Ein cyf/Our Ref: AOS-21167-0035
Eich cyf/Your ref: EN010136
Our Unique Ref: 20049491

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Dyddiad/Date: 02/10/2024

Er sylw / For the attention of: Susan Hunt

Annwyl / Dear Susan,

PROPOSED MORGAN OFFSHORE WINDFARM

PLANNING INSPECTORATE REFERECE: EN010136

OUR REFERENCE: 20049491

RE: NATURAL RESOURCES WALES' WRITTEN SUBMISSION FOR DEADLINE 1

Thank you for your Rule 8 letter, dated 12 September 2024, requesting Cyfoeth Naturiol Cymru / Natural Resources Wales' comments regarding the above.

This letter comprises the following submission from NRW:

Written Representations – see Annex A.

The comments provided in this submission, including the associated Annexes, comprise NRW's response as a Statutory Party under the Planning Act 2008 and Infrastructure Planning (Interested Parties) Regulations 2015 and as an 'Interested Party' under s102(1) of the Planning Act 2008.

The comments are made without prejudice to any further comments NRW may wish to make in relation to this application and examination whether in relation to the Environmental Statement (ES) and associated documents, provisions of the draft Development Consent

Order ('DCO') and its Requirements, or other evidence and documents provided by bpENBW ('the Applicant'), the Examining Authority or other Interested Parties.

In Annex A NRW provide our Written Representations including a brief summary. The Written Representations are structured in a similar format to that of our Relevant Representations [RR-027].

The Rule 8 letter requested Initial Statements of Common Ground (SoCG) to be submitted at Deadline 1. NRW received a copy of the initial draft SoCG from the Applicant on 24 September 2024. We are working with the applicant to enable them to submit the draft to the Examining Authority by deadline 2.

NRW are in active and on-going engagement with the Applicant to progress all related matters (as advised in our Relevant Representations, SoCGs and below in our Written Representations) ahead of the next appropriate series of deadlines. Where NRW is satisfied that issues have been resolved by the Applicant (in response to our Relevant Representations) this progress, is explained, where relevant, in our Written Representations below. Where matters remain outstanding and / or unresolved, this is also explained below.

With respect to the advice contained within this document relating to nature conservation within Welsh inshore waters, reference to Welsh Offshore waters and English Onshore / Offshore waters may be made in view of mobile species, Zones of Influence and potential cross-border and cumulative / in-combination impacts on the Welsh inshore marine area and protected sites. Where potential impacts are wholly within Welsh offshore waters or English Onshore / Offshore waters, NRW (A) defer to comments provided by the Joint Nature Conservation Committee (JNCC) and Natural England (NE) respectively.

Please do not hesitate to contact Paige Minahan ([redacted]@cyfoethnaturiolcymru.gov.uk) Adam Cooper [redacted]@cyfoethnaturiolcymru.gov.uk) should you require further advice or information regarding these representations.

Yn gywir / Yours sincerely,

Andrea Winterton
Marine Services Manager
Natural Resources Wales

[CONTINUED]

Contents

Annex A – Written Representations

1. Summary

Marine Ornithology

1. NRW (A) provide more detail on the issues raised in our Relevant Representations, along with updates on progress made on some of these issues since then. Some issues remain unresolved. The issues relate to Collision Risk Modelling, cumulative assessment and Habitats Regulations Assessment.

Marine Mammals

2. NRW (A) provide more detail on the issues raised in our Relevant Representations along with updates on progress made on some of these issues since then. However, some issues remain unresolved, these include impacts to marine mammals from elevated levels of underwater sound, interrelated effects and have provided notes for consideration on the Applicant's Underwater Sound Management Strategy.

Fish and Shellfish Ecology

3. NRW (A) agree with the overall conclusion of no risk of an adverse effect on the integrity of diadromous fish features from the Welsh protected sites. As the development is within English territorial waters, NRW defer to advice from Natural England (NE) on all fish species not originating from Welsh protected sites.

Physical Processes

4. When considering cumulative impacts, the zone of influence for the potential alteration to the hydrodynamics during operation caused by the presence of the generation asset structures and the potential advection of the suspended sediment concentration plumes generated during construction works and maintenance works do not overlap with Mona OWF inside the 12NM jurisdiction boundary line. As a result, NRW will be deferring to JNCC/NE for these matters.

Benthic Subtidal and Intertidal Ecology

5. Considering the physical processes advice provided above, the location of Morgan Generation Assets being wholly in English waters, and the zone of influence affecting benthic habitats in Welsh waters only, NRW defers all benthic subtidal and intertidal ecology advice to JNCC/NE.

Biodiversity Benefit

6. NRW welcomes the Applicant's ongoing commitment to engage with us on biodiversity enhancement measures at an appropriate time.

Designated Landscapes/Seascapes

7. NRW are satisfied with the 60km study area used in the Seascape, Landscape and Visual Impact Assessment (SLVIA), and the decision to scope out statutory designated landscapes in Wales from the SLVIA.

2. Detailed Comments

8. This section of our Written Representation covers issues associated with matters considered to be cumulative impacts and/or mobile species in relation to Welsh designated sites. It draws on the information contained in the original application documents submitted by the Applicant and the Applicant's response to our Relevant Representations [RR-027] as set out in in the Applicant's response to the Procedural Deadline of 27 August 2024 in PD1-017 (and documents referenced therein). In our Relevant Representations, NRW (A) set out the main issues in relation to the application. This Written Representation is intended to provide more detail on these issues and to update the Examining Authority (ExA) on progress on those issues following the Applicant's response to our Relevant Representations provided into the examination in document PD1-017 (and relevant documents contained and referred to therein), with the Applicant during the pre-examination period and any updates on issues. Where relevant this Written Representation will refer to the Applicant's response to the specific issues raised in our Relevant Representations as set out by the Applicant in PD1-017. We also provide advice on the Applicant's approach when (although it may be suitable for this application) it may not be for other situations and should not set a precedent for further offshore wind applications coming up in the same area. We are also progressing a draft SoCG between NRW and the Applicant, which is planned for submission (by the Applicant) at Deadline 2. This SoCG will highlight progress made and those matters that are still outstanding / ongoing between the two parties.

2.1 Marine Ornithology

9. Following a review of the environmental material submitted by the Applicant, in our Relevant Representations NRW (A) identified the key issues as:

- Methods and input parameters (avoidance rates and flight speeds) used in collision risk modelling (CRM).
- Data gaps and figures included in cumulative assessments.
- Displacement and mortality rates used in HRA Stage 2 ISAA integrity test step 1.
- Lack of consideration of Liverpool Bay SPA for operations and maintenance vessel movements in HRA Stage 1 Screening and Stage 2 ISAA.

10. This Written Representation sets out more detail on these issues and any updates to the issues identified above since submission of the Relevant Representations.

2.1.1 Methodological Issues

2.1.1.1 Seabird Collision Risk Modelling (CRM)

Density data used in CRM (Applicant response reference to RR-027.9 in PD1-017)

11. In our Relevant Representations NRW (A) requested clarification from the Applicant as to how the Applicant had entered the seabird density data into the sCRM. In PD1-017, the Applicant has clarified that they have undertaken the CRM using the code associated with the stochastic collision risk model developed by McGregor et al. (2018) which has been run within R studio. We would therefore request that the R code and any excel/.csv files used by the Applicant are made available, as we consider this to be best practice and for transparency in the approach taken. Without this information model run cannot be replicated and we are unable determine if the approach taken is correct.

12. Regardless of the method used for running the tool (through using R code or the Shiny app), clarification is required on the bird density data considered. We note that entering the mean monthly data plus confidence limits (as would have to be done based on the data provided in Table 1.5 of Volume 4, Annex 5.3 of APP-055) rather than uploading the bootstrapped density data could result in different collision predictions as the model samples from a truncated normal distribution, and as a result this may not reflect the distribution of the bird density data from the site (Trinder 2017). NRW advise the approach of uploading 1,000 samples from a distribution of mean density values (e.g. as generated by bootstrapping) is taken and that bootstrapped density data are provided along with the input and output log files generated by the sCRM tool. If bootstrapped data have been uploaded, then we highlight that supply of the bootstrapped data is required not only to verify the sCRM, but also to enable future access for consideration in cumulative and in-combination assessments.

