words, NRW request that mitigation is considered for cumulative PTS in the likely event that at the time there will be no new evidence that improves our collective understanding of cumulative PTS.	
REP1-080-2.7.5.c.x	x. NRW advise that mitigation is required in respect of EPS protection and needs to be regulated by the ML and/or the EPS licence (for which an application has not yet been submitted and which the applicant is encouraged to do)	The Applicant confirms that the EPS licensing process will be followed in the post-consent phase as described in Application Document 5.4 Consents and Licences Required Under Other Legislation (APP-037).
REP1-080-2.7.5.d.i	d. NRW does not recommend the use of dose/response (D/R) curves to conduct an area-based assessment to estimate the area of harbour porpoise habitat disturbed; D/R curves are used to estimate the number of animals affected, not the habitat/area affected. Given that disturbance for harbour porpoise SACs is defined through spatial and temporal thresholds of 20% daily and 10% seasonal disturbance, as set out in the supporting advice for the disturbance conservation objective (CO2) for porpoise sites, we advise that an area-based assessment should be carried out where the extent of habitat that	The Applicant notes and welcomes agreement on these points.  Please see the Marine Mammal Clarification Note (REP1-002). Since there is no agreed threshold to assess disturbance impacts to SACs (other than the 26 km EDR approach outlined JNCC et al., 2020 - which NRW does not subscribe to), the Applicant has provided a selection of different disturbance criteria that could be applied to expand the assessment presented in the RIAA. The Applicant confirms that none of these result in



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	<p>is ensonified to a level that might produce significant disturbance is determined. Although there is a strong link between area lost and numbers disturbed, directly equating the probability of population response to loss of habitat / loss of habitat quality (i.e. using a D/R curve to calculate habitat loss) is currently not possible.</p> <p>Dose-response (D/R) curves are a method used to estimate the numbers of animals disturbed by underwater noise. D/R curves are based on the fact that not all animals in an impact zone will respond and are determined from field data. D/R curves consist of a graph which shows probability of a behavioural response (Y-axis) against sound level (X-axis).</p> <p>Therefore, the probability of a response, and thus the proportion of animals experiencing behavioural disturbance, will depend on the "dose" (in this case, the sound level).</p> <p>i. For harbour porpoise, NRW recommends that an unweighted noise threshold of 143 dB re 1µPa<sup>2</sup>s (un-weighted) single strike sound exposure level (Brandt et al 2018; Heinis et al 2019) is used as the extent of disturbance for impulsive noise sources. This threshold is the modelled average of six different studies of full-scale pile driving operations and thereby represents the largest amount of empirical data (Tougaard 2021). Other threshold values might be suitable (e.g. 140 dB re 1µPa<sup>2</sup>s single strike SEL - ASCOBANS, 2014; or 145 dB re 1µPa<sup>2</sup>s single strike SEL - Lucke et al 2009). The 143 dB re 1µPa<sup>2</sup>s noise contour / isopleth is overlayed onto a map of the area to determine the extent of overlap with North Anglesey Marine SAC, and the extent of the area of the SAC that is ensonified to a level that could be considered significant disturbance can then be determined. The extent of the overlap is then compared against the 20%/10% thresholds set out in the conservation objectives for the site (CO2: significant disturbance).</p>	<p>effects of greater significance than assessed in the ES or RIAA and therefore the conclusions of those assessments remain valid.</p> <p>The Applicant acknowledges that there is no information on the behavioural response of bottlenose dolphins to pile driving. In the US, under the 1994 Amendments to the Marine Mammal Protection Act, Level B harassment is defined as any act of pursuit, torment or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioural patterns. The threshold for Level B harassment is 160 dB re 1µPa SPL<sub>rms</sub> from an impulsive sound source (NMFS 1995, 2005). This was derived from Malme et al (1983 and 1984) who showed that migrating gray whale female-calf pairs showed behavioral disturbance when exposed to impulsive sound levels above 160 dB re 1µPa<sub>rms</sub>. Richardson et al (1985, 1986 and 1990) showed similar responses in migrating bowhead whales. This threshold has subsequently been used by regulatory agencies for certain sound sources (e.g., seismic and high-resolution geophysical surveys, vibratory and impact pile driving, drilling) (Guan and Brookens, 2021). This threshold is therefore not derived from, nor is it specific to dolphin species or pile driving.</p> <p>The Applicant is pleased to note that NRW agrees that using harbour seal D/R curves as a proxy for grey seal is appropriate in this case, since there is evidence that grey seal show similar reactions to harbour seals and are within the same hearing group.</p> <p>The Applicant confirms that for completeness, the Level B harassment threshold for bottlenose dolphin (160 dB re 1 µPa SPL<sub>rms</sub>) will be modelled in line with NRW advice to confirm the number of dolphins expected to be disturbed, and this will be presented to NRW as soon as possible to allow comparison with the D/R methodology used.</p>
REP1-080-2.7.5.d.ii	<p>ii. The Applicant used a harbour porpoise D/R curve as a proxy for other species of cetacean. The literature suggests that bottlenose dolphin and minke whale are more tolerant to noise than harbour porpoise. Anecdotal / qualitative observations also suggest that these species behave very differently from harbour porpoise. Therefore, applying a D/R curve from a more sensitive species (e.g., harbour porpoise) to a less sensitive species (e.g. bottlenose dolphin) is likely to result in overestimates of disturbance, which might be considered an overly precautionous approach. It is agreed that consideration should be given to</p>	

