

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Technical engagement plan appendices part 2 (Appendix B)

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April 2024

F01



Image of an offshore wind farm

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
F01	Application	RPS	Morgan Offshore Wind Ltd.	Morgan Offshore Wind Ltd.	April 2024

Prepared by:

RPS

Prepared for:

Morgan Offshore Wind Ltd.

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Appendix B: Evidence Plan Benthic Ecology, Fish and Shellfish and Physical Processes EWG

B.1. Benthic ecology, Fish and shellfish and Physical processes EWG overview

Table B.1: Associated minutes from Benthic ecology, Fish and shellfish and Physical processes EWG consultation materials.

Date	Meeting	Information provided
17 February 2022	BE, FSF, PP EWG meeting 1	<p>Meeting minutes (B.2.1)</p> <p>Response from Natural England regarding the meeting minutes (B.2.2)</p> <p>Response from the Environment Agency regarding the meeting minutes (B.2.3)</p> <p>Response from the MMO regarding the meeting minutes (B.2.4)</p> <p>Response from JNCC regarding the meeting minutes (B.2.5)</p> <p>Morgan and Mona Benthic Survey Scope of Works Report (B.2.6)</p> <p>Response from JNCC regarding the Benthic Survey Scope of Works Report and Provision of Intertidal Scope (B.2.7)</p> <p>Response from Natural England regarding the Benthic Survey Scope of Works Report and Provision of Intertidal Scope (B.2.8)</p> <p>Response from NRW regarding the Benthic Survey Scope of Works Report and Provision of Intertidal Scope (B.2.9)</p>
01 April 2022	The Applicant, RPS, Natural England, MMO, Cefas, JNCC, NRW and TWT.	Provision of the benthic survey scope of works.
29 November 2022	BE, FSF, PP EWG meeting 2	<p>Meeting minutes (B.3.1)</p> <p>Response from Natural England regarding the meeting minutes (B.3.2)</p> <p>Response from Cefas regarding the meeting minutes (B.3.3)</p> <p>Response from JNCC regarding the meeting minutes (B.3.4)</p> <p>Response from NRW regarding Low Resemblance Stony Reef (B.3.5)</p>
14 March 2023	BE, FSF, PP EWG meeting 3	Meeting minutes (B.4.1)
11 July 2023	BE, FSF, PP EWG meeting 4	<p>Meeting minutes (B.5.1)</p> <p>Response from Natural England regarding the meeting minutes (B.5.2)</p> <p>Mona and Morgan Generation Offshore Wind Projects Physical Processes Environmental Statement Modelling Strategy (B.5.3)</p> <p>Response from JNCC regarding the Physical Processes Modelling Strategy (B.5.4)</p> <p>Responses and advice note from NRW regarding the Physical Processes Modelling Strategy (B.5.5)</p>

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Date	Meeting	Information provided
		Email from RPS regarding the herring larval approach and the herring larval heatmap (B.5.6) Response from NRW regarding the herring larval heat/contour mapping (B.5.7)
14 August 2023	The Applicant, RPS, Natural England, MMO, Cefas, JNCC, NRW, TWT and IoM Defa	Provision of a technical note presenting the approach to physical processes modelling for the application.
12 October 2023	BE, FSF, PP EWG meeting 5	Meeting minutes (B.6.1) Response from NRW regarding the meeting minutes (B.6.2) Provision of Benthic subtidal and intertidal ecology technical report (B.6.3) NRW comments on Benthic subtidal and intertidal ecology technical report (B.6.4)
07 December 2023	BE, FSF, PP EWG meeting 6	Meeting minutes (B.7.1) Response from Cefas regarding the meeting minutes (B.7.2)
-	BE, FSF, PP EWG agreement log	Agreement log (B.8)

Note: EWG meeting is scheduled for March 2024 but MoM not available ahead of TEP submission.

B.2. Benthic ecology, Fish and shellfish and Physical processes EWG meeting 1

B.2.1 Meeting minutes

MINUTES OF MEETING



Security Classification: Project Internal

MOM Number : 20220217_Morgan and Mona EP_BE, FSF, PP EWG01 **REV. No.** : F02

MOM Subject : Morgan and Mona Evidence Plan Benthic, fish and shellfish and physical processes expert working group meeting 1.