Flight speeds used in CRM (Applicant response reference to RR-027.11 in PD1-017)

13. We acknowledge the Applicant's review of evidence of seabird flight speeds that was presented in APP-055. The evidence presented by the Applicant was considered in the formulation of the SNCB advice on CRM parameters that was provided to the Applicant via Natural England during the EWG. As was acknowledged by NRW (A) in our Relevant Representations [RR-027] bird flight speeds are an important issue in the context of CRM, and bird flight speeds are acknowledged by the SNCBs as requiring update. We understand that work is currently underway using tracking data for a number of species at a range of sites, which should provide further information on flight speeds. In the interim period we are happy to consider the application of site or region-specific evidence for specific

projects (for example we have been happy for site-specific flight speed of gannet from Grassholm to be used in a previous project assessment).

14. Our advice therefore remains at present that the flight speeds as presented in the recommended input parameters provided to the Applicant by Natural England during the EWG are used. We again acknowledge that the Applicant has presented CRM outputs for a range of flight speeds, including those recommended by the SNCBs. We again note that NRW (A) will base its advice when considering the assessment conclusions on impact significance or the potential for Adverse Effect on Site Integrity (AEoSI) on the predicted impacts resulting from the SNCB recommended input parameters, including flight speeds (from Alerstam et al. (2007) or Pennycuick (1997)). Therefore, we advise that the estimates calculated using SNCB recommended parameters should continue to be progressed through all stages of the assessment.

Avoidance rates used in CRM (Applicant response reference to RR-027.12 in PD1-017)

15. As noted in our Relevant Representations [RR-027], the use of species-specific versus species-group avoidance rates was discussed with the Expert Working Group (EWG). We again reiterate the advice provided to the Applicant through the EWG, that we do not currently consider the use of species-specific rates (as the applicant has done) to be appropriate for CRM. This is because the paucity of offshore, species-specific data undermines the confidence we can place in species-specific rates at this stage. Additionally, some of the high value collision data collected offshore could not confirm specific species identifications, so there is more data to inform grouped rates in some cases.

16. We again acknowledge that the Applicant has presented CRM outputs for a range of avoidance rates, including those advised by the SNCBs. As noted above, NRW (A) will base its advice when considering the assessment conclusions on impact significance or the potential for AEoSI on the predicted impacts resulting from the SNCB advised input parameters, including species-group avoidance rates. Therefore, we again advise that the estimates calculated using SNCB advised parameters should continue to be progressed through all stages of the assessment.

2.1.1.2 Impacts to Sites of Special Scientific Interest (SSSI) (Applicant response reference to RR-027.14 in PD1-017)

17. In our Relevant Representations [RR-027], NRW highlighted that several areas of clarification were required regarding the Applicant's assessment of impacts from the Morgan Generation Assets project on the guillemot, razorbill and kittiwake features of the Pen y Gogarth / Great Orme's Head SSSI. We welcome the commitment by the Applicant in their response to our Relevant Representations [PD1-017] that they intend to submit a clarification note at Deadline 1, detailing responses to our comments regarding this aspect. We will provide further advice on this aspect following review of this document.

2.1.1.3 Cumulative (and in-combination) Assessments

Data gaps (Applicant response reference to RR-027.17 to RR-027.19 in PD1-017)

18. As noted by NRW in our Relevant Representations [RR-027], the Applicant's cumulative (and in-combination) impact assessments contain numerous data gaps and cannot be considered comprehensive. This issue was raised as a concern by the SNCBs (NRW/NE/JNCC) in PEIR responses and discussed during the EWGs.

19. We welcome that the Applicant, together with the Mona project Applicant, is engaging with SNCBs on the proposed methodology for a 'gap-filling' exercise and that the Applicant intends to produce a technical note regarding this exercise in accordance with the SNCB Advice Note at Deadline 1. NRW (A) has engaged with the Applicant regarding their proposed approach and results of the 'gap-filling' exercise, and a useful meeting was held with the Applicant, NRW (A), JNCC and NE to discuss this on 29th August. Joint SNCB written comments (NRW (A), NE and JNCC) have been provided to the Applicant following this meeting (sent via email by JNCC on 6th September 2024). NRW (A) will provide further advice into the examination following full review of the Applicant's document that will be submitted into the examination at Deadline 1.

Data included for other projects in cumulative assessments (Applicant response reference to RR-027.20 to RR-027.22 in PD1-017)

20. In our Relevant Representations [RR-027], NRW highlighted a number of issues with inconsistencies with figures for projects included in the assessments between the Morgan application and the Mona application. We understand that the Applicant is working with the Mona Applicant on an updated cumulative effects assessment to fill the gaps for historic projects and we therefore suggest that both Applicant's ensure that the same figures are included for projects with data in both sets of cumulative assessments.

21. As noted in our Relevant Representations [RR-027], we noted that the cumulative collision assessment text and tables in Volume 2, Chapter 5 [APP-023] suggests the predicted collision figures for the other projects included have been corrected for the species-specific avoidance rates from Ozsanlav-Harris et al. (2023), with cumulative totals also presented for the species-group avoidance rates as advised by NE/NRW/JNCC. In PD1-017, the Applicant has confirmed that this is the case, but does not provide any information as to the approach they have taken to do this and so we again request information is provided on this – we assume a correction factor of some kind has been applied but would welcome more information on the approach taken. We note that correcting collision figures to account for current advised avoidance rates has been standard practice in cumulative/in-combination assessments undertaken for assessments for projects located in the North Sea and we do not have any issues with this approach being taken by the Applicant. However, we would like to understand the approach taken and whether it is consistent with approaches taken in the North Sea.

22. In PD1-017 the Applicant has confirmed that Option 2 figures for all species have been included for Awel y Môr with the exception of herring gull where the Option 3 figure has been included. Based on this response, it is unclear as to the reasoning for the Applicant's decision to include Option 3 figures for herring gull, but Option 2 for great black-backed gull. We note that the avoidance rates recommended for use by the Morgan Generation Assets Applicant by NE/NRW (A)/JNCC are those for the 'basic' Band model (i.e. Options 1 and 2) and are not considered appropriate for use with the 'extended' model (i.e. Option 3). We note that at the time of the Awel y Môr examination SNCB advice would have been that the extended model (i.e. Option 3) could be used for large gulls (including herring gull) using the avoidance rates advised for the extended model. However, we note that the advice provided to the Applicant in the EWG by NE regarding CRM parameters in July 2022 stated that they no longer accept use of the extended Band model (options 3 & 4) (see Section D.3.9 of Appendix D of Technical Engagement Plan APP-092). NRW (A) agree with NE's position. Therefore, we advise that if the Option 3 herring gull collision predictions for Awel-y-Môr are included in the cumulative assessments, they should not be corrected to the currently advised avoidance rates. However, if the Option 2 figures for this project are included instead (which in light of current advice would be our preferred approach), then these could be corrected to the currently recommended avoidance rates. In PD1-017 in response to this issue (response to point REP-027.30) the Applicant notes that the use of Option 2 figures for herring gull would make no difference to the conclusions of the herring gull cumulative collision assessment. Whilst this may be the case, as the Applicant intends to submit an updated cumulative effects assessment to gap fill for historic projects, we advise that the herring gull figures included for Awel y Môr are updated to include the Option 2 rather than Option 3 figures.

23. In our Relevant Representations [RR-027] we also noted that the figures the Applicant had included in their cumulative assessments for the Morecambe generation assets project were based on the PEIR figures for this project, which were based on only the first 12 months of data for that project and hence were subject to a level of uncertainty. We acknowledge that at the time of the Applicant's production of the ES, the Morecambe generation PEIR figures represented the most applicable publicly available data at the time. As note by the Applicant in the response to REP-027.22 in PD1-017, the Applicant notes that since their application submission the Morecambe Generation assets application has been accepted for examination by PINS. Given that the Applicant is working on an updated cumulative effects assessment to fill gaps in historic projects, we advise the Applicant to consider updating the numbers included for the Morecambe Generation Assets project to those in the submission at the same time.

2.1.2 HRA Related Issues

24. We note that the advice provided below is applicable to the potential impacts and effects to Welsh protected sites only. For the many SPAs/Ramsar sites screened and assessed by the Applicant that are located outside of Wales (in England, Scotland, Northern Ireland and Ireland), the relevant Statutory Nature Conservation Bodies (SNCBs) should be consulted.

2.1.2.1 LSE Screening

25. We again reiterate our advice provided in our Relevant Representations [RR-011] and during the EWG discussions on the approach to the HRA Screening of likely significant effects (LSE) taken by the Applicant, i.e. that the approach taken may be considered appropriate regarding the Morgan Generation Assets project alone, but that this approach will not necessarily be appropriate for all offshore wind cases. Therefore, we advise future offshore wind projects discuss any proposed LSE screening approaches with NRW well in advance of any proposed submission of an application.