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	<p>the fact that sound energy of pile driving is highest in the low frequency range and overlaps more with the hearing range of a minke whale than with that of a harbour porpoise - pile strikes of the same unweighted single-strike SEL (SEL<sub>ss</sub>) are louder for a minke whale than a harbour porpoise. For minke whale, however, evidence from studies with sonar suggests that they are less sensitive by ca 40-50 dB re 1 µPa (Tougaard 2021). NRW acknowledges that the Applicant used a method known to be precautionary for other species and explained its basis for doing so in some detail. Although NRW would not recommend this approach, given that other threshold options are available for other species (minke whale and bottlenose dolphin) (e.g., Level B harassment: NMFS 1995, 2005)<sup>4</sup>, we do not explicitly rule this method out.</p> <p>(4 - Level B Harassment is a threshold that was first introduced in the US by NOAA/NMFS. It is a widely used general noise threshold (i.e. not species specific) for all marine mammals for assessment purposes. Thresholds are: 120 dB SPLrms for continuous noise, and 160 dB SPLrms for impulsive noise.)</p>	
REP1-080-2.7.5.d.iii	<p>iii. NRW advises that the Applicant include an analysis using a fixed threshold, such as 160 dB re 1 µPa SPL<sub>rms</sub>, for impulsive noise for bottlenose dolphin (Level B harassment: NMFS 1995, 2005) to calculate the number of dolphins disturbed. This would also be useful to compare against the results of the proxy D/R analysis. This is because D/R curves are developed from fine scale behaviour – therefore even if these species started to respond at similar sound levels, there is no guarantee that the probability curve will have the same shape for different species.</p>	
REP1-080-2.7.5.d.iv	<p>iv. There currently are not enough data to establish a D/R curve or a definite threshold for grey seal. NRW agrees that using harbour seal D/R curves as a proxy for grey seal is appropriate in this case, since there is evidence that grey seal show similar reactions to harbour seals and are within the same hearing group (Aarts et al 2017, Gotz and Janik 2010).</p>	
REP1-080-2.7.5.d.v	<p>v. Following on from a meeting with the applicant on 6/9/2022, a clarification note – <i>Marine Mammal Clarification Note</i> - dated September 2022 was issued to NRW with respect to the above issues. The Applicant conducted further area-based assessments for harbour porpoise using a range of thresholds, an EDR and the D/R, by way of comparison. All methods indicated considerably less than 20% of the area of NAM SAC would be disturbed and thus AEOSI from</p>	