MINUTES OF MEETING

MEETING DATE : 17/02/2022

MEETING LOCATION : Microsoft Teams

RECORDED BY : ██████████ (RPS)

ISSUED BY : ██████████ (RPS)

PERSONS PRESENT:

- ██████████ – bp (GV)
- ██████████ – bp (MP)
- ██████████ – bp (WD)
- ██████████ – RPS (KL)
- ██████████
- ██████████ – RPS (AP)
- ██████████ – RPS (NS)
- ██████████
- ██████████ – Natural England (EH)
- ██████████ – MMO (JS)
- ██████████ – MMO (SJ)
- ██████████ – JNCC (JW)
- ██████████ - Environment Agency (SK)
- ██████████ – NRW (LR)
- ██████████ – NRW (JI)
- ██████████ - NRW (IN)
- ██████████ – Cefas (RB)
- ██████████ – Cefas (GE)
- ██████████ – Cefas (PM)
- ██████████ – Cefas (RB)
- ██████████ – TWT (EB)

ITEM NO:	DISCUSSION ITEM:	Responsible party	Date
1.	<p>Introduction (Presented by KL)</p> <p>KL- This meeting is the first expert working group for benthic, fish and shellfish and physical processes for Morgan and Mona.</p> <p>So far, two Evidence Plan (EP) Steering Group (SG) meetings for the projects have been held in November and December to introduce the project and get the EP up and running.</p>		

	<p>First few slides provide an introduction to the project, including how we envisage the EWG working. The RPS topic specialists will then run through the current surveys for their topic and any feedback we have already received on the current surveys.</p>		
<p>2.</p>	<p>Overview of the Projects (Presented by WD)</p> <p>bp are working with EnBW in a 50/50 partnership (the Applicants) to develop the Morgan and Mona offshore wind farms which are being progressed as two separate projects. These sites were awarded as part of The Crown Estate’s Round 4 offshore wind leasing round and are currently at ‘preferred bidder’ status, subject to completion of the plan-level Habitats Regulation Assessment (HRA). The intention is for both projects to be developed as fixed bottom offshore wind farms.</p> <p>Morgan is the northern project located in in English waters, and Mona is the southern project located mostly in Welsh waters. Together, they will have a combined capacity of 3GW. Morgan and Mona will be developed on similar but slightly staggered timescales and will be under separate consent applications. The Mona project is aiming to be operational in 2028 and the Morgan project is aiming to be operational in 2029.</p> <p>Key dates</p> <p>Both projects are currently at pre-scoping stage.</p> <p>The Applicants are working on the basis that The Crown Estate (TCE) will conclude the plan-level HRA in spring 2022. The Applicants will then be in a position to sign the agreement for lease for seabed rights. Due to the size and nature of both projects, Morgan and Mona are both considered Nationally Significant Infrastructure Projects (NSIPs). The Applicants intend to submit separate Development Consent Order (DCO) applications for Morgan and Mona. Mona will also require a Welsh marine licence and the Applicants are in discussion with NRW Marine Licensing Team on the remit of this marine licence. Currently the Applicants are targeting the 2025 Contract for Difference (CfD) round, noting the recent announcement on annual CfD rounds.</p> <p>The scoping reports for both projects are planned to be submitted April 2022. The intent is to have each project submission offset by a week as per the Planning Inspectorate’s preference.</p> <p>The Applicants are currently undertaking pre-scoping engagement including local authority engagement. Throughout 2022 the Applicants will progress with pre-application activities including both offshore and onshore surveys.</p> <p>Local authority engagement and fisheries engagement have begun. The Applicants have also established a maritime navigation engagement forum.</p> <p>The Applicants aim to publish the Preliminary Environmental Information Report (PEIR) towards the end of 2022 with formal consultation scheduled for early 2023. The Mona DCO application is currently planned to be submitted in Q4 2023 and the Morgan DCO planned for Q1 2024.</p>		

B.2.2 Response from Natural England regarding the meeting minutes

Date: 10 March 2022
Our ref: DAS/UDS A000566 / 381723
Your ref: Benthic ecology, fish and shellfish, and physical processes EWG01



[REDACTED] and [REDACTED]
BP Alternative Energy Investments Limited

c/c [REDACTED] and [REDACTED]
RPS/ Energy

Customer Services
Hornbeam House

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

BY EMAIL ONLY

Dear [REDACTED]

Discretionary Advice Service (Charged Advice) - UDS A000566

Contract Reference: BP EnBW Morgan and Mona Offshore Wind Farm

Consultation: Benthic ecology, fish and shellfish, and physical processes EWG01

This advice is being provided as part of Natural England's Discretionary Advice Service in accordance with the Quotation and Agreement dated 17 May 2021 to BP Alternative Energy Investments Limited.

The following advice is based upon the information presented in the Benthic Ecology, Fish and Shellfish Ecology and Physical Processes Expert Working Group (EWG) Meeting 1 (attended on 17 February 2022) and subsequent meeting notes provided on the 25 February 2022 by [REDACTED].