Liverpool Bay SPA (Applicant response reference RR-027.25 in PD1-017)

26. As noted in our Relevant Representations [RR-027], whilst the Morgan Generation Assets application does not cover the offshore export cable, as the port location is not yet decided, we consider that there is the potential for operations and maintenance vessel movements through the Liverpool SPA for such vessels transiting from port to the array area. No consideration has been given in the HRA Stage 1 Screening Report [APP-099] to the potential impacts from such activities on the qualifying features of this SPA, particularly the red-throated diver and common scoter features. Given that these features are particularly sensitive to disturbance/displacement from vessel movements, we would consider that an LSE cannot be ruled out for these features and hence should be taken through to the HRA Stage 2 ISAA. However, we note the measures listed in Table 5.26 of Volume 2, Chapter 5 [APP-023] of adherence to an offshore Environmental Management Plan (EMP) that will include measures to minimise disturbance to rafting birds from transiting vessels (as set out in APP-070) and include a Marine Pollution Contingency Plan (MPCP). We note and agree that the offshore EMP is secured within the deemed marine licence (dML) in Schedule 3 Part 2 of the draft DCO [APP-005]. Therefore, based on the adoption of best practice vessel operations to minimise disturbance it is likely that an AEoSI from operation and maintenance vessel movements can be ruled out for these features of the SPA.

2.1.2.2 Qualifying features of Welsh SPAs/Ramsars (Applicant response to RR-027.26 in PD1-017)

27. We welcome that assessments have been made of all qualifying features and listed main component species of assemblage features for designated sites. However, the Applicant should note that the assemblages are qualifying features in their own right and require their own assessment. We recommend the Applicant includes an assessment for each assemblage feature.

2.1.2.3 Apportionment of impacts (age classes, methods for apportionment of impacts to designated sites)

Age class apportionment: kittiwake in the breeding season (Applicant response reference to RR-027.27 in PD1-017)

28. In our Relevant Representations [RR-027], NRW (A) raised concerns regarding the appropriateness of the Applicant's use of the kittiwake adult proportion that was calculated for Hornsea 2. We note that this approach was not raised by the Applicant during EWG meetings or subsequently, and therefore NRW (A) has not agreed to this approach.

29. In their response to this issue in PD1-017, the Applicant states that 'this approach was developed as part of the Hornsea Two assessments in consultation with Natural England and applied as part of the assessments presented for that project'. Whilst it may be the case that the Hornsea 2 approach was developed in consultation with NE, it does not necessarily mean NRW agree with the approach or that it is applicable to a different project located in a different area. We note that the Hornsea 2 approach to apportioning to age class referred to in Paragraph 1.2.3.13 of the Applicant's Apportioning Technical Annex [APP-057] relies on reliable counts of first year birds, i.e. in the case of kittiwake first summer birds which by August of that year have largely transitioned to adult plumage and are indistinguishable from mature adults. Therefore, the identification rate of first summer kittiwake is questionable and calculations derived from this e.g. applying survival rates to define an age class structure, are also questionable. Additionally, the juvenile survival rates (0-1 year) given in Horswill & Robinson (2015) are very old and from a single colony in the North Sea (taken from Coulson & White 1959) and hence have a poor data quality score (score of 1) and therefore it is highly uncertain that they are applicable here. These issues mean there is uncertainty around the appropriateness of the approach for use at the Morgan Generation Assets site which is located in the Irish Sea. Therefore, we reiterate our advice from our Relevant Representations [RR-027] that a more appropriate approach for the breeding season would be to use the 84.11% of adults recorded in the Morgan Generation Assets site-specific Digital Area Survey (DAS) data, or to take the same approach as for auks and Manx shearwater and assume all birds are adults.

30. We also note that the Mona project (also located in the Irish Sea) were also initially taking this Hornsea 2 approach but following NRW (and JNCC) concerns raised in Relevant and Written Representations (same concerns as raised here), the Mona applicant has now committed to updating assessments using their DAS data proportion of adults for kittiwake age class apportioning in the breeding season. Therefore, we recommend the Morgan Generation Assets Applicant considers doing the same.

Age class apportionment for all other species in the breeding season (Applicant response reference to RR-027.28 in PD1-017)

31. In our Relevant Representations [RR-027], we requested clarification from the Applicant as to the approach that had been taken for age classes for species where

it is not possible to use the site-specific DAS data (e.g. auks, Manx shearwater), as it was unclear from Volume 4, Annex 5.5 'Apportionment Technical Report' [APP-057]. In their response to this in PD1-017, the Applicant has confirmed that where data on age classes is available from site-specific surveys (i.e. at least one or more immature age classes are readily identifiable during surveys) these data have been used within the apportioning process to identify the proportion of immature present at the Morgan Generation Assets. This has been applied to gannet, kittiwake and large gulls. Where immature age classes are not identifiable from surveys, it is assumed that all birds present at the Morgan Generation Assets are adult birds. This has been applied to guillemot, razorbill, fulmar and Manx shearwater. We welcome this clarification and are content with the approaches taken regarding this aspect.

Non-breeding season apportionment of impacts (Applicant response reference to RR-027.29 and RR-027.30 in PD1-017)

32. The Applicant has clarified that the approach taken to apportioning in the non-breeding season utilises population data from Furness (2015) to derive apportioning values that reflect the proportion of adults that are assumed to be present at a site. We note that the approach taken APP-057 is based on the proportion of the SPA adult birds across the BDMPS total of birds of all ages for each relevant non-breeding Biologically Defined Minimum Population Scale (BDMPS) season based on data presented in Appendix A tables of Furness (2015). We agree that this approach follows standard practice that is advised by NRW (A) and are therefore content with the approach taken.

33. In our Relevant Representations [RR-027] we advised that the Applicant checks the apportionment rate calculations for the non-breeding seasons for lesser black-backed gull for Skomer, Skokholm and seas off Pembrokeshire SPA as the figures presented in Table 1.16 of Annex 5.5 'Apportioning Technical Report' look incorrect. In the response to this in PD1-017m the Applicant has confirmed that the values in Table 1.16 of APP-057 for this site and species are incorrect. However, the have confirmed that this is just a transcription error and the correct values were used in the apportioning calculations and associated impact assessments, which was as NRW had suspected. We welcome that the Applicant has noted this in their Errata document [PD1-002]. We therefore consider this issue to be suitably resolved.

2.1.2.4 Apportioned impacts from the Morgan project alone

Apportioned CRM impacts and avoidance rates and flight speeds (Applicant response reference to RR-027.31 in PD1-017)

34. In our Relevant Representations [RR-027], NRW (A) noted that the apportioned collision risk estimates presented in paragraph A.1.2.1.1 (Table A.1) of the HRA Stage 1 Screening report [APP-099] were the estimates calculated using flight speed data from Skov et al. (2018) and species-grouped avoidance rates. As noted in Section 1.1.2 above, use of the Skov et al. (2018) flight speeds does not reflect the flight speeds advised by the SNCBs (including NRW) for use in CRM. In their

response to this issue in PD1-017, the Applicant notes that: 'the collision risk estimates presented in paragraph A.1.2.1.1 (Table A.1) are incorrect and represent collision risk estimates calculated using flight speed data from Skov et al. (2018) and grouped avoidance rates, a parameter set not advocated by either the Applicant or the SNCBs. However, this is a transcription error and these values have not been used to inform the screening process undertaken in HRA Stage 1 Screening Report (APP-099) or any other document supporting the application. This process has incorporated the collision risk estimates calculated incorporating the parameters recommended by the EWG. These estimates are provided in Volume 4, Annex 5.3 Offshore ornithology collision risk modelling technical report (APP-055).' Whilst we welcome the error has been noted by the Applicant and that this has been included in the Applicant's Errata document [PD1-002], we suggest that this error is actually amended in A.1.2.1.1 of the HRA Screening Report and an updated version of the report is submitted into the examination in order for the most appropriate figures for the project to be easily accessible for use by future projects including the Morgan Generation Assets project in in-combination assessments. We also suggest that the Applicant conducts a full review of their apportioned impacts to fully ensure that all apportioned collision estimates based on the SNCB advised input parameters are made available, particularly following any updates to assessments in light of the documents the Applicant intends to submit at Deadline 1 (particularly for collision plus displacement assessments for gannet (and kittiwake) designated sites).