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	disturbance can be ruled out. NRW are satisfied that no further information is required in this regard.	<p>NRW notes and welcomes agreement that provision and implementation of a Vessel Traffic Management Plan in consultation with NRW that considers both ornithological and marine mammal interests would sufficiently rule out LSE and AEoI. The Applicant has provided a revision of the Marine Licence Principles (Document 2.22 of the Applicant's Deadline 2 submission) that includes this at Condition 34.</p>
REP1-080-2.7.5.d.vi	vi. NRW advise adding an analysis of the area ensonified from 160dB SPL <sub>rms</sub> for bottlenose dolphin so as to compare against the D/R proxy.	
REP1-080-2.7.6	NRW previously advised that insufficient justification to support a conclusion of no Likely Significant Effect (LSE) from vessel collision for bottlenose dolphin, grey seal or harbour porpoise features of relevant SACs was presented by the Applicant, and that LSE for vessel collision should not be ruled out. The submitted Report 5.2 RIAA (see Table 4 p105 [APP-027]) lists only underwater noise as the pathway with LSE for all mammal species/SAC combinations.	
REP1-080-2.7.7	Page 65; Table 1 of the RIAA [APP-027] states: "The Applicant acknowledges this feedback. The Project is making a commitment to minimise the risk of collisions. The adoption of best practice vessel handling protocols (e.g. following the Codes of Conduct provided by the WiSe Scheme, Scottish Marine Wildlife Watching Code or Guide to Best Practice for Watching Marine Wildlife) will minimise the potential for any impact. The final codes of conduct will be discussed and agreed with NRW and JNCC through the marine licence conditions."	
REP1-080-2.7.8	While NRW encouraged the Applicant's intention to minimise the risk of collisions with vessels and to adopt best practice (as per our advice on the Preliminary Environmental Information Report (PEIR) and RIAA comments log (Table 1: RIAA [APP-027])), we considered that the potential for an LSE could not be ruled out and thus needed to be taken forward to Appropriate Assessment. We advised that the information provided by the Applicant in light of the application would likely be sufficient to inform an Appropriate Assessment and that had vessel collision been included in the RIAA, NRW would not anticipate an AEOSI from this pathway with the listed mitigation (including best practice and codes of conduct) in place.	
REP1-080-2.7.9	We noted the commitment by the Applicant to produce and implement a Vessel Traffic Management Plan in consultation with NRW. We discussed with the Applicant that whilst it appears that this plan relates solely to ornithological interests, we recommend that the Plan also appropriately considers marine	

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	mammal interests. We advised that such a plan is secured as a condition in the ML.	
REP1-080-2.7.10	Following on from a meeting with the applicant on 6/9/2022, a clarification note – <i>Marine Mammal Clarification Note</i> - dated September 2022 was issued to NRW with respect to the above issues. NRW had highlighted that a commitment to embedded mitigation cannot be used to scope out an impact from LSE. The Applicant provided additional text in the clarification note on the assessment of vessel collisions for the RIAA. NRW agrees that the proposed management of vessel traffic is sufficient to rule out any AEOSI.	
REP1-080-2.7.11	We advise that the Applicant submits the above-mentioned Clarification Note into the DCO Examination at the next available deadline.	The Applicant provided the clarification note at Deadline 1 (REP1-002).
REP1-080-2.7.12	A number of figures in the revised marine mammal Chapter 7 [AS-026] appear to be incorrect. For example, Figure 21 is supplied in place of Figure 19, and Figure 21 does not contain all the necessary data layers either time it is presented. Corrected figures should be supplied alongside confirmation of the nature of any revisions from the original version – this is required to provide NRW with confidence that the revisions and assessments have been applied correctly.	Corrected versions of these figures were provided in the Application Errata List submitted at Deadline 1 (REP1-004).
REP1-080-2.7.13	-Cumulative / in-combination effects  NRW notes that there appear to be potential discrepancies and inconsistencies with respect to the assessment of cumulative effects from underwater noise between marine mammals and fish ecology. For example, we note that several projects are missing from the Marine Mammal Cumulative Effects Assessment although they are included and qualitatively assessed for fish and shellfish. We are working with the Applicant to understand and clarify these issues. NRW reserves our position on this matter until further clarity comes forward at which point, we may advise the Examining Authority further.	See also the Applicant's response to REP1-080-2.5.8 regarding a similar comment in relation to fish and shellfish ecology. The Applicant has provided a clarification note addressing this comment in Document 2.28 of the Applicant's Deadline 2 submission.
REP1-080-2.8.1	Water Framework Directive (Offshore)  - North Wales Coastal Water Body  Hydromorphology	The Applicant notes and welcomes these agreements. It is expected that these points will form areas of agreement in the SoCG between the Applicant and NRW.