Natural England were asked to provide advice upon:

1. Agreement on the remit of the EWG;
2. Agreement on Ways of Working document;
3. Agreement on board approach to future surveys;
4. Agreement on board approach to baseline characterisation.

1. Agreement on the remit of the EWG;

Natural England provided comment on the draft Evidence Plan, via a comments log, on 4 November 2021. It was our view that the Evidence Plan set out the basic framework of the Evidence Plan. This was ahead of the 1st Evidence Plan meeting on 16 November 2021. We welcome the update of the Evidence Plan (version F02, provided 4 February 2022) which has incorporated our earlier comments.

The remit of the Benthic Ecology, Fish and Shellfish Ecology and Physical Processes EWG as set out under 4.2 of the Evidence Plan (v F02) is appropriate and in line with Natural England's previous comments, we agree the remit as set out. We welcome the outlined timetable of future meetings and their focus as presented in Table 4.2.

2. Agreement on Ways of Working document

We welcome the Evidence Plan Ways of working document (version F01, provided 4 February 2022) as a clear reference document.

Natural England agrees with the Ways of Working document which aligns with previous comments in terms of timescales for review and comment provided as part of our comments on the draft Evidence Plan (4 November 2022). As noted in the document, it may be necessary for timescales to be amended to ensure sufficient time to review and comment (e.g. large documents or multiple documents), in which case we will communicate and agree an alternative deadline.

3. Agreement on board approach to baseline characterisation and approach to future surveys

Natural England have set up a SharePoint Online (SPOL) site to share Natural England's advice on the environmental considerations and use of data and evidence to support offshore wind and cable projects in English waters. These should be considered when developing the baseline characterisation and designing future surveys. Advice provided on this site includes Natural England and Joint Nature Conservation Committee (JNCC)'s shared advice on 'Nature conservation considerations and environmental best practice for subsea cables in English inshore and UK offshore waters.'

The outputs of Natural England's project 'Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards' are also provided. This project, produced in collaboration with DEFRA, the following reports are currently available;

- Phase I: Expectations for pre-application baseline data for designated nature conservation and landscape receptors to support offshore wind applications.
- Phase II: Expectations for pre-application engagement and best practice guidance for the evidence plan process.
- Phase III: Expectations for data analysis and presentation at examination for offshore wind applications.

You can access the new SPOL site from the following links:



[Environmental considerations for offshore wind and cable projects - Home \(sharepoint.com\)](https://defra.sharepoint.com/sites/WorkDelivery2512/SitePages/Home.aspx) or <https://defra.sharepoint.com/sites/WorkDelivery2512/SitePages/Home.aspx>

Due to how SharePoint Online works, people outside of Defra will need to request access to the site before being able to view the advice documents, so there could be a slight delay for external stakeholders to access the site.

In addition lessons learnt from previous offshore windfarm constructions should be taken into account. For example the Natural England report (2018) Natural England Offshore wind cabling: ten years' experience and recommendations available from: [EN010080-001240-Natural England - Offshore Cabling paper July 2018.pdf \(planninginspectorate.gov.uk\)](https://www.planninginspectorate.gov.uk/media/10080-001240-Natural-England-Offshore-Cabling-paper-July-2018.pdf). Also, the Natural England and JNCC report (2019) on key sensitivities of habitats and Marine Protected Areas in English Waters to offshore windfarm cabling within Proposed Round 4 leasing areas, available from: <https://hub.jncc.gov.uk/assets/3c9f030c-5fa0-4ee4-9868-1debedb4b47f>. Please note that this publication is about to be revised, Natural England will forward the updated version when available.

For clarification of any points in this letter, please contact me using the details provided below.

Yours sincerely


Strategic Coastal Lead Adviser
Coast and Marine Team
Cheshire, Greater Manchester, Merseyside & Lancashire Area Team


The advice provided in this letter has been through Natural England's Quality Assurance process.