Stage 2 ISAA Part 3 (SPAs and Ramsars), Step 1 displacement assessments (Applicant response reference to RR-027.32 to RR-027.33 in PD1-017)

35. In our Relevant Representations [RR-027], NRW (A) noted that the apportioned impacts from displacement and resulting % increases to baseline mortality presented and assessed in the Step 1 assessment of the HRA Stage 2 ISSA Part 3 (SPAs and Ramsars) [APP-098] are based on the Applicant's considered appropriate % displacement and % mortality rates only. The apportioned impacts for the full ranges of SNCB (NRW/NE/JNCC) advised % displacement and % mortality rates are not presented in the HRA Stage 1 Screening [APP-099] or HRA Stage 2 ISAA Part 3 (SPAs and Ramsars) [APP-098] reports. The only apportioned figures available are for the Applicant's preferred % displacement and % mortality for each species feature of: 50% displacement and 1% mortality for auks, Manx shearwater and kittiwake and, 70% displacement and 1% mortality for gannet. To account for uncertainty in displacement and mortality rates we advise that apportioned impacts and associated increases in baseline mortality across the range of SNCB advised % displacement and % mortality are also presented and considered in the assessments. While it's possible that this might not materially change the conclusions we cannot agree to the applicant's preferred mortality and displacement rates.

Auk displacement rates

36. In paragraphs 5.9.1.13-5.9.1.17 of the Offshore Ornithology Chapter [APP-023] the Applicant presents evidence to justify its preferred rates of 50% displacement and

1% mortality across the site and 2km buffer as being the most realistic rates to base the auk HRA assessments on. NRW considers that the evidence for auk displacement is variable, with some studies finding a strong displacement effect of guillemots and razorbills from offshore wind farms, whereas other studies have found none. For example, displacement of guillemots and razorbills have been reported in the non-breeding season in the southern North Sea of distances from 2 to 4km (Petersen et al. 2004) and Petersen & Fox (2007) demonstrated the exclusion of guillemots out to at least 2km at Horns Rev development site. Mendel et al. (2014), studying the Alpha Ventus windfarm in Germany found that guillemot were in significantly lower numbers in all distance bands from the windfarm (out to 6-10km), with the highest displacement within 2km of the windfarm (razorbill were not in sufficient numbers to assess). Welcker & Nehls (2016), also studying Alpha Ventus, found that auks (predominantly guillemot) were 75% lower inside compared to outside the windfarm and that the lower numbers were evident out to 2.5km of the windfarm. Welcker & Nehls (2016) also conducted a literature review of studies looking at displacement and concluded that there was strong evidence across studies that auks are displaced by offshore windfarms. However, this has not been the case for other studies, e.g. guillemots at Robin Rigg wind farm in Scotland (Vallejo et al. 2017) and a study by Webb et al. (2017) found no displacement or attraction occurred at the Lincs and LID wind farms for all auks. Dierschke et al. (2016) conducted a review (for full details see table 3 in the paper) and they concluded that common guillemot and razorbill 'weakly avoided' windfarms. We note 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). The Applicant's evidence in paragraph 5.9.1.13 of APP-023 notes that evidence for auk displacement is variable. We also note a recent study has highlighted the potential for displacement to occur over much greater distances (up to ~20km) than are typically assessed or considered by baseline characterisation surveys (Peschko et al. 2024). Therefore, our advice remains that consideration should be given to a range of displacement rates from 30%-70% across a 2km buffer and we strongly advise the Applicant provides apportioned impacts for relevant designated sites across this range to give us confidence in the approach. This is in line with Natural England's advice in their Relevant Representation Response [RR-026]. We understand the Applicant intends to submit a clarification note at Deadline 1 a response in relation to the comments above (see 46 paragraph below).

Manx shearwater displacement rates

37. The Applicant has not presented any evidence to justify a 50% displacement and 1% mortality rate as being appropriate evidence-based rates to use for Manx shearwater HRA displacement impact assessments. As was noted by NRW in our response to actions from EWG2 (see Section D.3.15 of Appendix D of APP-092), there is currently no evidence for any particular range of displacement rates (1-10%, 30-70% or any other) for this species from offshore wind farms. Therefore, we advise that the full displacement matrices for apportioned impacts to Manx shearwater designated sites are provided, or as a minimum the range of impacts across the same range of rates as per auks are provided (i.e. 30-70% displacement and 1-10% mortality). We strongly advise the Applicant provides apportioned impacts for

relevant designated sites across this range and/or the full displacement matrices for apportioned impacts for each relevant designated site. It is possible that these may not materially change the conclusions but without this information being provided, we are unable to confirm our agreement.

Gannet displacement rates

38. With regard to the Applicant's chosen rates of 70% displacement and 1% mortality for use for gannet displacement assessment, we note that in paragraph 5.9.1.21 of the Offshore Ornithology Chapter [APP-023], the Applicant presents the evidence from Pavat et al. (2023) and Apem (2022) as justification for its chosen rates. The Apem (2022) review results in a conclusion that 40-60% displacement should be considered for gannet during the breeding season and a 60-75% would be more appropriate during the non-breeding season. We note that of the seven studies reported in Apem (2022) suggesting displacement rates of less than 60%, the authors placed low confidence in the survey methods and/or data collected for five of these. We also note there is currently no empirical evidence for displacement consequent mortality of gannet and the studies quoted in Apem (2022) have significant limitations and numerous underlying assumptions limiting confidence in their conclusions. Therefore, based on the evidence, we do not consider that the Apem (2022) report provides sufficient justification for the use of different displacement and mortality rates to those advised by NRW.

39. We note that the work by Pavat et al. (2023) was commissioned by Natural England and the aim of the work was to deliver an evidence-based method to ensure macro-avoidance behaviour is appropriately accounted for in collision risk models of gannet at offshore wind farms. This work was not aimed at reviewing displacement rates for use in the displacement matrix. We acknowledge that displacement effects are an inherent part of macro-avoidance behaviour because macro-avoidance is a combination of both displacement and barrier effects. However, currently displacement and collision risk are performed as separate analyses and there are spatio-temporal mismatches in how displacement and collision mortalities are measured (Pavat et al. 2023). We note that in assessments macro avoidance applies only to birds in the array footprint in flight, whereas displacement applies to the buffer as well and to all birds (on the water plus in flight). NRW agree with the advice provided by NE to the Applicant on 7th July 2022 regarding CRM parameters that to account for gannet macro avoidance by a reduction of density of birds in flight based on the level of macro avoidance displayed by this species, which was advised to be 70% (see Section D.3.9 of Appendix D of APP-092). However, we note that the displacement matrix approach uses mean seasonal peaks of all birds, whereas CRM uses monthly means of birds in flight. Hence the two things do not fit together, and we have no way of reconciling this at present.

40. Therefore, NRW (A) maintain our position that a range of 60-80% displacement and 1-10% mortality for gannet should be considered in the assessment. So, we strongly advise the Applicant provides apportioned impacts for relevant designated sites across this range of displacement and mortality rates. It is possible that this may not materially change the conclusions but without the provision of this information we are unable to confirm our agreement with the conclusions.

Mortality rates

41. We note that empirical evidence regarding the energetic consequences of displacement for seabirds and wintering waterbirds using the marine environment are very limited, and the role of overwinter survival on seabird population dynamics is poorly understood. Therefore, as there is very little information available about the consequences of displacement for individuals, there is no evidence to suggest that 10% is precautionary. Furthermore, we note that the mortality rates are a crude method of capturing a range of potentially deleterious effects that could arise from displacement, including reduced fitness for migration and reduced productivity during the breeding season. These are particularly relevant when considering displacement effects within sites designated for the species affected.

42. We note that the evidence for mortality rates cited by the Applicant in paragraph 5.9.1.11 of APP-023 (e.g. Van Kooten et al. 2019 and Searle et al. 2014; 2018) used individual based models (IBMs) to infer mortality rates and we highlight that in each case that was not the primary aim of the studies. The cited studies each suffer from data deficiencies that introduce significant uncertainty to any estimate of mortality rate arising from OWF displacement.

43. Therefore, as there is very little information available about the consequences of displacement for individuals, we continue to advise that a range of mortality rates from 1-10% are assessed for all species for displacement assessments.

Conclusion and range based approach

44. We consider that the applicant's use of single values runs a significant risk of 'false precision', which is inappropriate given the range of responses apparently recorded and the limitations of the studies so far carried out. As a result, the SNCB advised range-based approach seeks to encompass a range of potential displacement effects as observed in post-construction monitoring studies and mortality rates that reflect the considerable uncertainty relating to site-specific drivers for, and impacts of, displacement. The Applicant should note that the mortality rates are a simple way of attempting to capture a range of sub-lethal as well as lethal effects from displacement, e.g. adults entering the breeding season in poor condition. Furthermore, this approach is considered evidence-based and accurately reflects the relatively data poor landscape of offshore impact assessment.