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	North Wales Coastal Water Body Hydromorphology NRW agrees with the assessment of potential effects on the hydromorphology resulting from the presence of physical structures as provided in Volume 2, Chapter 2: Marine Geology, Oceanography and Physical Processes [APP-048]. We therefore agree with the conclusions of the WFD CA for the hydromorphology element – that the proposed activities will not result in deterioration of the water body or jeopardise the attainment of its objectives.	
REP1-080-2.8.2	Biology NRW agrees with the characterisation of the biology, assessment methodology and assessment conclusions of the potential impacts on benthic receptors as outlined in Volume 2, Chapter 5: Benthic and Subtidal Ecology [APP-051]. NRW therefore agrees with the conclusions of the WFD CA for biology: habitats within the water body – that the biological elements associated with this would not be at risk of deterioration as a result of the project.	
REP1-080-2.8.3	-Clwyd Transitional Water Body Hydromorphology Based on the statement made at paragraph 128 and within Table 9 of Volume 4: Annex 3.1 [APP-094] that "...there are no current intentions to install structures which may alter the hydromorphology of the Clwyd transitional water body", NRW agrees with the conclusions of the WFD CA for the hydromorphology element within the Clwyd water body.	
REP1-080-2.8.4	Notwithstanding this, we advise that if this intention changes, and infrastructure associated with the scheme is to interact with the Clwyd transitional water body, then this will need to be appropriately assessed and the WFD CA revisited to consider this, and any potential footprint and secondary effects properly assessed.	This advice is welcomed by the Applicant. It is agreed that, should infrastructure associated with the scheme interact with the Clwyd transitional water body, it will be necessary to revisit and update the WFD Compliance Assessment accordingly.
REP1-080-2.8.5	Biology NRW agrees with the WFD CA conclusions for biology – habitats within the water body, that provided no direct interaction with the biological habitats in the Clwyd transitional water body will occur due to the proposed trenchless techniques, the project will not cause deterioration of the biological elements within the water body, or jeopardise the attainment of Good Ecological Potential, the WFD objective for the water body.	The Applicant notes and welcomes this agreement. It is expected that this point will form an area of agreement in the SoCG between the Applicant and NRW.

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-2.8.6	We note the commitment by the Applicant to utilise trenchless techniques to bring the cable underneath the Clwyd estuary. This commitment is set out in the Crossing Schedule [APP121]. We require confirmation that the techniques employed for crossing the river will be of sufficient depth to avoid any potential for interaction with the saltmarsh habitat (please also see comments at 2.4.1 – 2.4.2 above). We advise this information is provided in the Outline CMS [APP-313]. We also advise that if the proposal to utilise trenchless techniques changes, then the WFD CA will need to be revisited and any impacts properly assessed.	As noted in the Applicant's response to NRW's RR on this point (RR-015-2.5.1 of REP1-001), the Applicant confirms that trenchless crossing techniques (such as HDD), will be used for the installation of cables beneath the River Clwyd with above ground construction works located to the east and west of the existing flood defence embankments (and therefore outside the area identified as saltmarsh within the Habitat and Hedgerow Survey Report (APP-125)). Although construction works within the saltmarsh area would be underground, there could be a requirement for personnel to access the saltmarsh area on foot in order to monitor and guide the HDD (or other underground equipment).  It is agreed that, should the proposal to utilise trenchless techniques to cross the Clwyd transitional water body changes, it will be necessary to revisit and update the WFD Compliance Assessment accordingly.
REP1-080-2.8.7	The Applicant will be required to assess the potential effects of all activities associated with watercourse crossings, including the potential for secondary effects in all hydrologically connected WFD water bodies, where there is a pathway for effect, for example: sediment transport or effects to migratory species. Where doubt remains regarding the nature of the watercourse crossings, a reasonable worst-case scenario must be assumed as the basis for assessment. The assessment will also need to take into account the potential for cumulative effects where they may occur. Please also see sections 3.3.6 below.	This is noted by the Applicant. Please see responses to detailed points raised in the rows below in response to REP1-080-3.3.1 to REP1-080-3.3.7.
REP1-080-2.8.8	-Marine Water & Sediment Quality  NRW noted in its Relevant Representation that whilst we agreed with the conclusions in the ES with respect to suspended sediment (water clarity) and contaminated sediment in WFD water bodies (Chapter 3: paragraphs 129&132 [APP-049], the information presented in the MW&SQ Chapter had not been transposed in the WFD Compliance Assessment (CA) and that as such, we could not agree with the conclusions of the CA with respect to those aspects of the assessment. Our concerns regarding CA signposting were discussed in a meeting with the Applicant on 13.09.2022. It was agreed more robust signposting would be made throughout and that would be sufficient to address our concerns.	The Applicant has aimed to minimise duplication between the ES chapter for Marine Water and Sediment Quality and the WFD Compliance Assessment, with further detail relating to suspended sediment (water clarity) and contaminant concentrations in sediments, as well as implications for dissolved oxygen and phytoplankton, within a Clarification Note (REP1-015). It is understood that the note has supported this query, with no concerns for the validity of the assessment outcomes for the ES chapter or WFD Compliance Assessment.