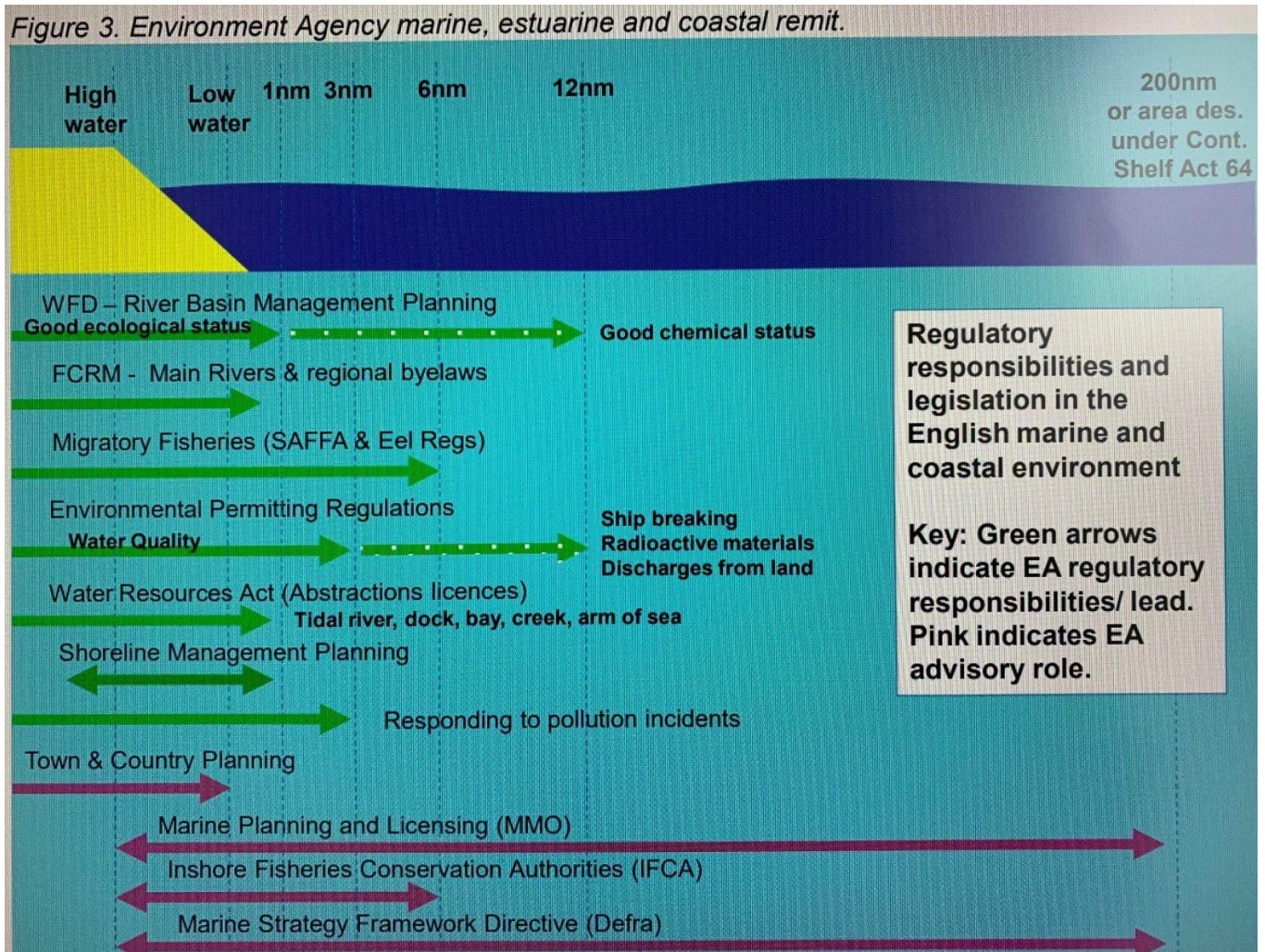
The advice provided within the Discretionary Advice Service is the professional advice of the Natural England adviser named below. It is the best advice that can be given based on the information provided so far. Its quality and detail is dependent upon the quality and depth of the information which has been provided. It does not constitute a statutory response or decision, which will be made by Natural England

acting corporately in its role as statutory consultee to the competent authority after an application has been submitted. The advice given is therefore not binding in any way and is provided without prejudice to the consideration of any statutory consultation response or decision which may be made by Natural England in due course. The final judgement on any proposals by Natural England is reserved until an application is made and will be made on the information then available, including any modifications to the proposal made after receipt of discretionary advice. All pre-application advice is subject to review and revision in the light of changes in relevant considerations, including changes in relation to the facts, scientific knowledge/evidence, policy, guidance or law. Natural England will not accept any liability for the accuracy, adequacy or completeness of, nor will any express or implied warranty be given for, the advice. This exclusion does not extend to any fraudulent misrepresentation made by or on behalf of Natural England.