45. We note that NRW (A) are not advising that the HRA be based solely on the upper end of the % displacement and % mortality rates advised (e.g. 70% displacement and 10% mortality for auks), but we are advising that in order to account for the large degree of uncertainty regarding displacement rates and effects, that the assessments consider a range of potential rates and effects rather than focussing on a single figure as the Applicant has done in their HRA documents. Additionally, seabirds in general also continue to experience multiple human induced pressures that offshore developments are at risk of accentuating. Therefore, NRW (A) do not consider our advised approach to the impact assessment to be unduly precautionary

and question the characterisation of it as such in light of the evidence base and high levels of uncertainty regarding the consequences of displacement.

46. We would highlight that NRW will base our advice and conclusions on assessments that consider the full range of advised displacement and mortality rates that follow SNCB guidance. As the apportioned impacts across the full range of advised displacement and mortality rates are currently not available for each designated site, we suggest that the Applicant provides this information into the examination as soon as possible. We note that the Applicant intends to submit a clarification note at Deadline 1, detailing responses to the comments regarding our recommendations that apportioned impacts and associated increases in baseline mortality across the range of SNCB advised % displacement and % mortality are also presented and considered in the assessments. NRW (A) will provide further advice into the examination following review of the submitted document.

Stage 2 ISAA Part 3 (SPAs and Ramsars), Step 1 collision assessments (Applicant response reference to RR-027.34)

47. In our Relevant Representations [RR-011], NRW (A) requested clarification as to what the range of predicted collision impacts presented in the Step 1 assessment tables of the HRA Stage 2 ISSA Part 3 (SPAs and Ramsars) [APP-098] are based on. In their response in PD1-017, the Applicant has confirmed that: 'the range of collision risk estimates incorporated into the analyses presented in HRA Stage 2 information to support an appropriate assessment Part Three: Special Protection Areas and Ramsar Site assessments [APP-098] reflect the range of estimates presented in Volume 4, Annex 5.3 Offshore ornithology collision risk modelling technical report. This therefore incorporates collision risk estimates calculated using both the Applicant's and the EWG's preferred modelling parameters. Where any value within this range surpasses the baseline mortality thresholds defined, the SPA feature is progressed to the next stage of the assessment.' We welcome this clarification and that all input parameter scenarios have been considered and if any surpasses the baseline mortality thresholds defined, the SPA feature is progressed to the next stage of the assessment. However, as NRW (A) will base its advice on the predicted impacts based on the SNCB recommended input parameters (including flight speeds and species group avoidance rates), we advise that the apportioned predicted impacts calculated using SNCB parameters are highlighted and made explicitly clear in the HRA Stage 1 Screening and HRA Stage 2 ISAA where sites are taken forward to this stage. It is possible that this may not materially change the conclusions but without seeing this information we are unable to confirm our agreement with the the conclusions.

Stage 2 ISAA Part 3 (SPAs and Ramsars), survival and mortality rates used (Applicant response reference to RR-027.34)

48. In our Relevant Representations [RR-027], NRW (A) requested clarification from the Applicant as to the survival and hence mortality rates used to calculate the baseline mortality and proportions of baseline mortality predicted impacts equate to

presented in Step 1 of the HRA Stage 2 ISSA Part 3 (SPAs and Ramsars) report [APP-098]. We assumed that the species adult survival rates from e.g. Horswill & Robinson (2015) had been used in these calculations, but we requested that this was clarified. In their response in PD1-017, the Applicant has confirmed that the mortality rates used in the analyses presented in HRA Stage 2 information to support an appropriate assessment Part Three: Special Protection Areas and Ramsar Site assessments [APP-098] are indeed sourced from Horswill & Robinson (2015). We agree with this approach.

Stage 1 HRA Screening and Stage 2 ISAA Part 3 (SPAs and Ramsars), presentation of gannet and kittiwake collision and displacement impacts separately as well as combined (Applicant response reference to RR-027.36)

49. In our Relevant Representations [RR-027], NRW (A) advised on the need for apportioned collision and apportioned displacement impacts to designated sites to be presented separately as well as combined. The Applicant has responded in PD1-017 noting that: 'In Volume 2, Chapter 5 Offshore ornithology [APP-023], displacement mortality estimates for kittiwake are presented in Table 5.36 and for gannet in Table 5.48. Collision estimates are presented for kittiwake in Table 5.51 and for gannet in Table 5.58. Combined collision and displacement impacts are presented in Table 5.62 for both kittiwake and gannet.' We note that these are referring to the EIA scale predicted impacts, rather than the apportioned impacts to designated sites. The results for Welsh designated sites in the HRA Stage 1 Screening Report [APP-099] do not therefore present the predicted apportioned impacts from collision and displacement separately, rather they just discuss the combined total (for example see text regarding disturbance and displacement and collision risk in paragraph 1.4.6.50 for Grassholm gannet in APP-099).

50. NRW (A) do not recommend that displacement is assessed for kittiwake as we currently consider the evidence base to be insufficient. Hence, we have not provided advice/comment on the displacement aspect of the kittiwake assessment, and we recommend that impacts to kittiwake (to Welsh designated sites at least) are presented for collision and displacement separately, rather than just the single combined total of collision and displacement. We also again recommend that the impacts of gannet collision and displacement are also presented separately as well as the combined impact of both. As noted in our Relevant Representations [RR-027], presentation of these apportioned impacts separately as well as combined will assist with verification of predicted impacts to Welsh sites.

51. Please note our advice above with respect to the provision of apportioned impacts for gannet across the range of advised % displacement and % mortality rates in addition to the preferred single rates used by the Applicant.

2.1.2.5 In-combination Assessments (Applicant response reference to RR-027.39 to RR-027.41 in PD1-017)

52. We reiterate our advice provided in our Relevant Representations [RR-027] that the approach taken by the Applicant to in-combination assessment may be appropriate for this project where predicted impacts from the project alone are likely very small. However, we advise that the Applicant gives consideration to our advice in the Sections above, particularly regarding the advice for the Applicant to consider the apportioned impacts across the full range of SNCB advised % displacement and % mortality rates.

53. It should be noted that this advice is provided with regard to Welsh designated sites only. As we noted in our Relevant Representations [RR-027], the approach taken by the Applicant may not be appropriate in other situations, including for designated sites where in-combination impacts are already close to/at levels that are already considered to be of an adverse effect; or designated sites considered to be in unfavourable condition/have restore conservation objectives. We note that this may be the case for designated sites located outside of Wales. We again note that it also does not mean that impacts from the Morgan Generation Assets project should be excluded from in-combination totals for future project assessments.

54. Therefore, it should be noted that we do not endorse this approach for use by future projects and recommend that future Applicants discuss proposed approaches to in-combination assessments with NRW (A) (and/or other relevant SNCBs) well in advance of submission.

55. We again note that, if following the advice we have provided in the various Sections above, the Applicant's apportioned impacts predict further Welsh site and feature combination impacts from the project alone may exceed 0.05% of baseline mortality, then the gaps in the cumulative and hence in-combination assessments will be relevant.

2.2 Marine Mammals

56. Following a review of the environmental material submitted by the Applicant, in our Relevant Representations [RR-027], NRW identified the key issues as:

- Inadequate justification has been provided to support the assigned magnitude score of low when assessing the cumulative effects of injury and disturbance to marine mammals from elevated underwater sound due to vessel use, traffic and other non-piling sound producing activities.
- The general cumulative effects assessment has not included the in-combination effects of other key offshore projects.
- Inadequate justification has been provided to support the absence of assessing potential barrier effects as a result of the development.

- Inadequate justification has been provided to support the conclusions of interrelated effects on marine mammals receptors.
- Impacts from additional disturbance caused as a result of the large-scale use of Acoustic Deterrent Devices (ADDs) need to be considered.

57. This Written Representation sets out more detail on these issues and any updates to the issues identified above since submission of the Relevant Representations.

2.2.1 Baseline

58. NRW agrees with the data collected through surveys and literature including the data sources used to characterise the baseline, as well as the management unit approach adopted [AS-010] (although please see section Morgan ISA SAC section below), as discussed through the various EWGs. We agree with the majority of the conclusions in the Environmental Statement (ES) and Habitats Regulation Assessment (HRA), unless listed in the representations below.