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REP1-080-2.8.9	NRW agrees with the conclusions provided within the Marine Water and Sediment Quality Clarification Note with respect to impacts on Dissolved Oxygen and Phytoplankton by suspended sediment. We agree there will not be an impact on WFD water body status.	The Applicant notes and welcomes these agreements. It is expected that these points will form areas of agreement in the SoCG between the Applicant and NRW.
REP1-080-2.8.10	Marine Fish NRW agrees with the conclusions that the project will not impact Water Framework Directive (WFD) fish status in the affected Transitional waterbodies	
REP1-080-2.8.11	General We welcome the Applicant's proposal to produce a biosecurity risk assessment, as outlined in the Schedule of Mitigation [APP-310] and the Marine Licence Principles document [AS023]. We advise this is secured by a requirement of the DCO and a condition of the Marine Licence as it is of relevance to both aspects of the consenting process. NRW should be consulted on the suitability of a marine biosecurity risk assessment and plan prior to commencement of any works.	The Applicant has proposed that a marine Biosecurity Plan be secured as a condition of any Marine Licence granted by NRW as part of the PEMP (Condition 16 of the Marine Licence Principles (REP1-025; Document 2.22 of the Applicant's Deadline 2 submission)). This is proposed to be freestanding and separate to the onshore INNS Management Plan which is secured under R10(2)(k) of the draft DCO (REP1-008; Document 2.14 of the Applicant's Deadline 2 submission). It is agreed by the Applicant that NRW should be consulted on the suitability of the Biosecurity Plan.
REP1-080-2.9.1	Decommissioning (Offshore) NRW acknowledges the commitment to produce a Decommissioning Plan under section 105 of the Energy Act 2004 and as identified in under Requirement 20 of the draft DCO [AS-014] and in the Marine Licence Principles document [AS-023].	R21 of the draft DCO (Document 2.14 of the Applicant's Deadline 2 submission) and Condition 40 of the Marine Licence Principles document (Document 2.22 of the Applicant's Deadline 2 submission) provide that the decommissioning of the offshore aspects of the development should be in accordance with a Decommissioning Programme approved under Part 2, Chapter 3 of the Energy Act 2004. This is a legal requirement and a standard DCO requirement and ML condition for offshore wind projects.  Under the DCO, the Applicant will not be able to commence offshore works until a Decommissioning Programme in compliance with any notice served by the Secretary of State pursuant to section 105(2) of the Energy Act 2004 has been submitted to the Secretary of State for approval.
REP1-080-2.9.2	We note, from the ES, the intention to completely remove all infrastructure at the end of the operational lifetime of the project, unless, closer to the time of decommissioning it is decided that removal would lead to a greater environmental impact than leaving some components <i>in situ</i> .	
REP1-080-2.9.3	NRW considers that offshore renewable projects should produce decommissioning plans that retain all decommissioning options (maintain, full removal and partial removal); the options can then be assessed and refined closer to the time of decommissioning itself in consultation with NRW. NRW reserves its position until a draft plan is submitted at which point, we will provide further advice	