Cc commercialservices@ [REDACTED]

B.2.3 Response from the Environment Agency regarding the meeting minutes

NSIP Morgan and Mona Offshore Windfarm –comments FBG team Environment Agency
 Environment Agency remit and relevance to proposed expert working groups EWGs



Here are some summary bullets:

- This is a new Nationally Significant Infrastructure Project (NSIP)
- With NSIPs most of the consultation & engagement is prior to submission, in the preparation of the Environmental Impact Assessment, which should address issues within our remit
- We need to identify issues at earliest stage so they can be designed out, or mitigation can be designed in.
- It will need engagement from FBG primarily, also PSO, and likely Land & water, and potentially Groundwater and Waste depending on the constraints.
- Uncertain yet where the cabling will come ashore – a broad corridor is expected to be known later in 2022. This is awaiting the conclusion of a separate Offshore Transmission Network Review
- Our involvement will be provided as chargeable advice, managed by [REDACTED] in Sustainable Places
- Expert working Groups established 2022 – will require involvement of EA technical teams, leading up to submission of the Environmental Statement.
- Most of our remit is around the onshore elements of the work, but FBG will be involved in offshore also see remit diagram above.
- The windfarms themselves are 20nm or over from the coast of Lancashire and S Cumbria, therefore the regulatory responsibilities of the Environment Agency are likely in this case to relate to the cable ways on the sea bed and any connection points to shore when these locations are decided, rather than the impacts of the wind turbines themselves. EA regulatory responsibilities extend to 12nm, however there may be an advisory capacity in relation to the MMO licence which extends 200nm.

NSIP Morgan and Mona Offshore Windfarm –comments FBG team Environment Agency
Environment Agency remit and relevance to proposed expert working groups EWGs

Fisheries Biodiversity and Geomorphology Team (FBG) input to the following expert working groups:

Benthic Ecology, fish/shellfish, physical processes – [REDACTED] as the initial contact, considering designated sites and protected species issues, mitigation and net biodiversity gain. Likely issues to be considered also include migratory fish, SAFFA and Eel Regs, so will need to bring in fisheries technical specialist advice too. WFD and geomorphology considerations and relevant to the physical processes element of this group so geomorphology officers in the team will be asked to input as needed.

Marine Mammals – Agree do not need Environment Agency representation at this group

Offshore ornithology - Agree do not need Environment Agency representation at this group, can be covered by Natural England and RSPB.

Onshore ecology – [REDACTED] as the initial contact Sustainable Places team. If the cable connections and onshore activities affect the Lancashire, Cumbria or Sefton coastline FBG and other EA teams are likely to provide comments, therefore best to coordinate through [REDACTED]. Again for onshore activities FBG will be considering designated sites and protected species issues, mitigation and net biodiversity gain. Particularly impacts to estuaries, river crossings, implications for fisheries issues and impacts to geomorphology. As with the benthic ecology group there may be times when biodiversity, fisheries and geomorphology specialist/officer advice is required.

B.2.4 Response from the MMO regarding the meeting minutes



Marine
Management
Organisation

Marine Licensing
Lancaster House

T [REDACTED]
F [REDACTED]
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[REDACTED]
Environmental Advisor
bp Alternative Energy Investments Ltd
(By email only)

Our reference:
ENC [REDACTED]

06 April 2022

Dear [REDACTED]

Morgan and Mona Offshore Windfarm – Expert Topic Group Meetings

The Marine Management Organisation (MMO) received the above document and accompanying comments for consideration on 04 February 2022. The MMO has reviewed the document alongside our advisors at Cefas and our comments are below:

Comments

Shellfisheries

1. Desktop data sources include the Northern Irish Sea Fish Trawl Surveys. Please note that this is unlikely to inform of shellfish abundances. At best, trawls (except for Nephrops if using an otter trawl) will provide presence/absence information at best. Shellfish (lobster, crab, whelks, cuttlefish) are typically targeted using specialised pots. The MMO would suggest interrogating MMO landings data to determine the extent of shellfish landings.

Underwater Noise

2. Timescales for Feedback (document F02 Ways of working document): Please note that although Cefas advisors can endeavour to provide comments and review minutes and contents of agreement logs within 2 weeks, the exact timeframes will ultimately depend on the deadlines specified by the MMO.

Benthic Ecology

3. The MMO requests confirmation that the benthic grab samples collected in relation to the developments will be processed to the recommend national processing guidelines (Worsfold and Hall, 2010) and that the resultant data will be made available as soon as possible.
4. The MMO note that there were several areas relevant to benthic ecology that were not discussed at the meeting (e.g., cumulative impacts, non-native invasive species, survey design and benthic analyses, electromagnetic fields, suitability of baseline



INVESTORS
IN PEOPLE | Bronze



datasets, data processing and availability). The MMO is aware this is only the first group meeting but will expect these topics to be covered in the future.