2.2.2 Injury and disturbance to marine mammals from elevated underwater sound due to vessel use, traffic and other (non-piling) sound producing activities [AS-010]

59. In its Relevant Representation [RR-027], NRW acknowledged and welcomed the information provided regarding vessel traffic data [AS-010]. We advised however, that there was inadequate justification for an overall conclusion of *low magnitude,* further noting that the estimated numbers of animals disturbed by vessels and any subsequent conclusions appear to be based on static impact radii – i.e. equivalent to vessels that are not moving. Given that vessels would be expected to move location, NRW considers that estimating numbers based on static radii may lead to both underestimates of daily numbers disturbed and an underestimate of the overall daily area ensonified.

60. As mentioned in the Relevant Representation [RR-027], NRW acknowledged that it is unrealistic to assess injury and disturbance from vessel use by presenting a sum of the impact ranges of all vessels. This is because the level of detail necessary to assess the trips of over 2000 vessels of different size and function for the project alone would be impractical and disproportionate in terms of the time required. While we still hold to this opinion, this does not preclude the need to propose an alternative method to gauge the number of animals affected by this impact pathway, which we suggest can be done by making certain assumptions to make the calculation more tractable (see below).

61. Given the known sensitivity of harbour porpoise (Dyndo et al 2015; Wisniewska et al 2018; Rojano-Doñate et al 2023) and other marine mammal species (e.g. Marley et al 2017a, 2017b; Erbe et al 2019) to vessel noise and the increase of the number of vessel trips in the area as a result of the construction / operation of the proposed development compared to baseline vessel traffic, we do not agree with an overall magnitude of *low*, and recommend that the assessment is revised and quantified both for the project alone and in-combination in a manner that takes into particular

account the impact of repeated and chronic interruptions to harbour porpoise foraging (see paragraph 63 below).

62. As a point of clarification in the actions following EWG05 the Applicant requested further advice from NRW on how to assess disturbance from vessels. Our email response of 27 July 2023 was as follows: *"In our PEIR comments, NRW(A) provided an example of how this could be done, referring to the Wylfa assessment which considered disturbance based on the travel paths of vessels used by the project. This by no means prescriptive and other approaches can be taken. We recommend that the crucial thing to consider is to avoid basing assessment conclusions on assumptions that marine mammals are anticipated to demonstrate some degree of habituation to sound from vessels as this runs the risk of verging into speculation and overlooking the extent of a potential impact pathway. While it is reasonably likely that boat noise as a stressor is tolerated by marine mammals, absence of displacement is not evidence of absence of all detrimental consequences to animals. Responses may be physiological which are harder to detect, and animals may react by reducing foraging which leads to energy intake costs (e.g. harbour porpoise, see Rojano-Donate et al. 2023 - presented at Oceanoise 2023), or making deeper dives increasing swimming effort, and ceasing echolocation and foraging for several minutes (Wisniewska et al. 2018). Thus the presence of vessels almost certainly has an energetic cost to harbour porpoise. Similar / related findings were made by, e.g. Pirotta et al. (2013, 2015), Dyndo et al. (2015), Oakley et al. (2017), Marley et al. (2017a, 2017b). Other arguments such as the increase in number of vessels will be small when compared to the baseline shipping traffic should ideally also be quantified. In future, ideally, direct measures of the associated energetic costs of exposure would be available for Population Consequence of Disturbance (PCoD) models, to link disturbance parameters to fitness and population dynamics, however work on this is still ongoing".*

63. We suggest adapting the approach taken for the Wylfa Newydd project (5.2 Shadow Habitats Regulations Assessment Report) referred to in paragraph 134, noting that conclusions on magnitude and significance for the operational and decommissioning phases may need to be reviewed and updated based on the assessment for the construction phase. This method would involve assuming that all vessels involved in the construction, operation, and decommissioning phases travel along the same track from port to their required location. For simplicity, this could be taken to be e.g. the centre of the array. A value from the literature, could then be used as an impact radius on either side of the track to allow calculation of an estimated area (and estimated numbers) ensonified on a daily basis. Further refinements could also be included, for example information on expected recovery time which could be touched upon qualitatively in an evidence-based discussion in the text.

2.2.3 Injury from elevated underwater sound due to piling [AS-010]

64. 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, like for example pile driving), 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).

65. 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 (SEL_{ss}) or summed over multiple pile strikes using a metric known as cumulative SEL (SEL_{cum}) When carrying out impact assessments, we often refer to instantaneous PTS (from SPL) and cumulative PTS (from SEL_{cum}), and the spatial extent or range (m to km) that can elicit PTS in marine mammal species from instantaneous and cumulative noise respectively.

66. Acoustic Deterrent Devices (ADDs) are often used to deter marine mammals from pile driving operations that may otherwise cause hearing injury. These devices work by emitting a noise to which the target animal is sensitive, and at a level loud enough, or for a long enough time period, to elicit a behavioural reaction sufficient for the animal to swim away to a safe distance – i.e. a deterrence range. This deterrence range can be altered based on the expected PTS impact range.

67. NRW [RR-027] noted that a conclusion of *negligible* magnitude for auditory injury impact pathway (i.e. Permanent threshold shift / PTS) had been assigned based on the inclusion of the potential indicative use of designed-in measures (i.e. 30 minutes of ADDs). NRW advised that consideration of the large-scale use of ADDs was required, as evidenced by, for example, Elmegaard et al. (2023), which demonstrates that harbour porpoise show very strong flight and physiological responses to ADD use far beyond the intended range of mitigation. NRW believe that there is a risk that in an effort to reduce the number of animals injured, a reliance on ADD deployment over other forms of mitigation will increase the number of animals disturbed, particularly harbour porpoise. A deterrence sound must be efficient in clearing an area of animals, yet it should not cause disruptions at scales larger than necessary.

68. In principle, NRW agree with the overall conclusion of *minor adverse* significance, based on numbers presented in the "*no ADD*" scenario [AS-010]. However, while we acknowledge that the proposed mitigation strategy outlined in the ES [AS-010], Marine Mammal Mitigation Protocol (MMMP) [APP-072] and Underwater Sound Management Strategy (UWSMS) [APP-068] is to be agreed post-consent, we note that the length of ADD exposure should be scaled to the need - i.e. the impact range from PTS. Where exposure length is indicative, this should be made clear. Based on results presented in the ES [AS-010], the range at which instantaneous PTS could be elicited at maximum hammer energy (for a hammer energy of 4400 kJ) ranged between 39 – 652 m. Estimated swim distances for 30 minutes of ADD activation ranged between 2,700m (for harbour porpoise) to 4,140m (for minke whale). We believe that the indicative length of ADD exposure may be excessive when considering the additional noise and disturbance introduced to the environment. We consider that there are other ways that the range could be reduced, for example by altering the pattern of pile strikes - especially by increasing

the time between each strike. We would be happy to discuss this further with the Applicant.

69. Evidence from Elmegaard et al. (2023), Graham et al. (2023), Voß et al. (2023), and Brandt et al. (2013) demonstrates that harbour porpoise show very strong flight and physiological responses to ADD use even at low received levels and often far beyond the intended mitigation zone. This evidence is corroborated by data collected on porpoise response (displacement) to chronic and long-term exposure to ADDs at aquaculture sites (Findlay et al. 2024). Such energetic responses to noise may have a cumulative effect on health if they occur frequently enough, particularly for porpoise who are thought to need to forage constantly to meet their energy demands.

70. We note the Applicant's response to the matters raised concerning ADD use in PD1-017 (RR-027.51). On balance, we consider that the Applicant's response is sufficient, noting in particular the final paragraph which states that "*Therefore, the Applicant understands the need for proportionate and judiciary application of ADDs, and this will be considered carefully when finalising the ADD deployment duration post consent*". We confirm that we agree with the Applicant that overall conclusions of the assessment are valid. We can also confirm that we do not believe it is necessary for the Applicant to assess separately the effects of Acoustic Deterrent Devices given that proportionate application of ADD use will be considered post consent.

71. However, we also note the Applicant's assertion at RR-027.51 [PD1-017] that the approach adopted is typical for Offshore wind assessments NRW (A) contend that this approach being "typical" does not preclude that publication of new evidence, akin to Elmegaard et al. (2023), Graham et al. (2023), and Voβ et al. (2023), may lead to questions being raised with respect to existing approaches. Furthermore, as per the agreement logs this issue was raised by both NRW and NE.

72. We welcome the Applicant's commitment as referenced in PD1-017 (RR-027.51) that the time period and final ADD duration will be agreed post-consent in the final MMMP and secured by condition within the DCO.