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-2.9.4	We advise that the Applicant follows the extant industry decommissioning guidance produced by BEIS ( <a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/916912/decommissioning-offshore-renewable-energy-installations-energy-act-2004-guidance-industry__1_.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/916912/decommissioning-offshore-renewable-energy-installations-energy-act-2004-guidance-industry__1_.pdf</a> )	Given the scope and remit of the Energy Act requirements in relation to offshore decommissioning, there is no precedent or need for an additional marine licence condition to duplicate this.
REP1-080-2.9.5	We note that the requirement for the production of a Decommissioning Plan for the offshore works is referenced in the draft DCO [AS-014] for the project. We recognise that there are issues that substantively overlap between the determination of the DCO and ML. However, given that the respective consents are determined under separate and distinct legal frameworks, we consider it would be prudent to understand how decommissioning plans (for both the offshore and onshore aspects of this project) will be dealt with.	
REP1-080-2.10.1	<b>Mitigation: Schedule of Mitigation and the Marine Licence Principles</b> There are a number of inconsistencies between the Schedule of Mitigation [APP-310] and the Marine Licence Principles document [AS-023] that require clarification. For example, the Schedule of Mitigation refers to a <i>Cable Specification and Installation Plan</i> to be secured as part of the marine licence, but which is not recognised in the Marine Licence Principles document as a specific document (albeit cable management plans are noted). Additionally, a <i>Vessel Traffic Management Plan</i> is proposed in Volume 2: Chapter 4: Offshore Ornithology [APP-050] but this plan does not appear within either the Schedule of Mitigation or the Marine Licence Principles document. Further, a Scour Protection Management Plan is proposed within the ES and to be secured by the ML (see also APP-310). However, AS023 notes that the plan “...is not anticipated to be needed given minimal scour predictions.”	The Applicant provided updated versions of the Marine Licence Principles and Schedule of Mitigation at Deadline 1 (REP1-025 and REP1-018, respectively). Further revisions have been provided at Deadline 2 (Documents 2.22 and 2.24 of the Applicant's Deadline 2 submission, respectively).
REP1-080-2.10.2	Such discrepancies may result in confusion and uncertainty as to the extent of measures that may be secured in respective consents. We request that clarification regarding such discrepancies and inconsistencies is provided and advise that both APP-310 and AS-023 are consistent and contain accurate reference to all proposed mitigation and plans as described in the application documents.	

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
DELETION		
REP1-080-4.1.1	<p>NRW Regulation and Permitting Services</p> <p>-Marine Licensing: Regulatory Response</p> <p>A marine licence application ('the ML application') was submitted to NRW on 30 May 2022 in respect of the marine works under the project, in respect of which a DCO under the Planning Act 2008 ('the DCO regime') is also required. The marine works comprise marine licensable activities under section 66 of the Marine and Coastal Access Act 2009 ('the MACAA'). NRW is the appropriate licensing authority in respect of the marine licence, acting on delegated authority of the Welsh Ministers. In practice, this licensing function is carried out by NRW's marine licensing team ('NRW MLT') which operates independently and separate from NRW's advisory function.</p>	This is noted by the Applicant.
REP1-080-4.1.2	<p>NRW MLT has carried out a public and technical consultation on the ML application. NRW MLT has received responses from the following consultation bodies: NRW's advisory function, JNCC, the Crown Estate, Ministry of Defence, RSPB, Welsh Archaeological Trust, Cadw, Royal Commission on Ancient and Historic Monument of Wales, NATS Safeguarding, Chamber of Shipping, National Federation of Fishermen's Organisations (NFFO), Cefas, Maritime and Coastguard Agency, Isle of Anglesey County Council, Department of Business, Energy &amp; Industrial Strategy, and the Isle of Man Department of Infrastructure. The comments received from the consultation bodies were sent to the Applicant on 4 September 2022 along with two representations received during the public consultation. On the 8 September 2022, NRW MLT requested that further information be provided by the Applicant in support of the ML application to address comments raised by the consultation bodies. A copy of this request is enclosed and a response from the Applicant is yet to be received. Following this, there may be further iterative responses from the Applicant, consultation bodies and public representees. NRW MLT is not in a position to provide detailed comments on the potential impacts of the project pending the proper determination of the ML application. Copies of consultation responses can be provided upon request, should this be of assistance to the Examining Authority.</p>	<p>The Applicant met with NRW on 26 October to agree a timeline for submission of its response to NRW's letter of 8 September as it has been agreed that this would be discussed in conjunction with the information requested by the ExA to avoid duplication.</p> <p>It has been agreed that any further information will be submitted by 25 November, along with any relevant responses from the D1.</p> <p>The Applicant continues to engage with interested parties relating to the ML application. An update on progress of discussions and Statements of Common Ground between the Applicant and interested parties are included in the Statement of Commonality (REP1-011; an update of which is Document 2.27 of the Applicant's Deadline 2 submission) which will be updated throughout the examination.</p>



REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
REP1-080-4.1.3	There is a significant amount of overlap between the proposed DCO and the ML application. Accordingly, there is also a significant overlap in respect of the supporting evidence between the respective regimes. By way of example, the environmental statement and the management plans relied upon for the purposes of the DCO regime are also, in general, applicable to the ML application. Accordingly, NRW MLT has relied upon Regulation 10 of the Marine Works (Environmental Impact Assessment') Regulations 2007 which exempts the need for an Environmental Impact Assessment ('EIA') in respect of the ML application on the basis that the EIA will be properly carried out by another consenting authority, which in this case is the Secretary of State. Under this arrangement, NRW MLT must take into account inter alia the conclusions of the Secretary of State's assessment, any conditions attached to the DCO, and mitigation and monitoring measures. A practical consequence of this therefore is that NRW MLT would not be in a position to issue a marine licence until the DCO has been issued.	This is noted, however to assist the ExA the Applicant is continuing to update the Marine Licence Principles Document (Document 2.22 of the Applicant's Deadline 2 submission) in order that the expected scope and content of any marine licence is clear and unnecessary duplication with the DCO can be avoided.
REP1-080-4.1.4	The ML application requests the issuing of three separate licences, respectively for the electricity generating infrastructure, the transmission assets, and infrastructure to facilitate the interlinking of the Awel-y-Môr project with the existing Gwynt-y-Môr offshore wind farm. NRW MLT understands that the reason behind this approach is to facilitate subsequent transfer and/or disposal of assets pursuant to the Offshore Transmission Operator (OFTO) regime requirements. NRW MLT also understands that following recent discussions with the Applicant, a fourth licence may be required in respect of drilling activities under the Clwyd estuary. NRW MLT is satisfied with this approach in principle. It is anticipated that the ML application will be determined concurrently with the DCO examination, although it is currently not possible to provide an indicative timescale in respect of the ML determination.	<p>As noted by NRW, the need for separate marine licences for the generation and transmission assets and the AyM/GyM interlink cables is driven by the OFTO regime. The transmission assets will be consented and constructed by the Applicant and must then be transferred to a separate OFTO. Having separate licences for these works avoids the complexity of splitting the marine licence post-construction and any uncertainty over enforcement. A separate marine licence for the trenchless River Clwyd cable crossing is also proposed as these works are discrete from the remainder of the offshore transmission works and are within the onshore environment.</p> <p>The Applicant continues to engage with NRW MLT and anticipates that NRW MLT will take an active role throughout the DCO examination in order to align the DCO and ML processes as far as possible.</p>
REP1-080-4.1.5	It should be noted that the ML application is determined under separate and distinct legislation and the integrity of the decision making under MACAA must be ensured and maintained.	A Marine Licence Principles document has been submitted to the ExA in order to assist the DCO examination process. The document marks a point of progress that has been reached with NRW MLT but should not be considered prejudicial to the Marine Licencing process.