Fisheries and Fish Biology

5. In the absence of confirmed export cable routes and cable landfall locations for the projects, the MMO are currently unable to comment, consider or advise on any potentially vulnerable fish receptors which may be affected by the construction activities associated with the construction and operational phases of the wind farms. The MMO will review this in more detail once landfall locations are confirmed.
6. During the expert topic meeting reference was made to the Cefas Pelagic ecosystem survey in the Western Channel and Celtic Sea (PELTIC) surveys and their potential use as a source of information/data to inform the baseline for fisheries. The MMO would advise that in the Irish sea the survey stations only go as far north as Llŷn Peninsula in North Wales, which is significantly further south of the proposed locations for Morgan and Mona. The day may be useful to provide broadscale information and data on pelagic species in the Irish Sea but may not be as useful for providing site-specific fisheries data for the windfarm study areas. See Annex1 for map of PELTIC survey stations.

Coastal Processes and Physical

7. No comments at this stage.

General- Benthic Scope of Works and the Intertidal Outline Scope Reports

8. The MMO note that [REDACTED] sent an email on 01 April 2022 requesting comments on the benthic scope of works report revision 2 with a deadline of 19 April 2022. The MMO has advised previously that consultation with our advisors requires 4 weeks and there will be time either side for quality checks. Further discussions are required around the timescales the projects are proposing as the MMO do not currently find them appropriate.

Conclusion

The MMO notes there are no major concerns at this stage of the projects and has provided advice to ensure all aspects of the topics raised above are adequately covered. The MMO is still concerned however by the time the project expects the MMO to provide comments within and would encourage further discussion on this topic at the next catch-up meeting with the MMO.

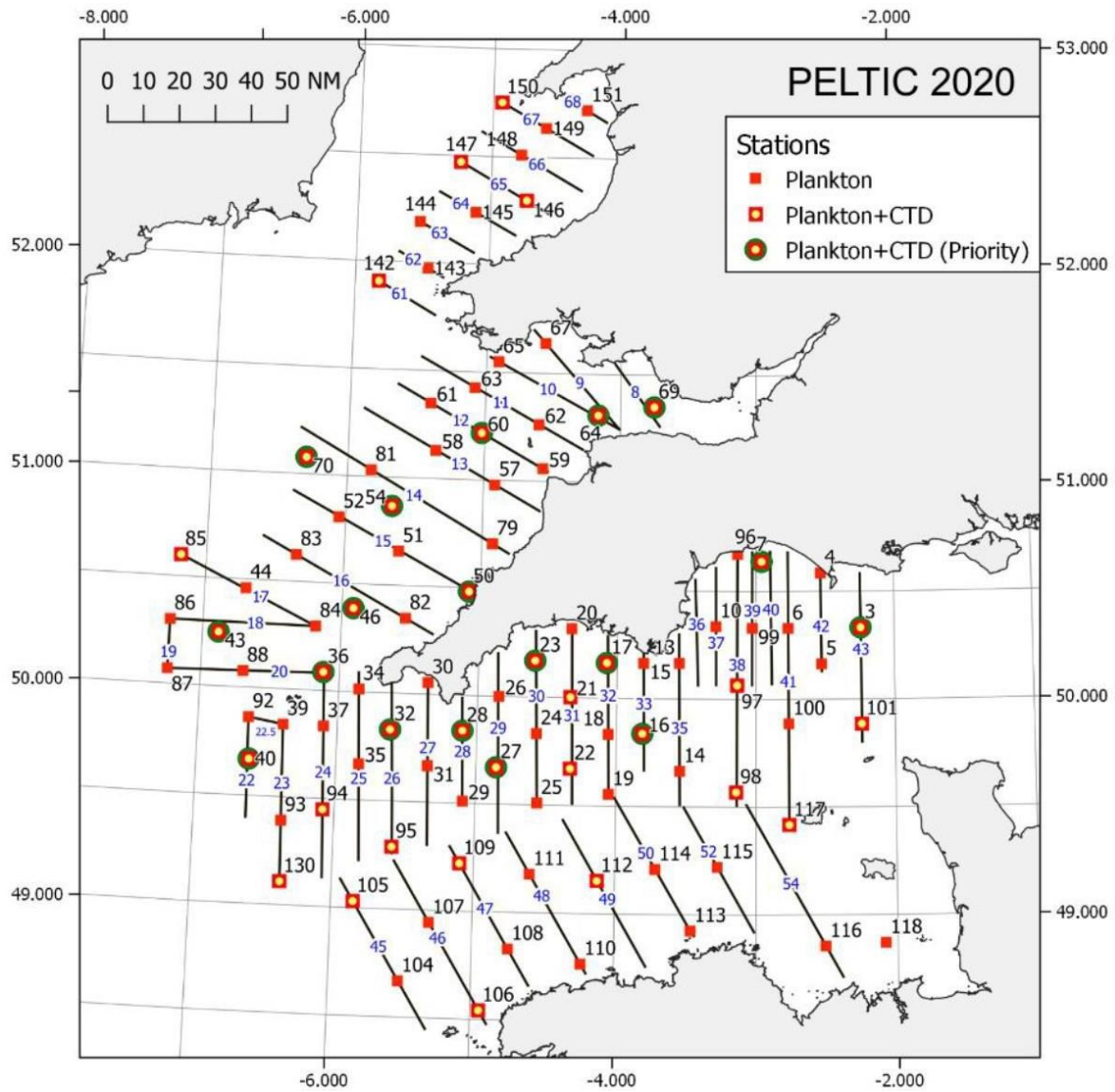
If you wish to discuss any of the points further, please don't hesitate to contact me.