2.2.4 Barrier effects [AS-010]

73. NRW note that in our Relevant Representation [RR-027] that limited justification had been provided for the absence of cumulative assessment of barrier effects. This is particularly relevant given the planned construction and operation of four new offshore windfarm arrays (Awel-y-Môr, Mona, Morgan, Morecambe) in the area. We advised that clarity and potentially further assessment was required.

74. We note the Applicant's response to this matter, as stated at RR-027.44 [PD1-017]. It is our view that a conclusion of non-significance for the project alone does not necessarily imply that the effects of all projects together may not potentially result in a scaling up of effects. Similarly, we advise that a conclusion of non-significance from an EIA perspective is not equivalent to lack of an effect. In addition, we would caution that while NRW's agreement that the UWSMS could reduce the magnitude

of impacts to an acceptable level, this should not be taken to imply unconditional agreement prior to any measures being discussed and finalised post-consent.

2.2.5 Interrelated effects [APP-022]

75. NRW noted in our relevant representation that there was inadequate, evidence-based, justification for the conclusion that “the effects on marine mammal receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase or when considered in conjunction with other topics addressed in the ES” [AS-010].

76. While the effect of two or more pressures acting together may not necessarily be additive (e.g. Crain 2008; Thomsen & Popper 2024), this does not rule out such a possibility occurring. The presence of several different pressures at the same time could also lead to different responses compared to when the animal is exposed to one. Animals within a population may potentially be making adaptive trade-offs to avoid or remain within a prime habitat due to the presence of favourable prey resources and site quality, even when exposed to noise, yet they may not have sufficient resilience to adapt to additional pressures.

77. NRW have reviewed the Applicant’s response in PD1-017 on interrelated effects. On balance, given the mitigation measures planned, including development of the MMMP, and being conscious of the challenges inherent in quantifying such effects, we anticipate being able to agree with the overall conclusion in the ES [AS-010] following discussion and provided agreement is reached on mitigation measures post-consent, secured through conditions.

78. In the Applicant’s response [PD1-017] we note that the conclusions are underpinned by statements that "the effect of behavioural disturbance is reversible, and receptors are expected to recover within hours/days following the cessation of the activity, therefore unlikely to lead to any long-term, additive effects on the individual." We understand that the assessment has based its conclusion of no long-term additive effects by considering each disturbance event to take place independently, assuming reversibility based on the temporary nature of the noise, and full recovery between each event. However, the potential effects of aggregate exposures to one or multiple pressures has not been discussed. The interrelated effects assessment would be made more robust by considering the potential effects of aggregate exposure, particularly within the context of this assessment being used to inform cumulative assessments with other future projects.

2.2.6 Outline Underwater Sound Management Strategy (UWSMS) [APP-068]

79. As noted in our Relevant Representation [RR-027], we agree, in principle, with the commitment to develop an Underwater Sound Management Strategy (UWSMS), and that it should identify all potential noise sources associated with the project with further detail provided in associated mitigation plans. Whilst we acknowledge that further detail cannot be populated at this time, we consider it likely that the UWSMS

could potentially reduce the magnitude of impacts to an acceptable level. We welcome the commitment of the Applicant to continue to engage with NRW to develop the USWMS during examination and post-consent. We agree that the UWSMS be conditioned through the deemed marine licence (dML) NRW welcomes the opportunity to engage with the Applicant on developing the UWSMS during the examination and post-consent.

80. We have the following comments on the draft UWSMS as provided with the application [APP-68]:

- The document focuses only on two species: bottlenose dolphin and harbour porpoise. The current decision appears to have been based on the conclusions of significance in the ES and appears to suggest that only two species are at risk. We do not consider that this is assumption is correct. Without mitigation, all marine mammals are sensitive to injury and disturbance from piling and Unexploded Ordnance (UXO) clearance and as European Protected Species (EPS), all cetacean species need to be considered. Thus, a conclusion of not significant / no adverse effects is not accurate; mitigation should be included as industry best practice to reduce the risk of a residual effect to negligible in relation to EPS.

- Noise abatement systems (NAS) for piling, which are technologies that reduce the noise propagating through the water during pile driving (e.g. bubble curtains), have been presented as other (or 'secondary') mitigation by the Applicant. It is our view that NAS should be given more serious consideration.

- In line with the Governments Joint Position Statement on UXO clearance [DEFRA, 2022] low order methods of clearance (i.e. methods which cause the UXO to burn out but not detonate and are thus less disruptive / damaging) should be prioritised, with high order clearance (i.e. detonation of UXO using a small explosive charge) only to be used in exceptional circumstances. We recommend that this commitment be made more explicit in the UWSMS.

- We do not recommend the proposed use of soft start charges for UXO clearance due to the substantial additional impulsive noise they introduce into the environment (Robinson et al 2022), and their scaring effect not being proven (Lewis 1996; Keevin and Hempen 1997, Cheong et al 2020).

- In relation to prey fish, no evidence has been provided to support the statement that "it is anticipated any reduction in sound impacts from potential implementation of the NAS will act to mitigate impacts on fish species in the same area." NRW requests that supporting evidence is provided.

2.2.7 Underwater Sound Technical Report [APP-028]

81. As noted in our Relevant Representation [RR-027] that whilst NRW did not disagree with the overall conclusion of *minor adverse* significance (for both disturbance and injury) for site investigation surveys, the impact ranges for sparkers (a type of pulsed sub-bottom profiler, or SBP) appeared relatively small in contrast with the non-

pulsed sub-bottom profiler methods presented. We requested further clarity in this regard. Following consideration of the Applicant's response and explanation [RR-027.54 of PD1-017], we consider this issue closed.

2.2.8 Morgan ES Marine Mammals [AS-010] / Morgan ISAA Special Areas of Conservation [APP-097]

82. For impulsive sources, both AS-010 and APP-097 reference that changes in the impulsive characteristics of impulsive noise at range implies that disturbance thresholds for piling noise should be considered precautionary at long range (i.e., a few kilometres).

83. We have reviewed the Applicant's response at RR-027.57 [PD1-017]. As outlined in our position statement [NRW 2023], we fully agree that at ranges over several kilometres impulsive noise gradually becomes more continuous due to refraction, absorption and scattering attenuating high frequencies more than low frequencies. Sound also reflects off the surface and bottom of the sea taking different paths, thus it takes a different amount of time to arrive at a given point, lengthening the pulse. In this way noise that is impulsive at the source becomes less likely to cause hearing injury with range (Hastie et al. 2019; Martin et al. 2020; ORJIP Offshore Wind, 2024).

84. NRW disagree that this will affect disturbance thresholds except in very specific cases where thresholds were based on observations close to the source noting that at present, changes in impulsive characteristics have only been discussed in the published literature in terms of their effects on hearing injury but not disturbance. Similarly, to our knowledge there are currently no published data which quantify the impact of these changes with regard to disturbance, or the relative importance / extent of this in comparison with other explanatory variables such as piling duration, piling schedule, exposure to previous piling events, and other contextual factors which include differences between species and individuals, situational contexts (e.g. foraging, breeding, presence of calves), and temporal scale. Thus, although we agree that it is plausible that changes in impulsive characteristics with range will influence animal behaviour, particularly when applying thresholds at ranges further away than the observations on which they were based, we also caution against phrasing this in conclusive terms in the absence of published data.

85. NRW can confirm that this does not materially affect the conclusions, since assessment results were based on the full modelled range of disturbance, however, we do recommend that for this project and future projects the Applicant acknowledges the uncertainty with regard to potential effects of impulsive noise at range on disturbance and clarifies that the points and conclusions made with regard to this are their own. When sufficient evidence is found to support this, it may then be appropriate to incorporate into an assessment.

2.2.9 Morgan ISAA Special Areas of Conservation [APP-097]

86. We noted in our Relevant Representations [RR-027] that in line with NRW's position statement on use of Management Units [NRW, 2022], photo-ID evidence shows that most individual dolphins move between the two SACs, strongly supporting the idea that the populations of the two Special Areas of Conservation (SACs) are highly connected, and that there is likely a single genetic population across the management unit (although a few individuals appear to be faithful to one particular site).

87. Cardigan Bay (CB) SAC is the principal SAC for bottlenose dolphin and was designated primarily (Grade A) for this species, whereas bottlenose dolphins are a secondary (Grade C) feature of Pen Llyn a'r Sarnau (PLAS) SAC. However, there is no legislative reason why one site would be more important than the other, and given the strong evidence outlined above, we consider the entire Irish sea MU to be a single inter-connected unit. We therefore consider the population associated with PLAS SAC and CB SAC to be the same and that this is broadly equivalent to the population of the wider management unit for purpose of assessment of site integrity.