REFERENCE	WRITTEN REPRESENTATION COMMENT	APPLICANT'S RESPONSE
		The Applicant continues to engage with NRW MLT and anticipates that NRW MLT will take an active role throughout the DCO examination in order to align the DCO and ML processes as far as possible.
REP1-080-4.1.6	<p>NRW MLT agrees with the current approach proposed by the Applicant whereby the DCO does not contain powers or controls which also sit within the marine licence. If one regime of regulation must deal with something according to law (the regime under MACAA) and it can deal with it adequately (for which NRW MLT, as a competent regulatory will do so), it would lead to unnecessary complexity if another regime (the DCO regime), which does not need to make the same provision, did so in any case. Ultimately, there should be avoidance of potential regulatory overlap which can give rise to problems in respect of implementation and enforcement of any duplicated consents. In respect of any works which comprise both development under the DCO regime and marine licensable activities under MACAA 2009, and where such regulatory overlap is unavoidable, then consistency between any respective duplicated provisions must be ensured. If the Examining Authority does not agree with this approach, NRW MLT requires clarity as to whether any measures, controls and provisions relevant to licensable activities will be included in the DCO, and if so, that consistency can be ensured with any corresponding conditions in the marine licence and that enforcement provisions are appropriately secured. It should be noted that NRW MLT is not in a position to formulate or present the DCO examination with a draft marine licence. This would not be possible at this stage of the determination process. Further, and in any event, NRW MLT does not routinely issue a draft licence for external consideration, regardless of the outcome of the consultation and whether or not it may be in a position to do so. This advice has been given to the Applicant in pre-application discussions with NRW MLT and accordingly, the Applicant has submitted a 'Schedule of Mitigation' and a 'Marine Licence Principles' document (application reference 5.4.1) into the DCO examination which seeks to identify conditions which have been included in previous marine licences issued by NRW MLT, and which the Applicant would expect to be incorporated in the Awel-y-Môr marine licence. Without prejudice to the general determination of the marine licence application NRW MLT is in general agreement with this document on the basis that the mitigation measures identified and proposed by the Applicant have been captured within previous Marine Licences (save as to the reference to</p>	<p>Rev C of the Marine Licence Principles document was submitted to the ExA at Deadline 1 (REP1-025) and Rev D is submitted as Document 2.22 of the Applicant's Deadline 2 submission. This includes additional details on mitigation measures set out in the updated Schedule of Mitigation submitted at Deadline 1 (REP1-018), which has also been updated and Deadline 2 (Document 2.24 of the Applicant's Deadline 2 submission). The purpose of these amendments is to confirm where the mitigation measures referred to in the Schedule of Mitigation would be secured through the ML. It also clarifies where different terms for plans and documents are used in the Schedule of Mitigation.</p> <p>The document marks a point of progress that has been reached with NRW MLT but should not be considered prejudicial to the Marine Licensing process.</p>

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	safety zones). Further information has been requested by NRW MLT in respect of this document, as detailed within the further information letter dated 8 September 2022 referred to above. NRW MLT is not in a position to comment substantively on this document for the purposes of the DCO, or on the issue of weight that should be given to this document.	



### 3 References

- JNCC (2020), 'Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (England, Wales & Northern Ireland)', Report No. 654, JNCC, Peterborough.
- Lucke, K., U. Siebert, P. A. Lepper, and M. Blanchet (2009), 'Temporary shift in masked hearing thresholds in a harbor porpoise (*Phocoena phocoena*) after exposure to seismic airgun stimuli', *Journal of the Acoustical Society of America*, 125:4060-4070
- Malme, C.I.; Miles, P.R.; Clark, C.W.; Tyack, P.; Bird, J.E. (1983). *Investigations of the Potential Effects of Underwater Noise from Petroleum Industry Activities on Migrating Gray Whale Behavior*; U.S. Department of the Interior, Minerals Management Service: Anchorage, AK, USA, 1983.
- Malme, C.I.; Miles, P.R.; Clark, C.W.; Tyack, P.; Bird, J.E. (1984) *Investigations of the Potential Effects of Underwater Noise from Petroleum Industry Activities on Migrating Gray Whale Behavior—Phase II: January 1984 Migration*; U.S. Department of the Interior, Minerals Management Service: Anchorage, AK, USA, 1984.
- Orsted (2022a), *Hornsea Four Gannet Displacement and Mortality Evidence Review* (Document reference G2.9)
- Orsted (2022b), *Hornsea Four Auk Displacement and Mortality Evidence Review* (Document reference G1.47)
- Richardson, W.J.; Fraker, M.A.; Würsig, B.; Wells, R.S. Behaviour of bowhead whales *Balaena mysticetus* summering in the Beaufort Sea: Reactions to industrial activities. *Biol. Conserv.* 1985, 32, 195–230.
- Richardson, W.J.; Würsig, B.; Greene, C.R. Reactions of bowhead whales, *Balaena mysticetus*, to seismic exploration in the Canadian Beaufort Sea. *J. Acoust. Soc. Am.* 1986, 79, 1117–1128.
- Richardson, W.J.; Würsig, B.; Greene, C.R. Reactions of bowhead whales, *Balaena mysticetus*, to drilling and dredging noise in the Canadian Beaufort Sea. *Mar. Environ. Res.* 1990, 29, 135–160.
- Guan, S., and T. Brookens (2021). The Use of Psychoacoustics in Marine Mammal Conservation in the United States: From Science to Management and Policy. *Journal of Marine Science and Engineering* 9:507.



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