Yours sincerely,

[REDACTED]
Marine Licensing Case Officer

D [REDACTED]
E [REDACTED]

Annex 1 – Map of Survey Stations for the PELTIC survey



B.2.5 Response from JNCC regarding the meeting minutes

[REDACTED]
Marine Consultant
RPS | Energy
Goldvale House

JNCC Reference: [REDACTED]
Date: 11 March 2022

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Dear [REDACTED]

Morgan and Mona wind farms Benthic Ecology, Fish and Shellfish and Physical Processes Expert Working Group (EWG)

Thank you for consulting JNCC on the bp / EnBW Morgan and Mona offshore wind Projects.

The documents reviewed as part of this response are;

- Morgan and Mona_BE_FSF_PP_EWG01_Presentation_F02 (received 25 Feb 2022)
- EOR0801_Morgan and Mona_Evidence Plan_F02 (received 4 Feb 2022)
- EOR0801_Morgan and Mona_Evidence Plan_Ways of Working_F01 (received 4 Feb 2022)
- EOR0801_Mona_BE, FSF, PP EWG01_Agr Log DRAFT F01 (received 25 Feb 2022)
- 20220217_Morgan and Mona_EP BE, FSF, PP EWG01 MoM DRAFT F01 (received 25 Feb 2022)

Any advice or assistance provided by JNCC via our Discretionary Advice Service is advisory only, and with reference to the [General terms and conditions for DAS chargeable services](#), JNCC excludes any warranty that the advice provided by its officers represents JNCC's opinion or otherwise binds JNCC when acting as a Statutory Consultee.

JNCC were asked to comment on the following aspects:

Agreement on the Remit and Inputs to the EWG (as set out in Section 4.2 of the Evidence Plan Template)

JNCC are content with the remit and inputs outlined in Section 4.2 of the Evidence Plan Template, however, we would like to take this opportunity to highlight that (with regard to *Section 3.1.1.4 Joint Nature Conservation Committee*) JNCC's role in relation to offshore renewables in English waters has been delegated to Natural England. Natural England is

now authorised to exercise the JNCC's functions as a statutory consultee in respect of certain applications for offshore renewable energy installations in inshore and offshore waters (0-200nm) adjacent to England. Therefore, JNCC would not look to provide comment on the Morgan project unless we anticipate an impact on a jointly managed site (i.e a site jointly managed by ourselves and Natural England). As such JNCC have not provided feedback in relation to the Morgan project within this response. We are currently holding internal discussions regarding this issue and how this can be managed in practice. We will endeavour to provide clarity as soon as is possible.

We also note that *Section 3.1.1.3 Natural Resources Wales Advisory* states that Natural Resources Wales Advisory (NRW) will provide comment on offshore elements of the project "within and outside of 12nm from the Welsh coast". We would like to highlight that JNCC are the statutory consultee for offshore Welsh waters but will, throughout this process, look to liaise with NRW to provide joint advice where it is deemed appropriate.

Agreement on the Ways of Working document, including timescales

JNCC are satisfied with the content of the Ways of Working document and feel that the proposed timings are reasonable. Where there may be an issue in achieving the timeframe set out within the Ways of Working document, JNCC will be sure to contact bp / EnBW and RPS in a timely manner to ensure minimal disruption to the progress of the agreement(s) in question.