88. However, we have reviewed the Applicant's response to this matter [PD1-017, section RR-027.58] and agree that this does not materially impact the conclusions of the application. We consider that this matter can now be closed.

2.2.10 Outline Marine Mammal Mitigation Protocol (MMMP) [APP-072]

89. Table 1.2 of the MMMP states 'For high order detonation of UXO, soft start will be undertaken using a sequence of small explosive charges detonated at specific time intervals allowing marine mammals to move away from the mitigation zone prior to the detonation of the UXO'. NRW determine these small explosions to be akin to scare charges. Noise monitoring of scare charges during a UXO clearance are not recommended as a mitigation option for marine mammals and therefore should not be used for this purpose.

90. NRW have reviewed the Applicant's response to this matter [PD1-017 section RR-027.55] and are satisfied with the Applicant's response and welcome the final MMMP which will be developed post-consent and in line with any new advice and guidance. The Applicant has proposed that clearance of UXOs will follow a mitigation hierarchy with preferred approaches being to avoid UXOs or clear using low order techniques. We can agree that this does not materially impact the conclusions of the application. We consider that this matter can now be closed.

91. NRW welcomes the conservative mitigation zone of 1700m for piling, in accordance with the modelling. Although suitably conservative, it is a large mitigation zone, given the average is usually 500m. We recommend a detailed explanation of how the Applicant plans to effectively monitor this zone and suggest the consideration of different technologies to aid monitoring.

92. NRW have reviewed the Applicant's response to this matter [PD1-017 section RR-027.56] and are satisfied with the applicants response and welcome the final MMMP which will be developed post-consent and in line with any new advice and guidance. In addition to the Applicant revisiting the sound modelling post-consent as part of the final UWSMS once project details have been finalised. This modelling (applying the confirmed project parameters (e.g. hammer energy)) will inform the establishment of a specific mitigation zone for piling, and thus an appropriate MMMP. We consider that this matter can now be closed.

2.2.11 Cumulative Effects Assessment [APP-022]

93. NRW have reviewed the Applicant's response to this matter [PD1-017, section RR-027.43 and RR-027.48] and are satisfied with the Applicant's understanding. NRW consider that in-general the Cumulative Effects Assessment now covers the key points of the in-combination effects of Morgan, Mona and Morecambe, as well as other offshore projects interacting together to effect changes on local marine mammals that can manifest as masking, behavioural response, hearing impairment and physical and physiological effects i.e., barrier effects. Additionally, NRW notes that the considerable information once missing from the 'List of other projects, plans and activities considered within the CEA issue has now been rectified and all columns of Table 4.50 are now visible in the updated version of the chapter submitted on 5 August 2024 (AS-010).

2.3 Fish and Shellfish

94. NRW agree with the screening undertaken in the HRA Screening report [APP-099] and the subsequent Stage 2 assessment [APP-096 AND APP-097] and agree with the overall conclusion of no risk of an adverse effect on the integrity of diadromous fish features from the Welsh protected sites; Dee Estuary/Aber Dyfrdwy SAC, River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC, and Afon Gwyrfai a Llyn Cwellyn SAC.

95. As the development is within English territorial waters, NRW defer to advice from Natural England (NE) on all fish species not originating from Welsh protected sites.

96. NRW note from PD1-017 that the Applicant notes and welcomes our comments on fish and Shellfish Ecology and therefore have no further comments to make.

2.4 Physical Processes

97. The potential impact to hydrodynamics, sediment transport and seabed morphology during construction caused by sand wave clearance and the deposition of scour protection and cable protection, was previously raised by NRW at PEIR stage even

though the Morgan Generation Assets are entirely in offshore English waters. When considering cumulative impacts, the zone of influence for the potential alteration to the hydrodynamics during operation caused by the presence of the generation asset structures and the potential advection of the suspended sediment concentration plumes generated during construction works and maintenance works does not overlap with the nearby Mona OWF inside the 12NM jurisdiction boundary line. As a result, NRW will be deferring to JNCC/NE for these matters.

98. The Applicant has noted the above [PD1-017], and as such NRW have no further comments to make on Physical Processes.

2.5 Benthic Subtidal and Intertidal Ecology

99. Considering the physical processes advice provided above, the location of Morgan Generation Assets being wholly in English waters, and the zone of influence affecting benthic habitats does not overlap with Welsh waters, NRW defers all benthic subtidal and intertidal ecology advice to JNCC/NE.

100. The Applicant has noted the above [PD1-017], and as such NRW have no further comments to make on Benthic Subtidal and Intertidal Ecology.

2.6 Biodiversity Benefit

101. NRW welcomes the Applicant's commitment to consider opportunities to enhance resilience of marine and coastal ecosystems as noted in APP-073 and the work that the Applicant has done on this topic thus far.

102. We note that the Applicant refers to providing biodiversity benefit measures in addition to ensuring sufficient mitigation is to be put in place, in order to reduce and/or eliminate potential for significant effects as part of the mitigation hierarchy (avoid, minimise, mitigate). We welcome the inclusion of nature positive design elements (subtidal and intertidal) in the proposals, beyond what may be required through the mitigation hierarchy, in order to deliver biodiversity benefits, and the commitments to explore wider opportunities to contribute to building resilience of marine and coastal ecosystems - both within the footprint of the proposal and beyond. We advise, however, that mitigation measures should not be considered as methods for biodiversity improvement or enhancement, as they are in place as preventative measures of deterioration of features rather than providing biodiversity benefits from the baseline.

103. NRW assume that the proposals for delivering biodiversity benefit presented by the Applicant are not being considered for Welsh waters given the project lies wholly within English waters. However, depending on the focus and nature of the delivery, projects targeted in English waters may also deliver benefits in Welsh waters, e.g. actions targeted to mobile species including birds, marine mammals and fish. Should the Applicant wish to consider proposals for delivering biodiversity

benefit in Wales, we recommend that the Applicant reviews NRW's Guidance Note 59 Principles supporting restoration and enhancement in marine or coastal development proposals, which sets out NRW 's approach to advising on the inclusion of restoration or enhancement elements in a marine or coastal development proposal and encourages engagement with NRW.

104. This guidance has been developed to support implementation of Welsh National Marine Plan (WNMP) policy ENV_01: Resilient Marine Ecosystems which aims to ensure that biological and geological components of ecosystems are maintained, restored where needed and enhanced where possible, to increase the resilience of marine ecosystems and the benefits they provide. WNMP Policy ENV_01 encourages consideration of the inclusion of restoration and enhancement in a development project at sea and at the coast but there is not currently obligation upon proposers of projects in the marine environment to do so.

105. The Applicant has acknowledged NRW's comments [PD1-017], and as such NRW have no further comments to make on Biodiversity Benefit.

2.7 Designated Landscapes and Seascapes

106. NRW's landscape planning advice relates to the landscape character and visual amenity of statutory designated landscapes in Wales, and the statutory purpose of these designations to conserve and enhance their natural beauty.

107. The following Maximum Design Scenarios for the Morgan Array Project are provided in Table 3.5 in ES Volume 1, Chapter 3: Project Description [APP-010]. It's noted these have been updated since the PEIR stage:

- Scenario 1 - 96 x 293m tall turbines
- Scenario 2 - 68 x 364m tall turbines

108. NRW advise that offshore turbines with tip heights up to 364m have an approximate average 48.5km buffer for low magnitudes of effect (White et al., 2019). Low magnitude buffer distances are an indication that there is a likelihood that there would be no significant effects on a high sensitivity receptor for the size of wind turbine at, or beyond, the distance stated.

109. Statutory designated landscapes on the north coast of Wales are all further than 48.5km from the Morgan Array Area. The Isle of Anglesey Area of Outstanding Natural Beauty (AONB) (National Landscape) is the closest at approximately 60km. The closest points to the Morgan Array Area in Eryri National Park and the Clwydian Range and Dee Valley AONB are approximately 70km and 73km respectively.

110. The Applicant's Seascape, Landscape and Visual Impact Assessment (SLVIA) includes one assessment viewpoint within the Isle of Anglesey AONB (Viewpoint 55 Trwyn Eilian (Point Lynas)) (Volume 4, Annex 10.6: Seascape visualisations Part 3, Figures 19.1-2 and Figures 65-66). The visualisations indicate the visual impact of the proposals at this location are expected to be minor and not significant.

111. Based on the above, we are satisfied with the 60km study area used in the SLVIA, and the decision to scope out statutory designated landscapes in Wales from the SLVIA. We have no further comments.

112. The Applicant acknowledges the above comments [PD1-017], and as such NRW have no further comments to make on designated landscapes and seascapes.

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