Agreement on the broad approach to future surveys – that previous feedback has been taken into account in future scope

JNCC are content with the surveys that have been undertaken as well as those scheduled for the array's Zone of Influence and the cable route. With regard to the upcoming surveys, we would like to refer bp / EnBW and RPS to previous advice provided by JNCC (Ref OIA-08126, 11 June 2021) regarding benthic survey scopes which may prove useful. We appreciate that the benthic survey scopes will be prepared and discussed with the EWG through the Evidence Plan process.

Agreement on the broad approach to characterisation for Benthic Ecology

JNCC note the presence and initial analysis of sea-pen and burrowing megafauna communities within the array area and welcome the opportunity to review the assessment of this feature. JNCC provide the following information as it may prove useful in further analysis.

The definition of the OSPAR T&D feature 'Seapens and burrowing megafauna communities' is the subject of on-going discussions between Contracting Parties as scientific knowledge improves, particularly for deep sea areas.

OSPAR (2008) defines the 'Seapen and burrowing megafauna communities' feature as "Plains of fine mud, at water depths ranging from 15-200m or more, which are heavily bioturbated by burrowing megafauna with burrows and mounds typically forming a prominent feature of the

sediment surface. The habitat may include conspicuous populations of seapens, typically *Virgularia mirabilis* and *Pennatula phosphorea*.” The narrative then notes that - “...the tall seapen *Funiculina quadrangularis* may also be present.” The OSPAR (2010) Background Document for Seapen and Burrowing megafauna communities instead notes that “... burrows and mounds may form a prominent feature of the sediment surface with conspicuous populations of seapens ...”

At a meeting of the OSPAR Contracting Parties in Bergen in November 2011¹, a key recommendation was that the **presence of burrowing megafauna is the essential defining characteristic** of the feature; the presence or absence of seapens does not in itself define the feature. Seapens may form a prominent feature of the seabed surface, but **do not have to be present** to define the OSPAR T&D habitat (SS.SMu.CFiMu.SpnMeg and/or SS.SMu.CFiMu.MegMax). This assumption is equally true of the Scottish ‘burrowed mud’ PMF, with the exception of the seapen *Funiculina quadrangularis*, which is designated as part of this PMF. JNCC believe that this is the most up-to-date position on the composition of this habitat.

JNCC have published the following report on the UK interpretation of the feature:

[JNCC clarifications on the habitat definitions of two habitat Features of Conservation Importance: Mud habitats in deep water, and; Seapen and burrowing megafauna communities](#)

In recent advice to Defra (concerning data from the *Nephrops* fisheries stock assessments) the threshold considered to demonstrate the presence of the OSPAR habitat Seapen and burrowing megafauna communities is a burrow density of >0.2/m². For further information on classifying Seapen and burrowing megafauna communities from *Nephrops* stock surveys see Section 5.1 of the JNCC’s 2014 advice on possible offshore Marine Conservation Zones considered for consultation in 2015, available at:

<http://data.jncc.gov.uk/data/91e7f80a-5693-4b8c-8901-11f16e663a12/2-pre-consultation-T2mcz-advice-140627-V5.0.pdf>

JNCC also notes the presence of habitat which is being categorised as “low” resemblance to rocky reef habitat and would like to provide the following guidance:

When assessing potential stony reef habitat, the use of Irving (2009) guidelines is correct, however, we would like to make bp / EnBW and RPS aware that JNCC and the Statutory Nature Conservation Bodies have also produced further guidance helping to refine the characterisation of ‘low resemblance’ reef. JNCC Report 656² published in September 2020 provides some overarching principles for the application of the Annex I stony reef guidance, specifically in relation to ‘low resemblance’ reef and the potential for reefs to have ‘medium’ or ‘high’ resemblance classification even when one or more of the criteria are ‘low’. We request that the recent surveys be reviewed against this report to ensure that there are no

¹ 20 October 2011 - 21 October 2011. OSPAR Workshop on the improvement of the definitions of habitats on the OSPAR list

²<http://data.jncc.gov.uk/data/4b60f435-727b-4a91-aa85-9c0f99b2c596/JNCC-Report-656-FINAL-WEB.pdf>

other areas of 'medium' or 'high' resemblance reef present which may require further mitigation planning.

Agreement on the broad approach to characterisation for Fish and Shellfish Ecology

We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.

Agreement on the broad approach to characterisation for Physical Processes

JNCC have no further comments at this stage in this process.

Further Comments

JNCC are content that the draft minutes are accurate.

Please contact me with any questions regarding the above comments.

Yours sincerely,

██████████

Offshore Industries Adviser

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B.2.6 Morgan and Mona Benthic Survey Scope of Works Report



Survey Report for
bp Alternative Energy Investments Limited

Project:
**Morgan and Mona
2022 Integrated Site Survey**

Description:
Benthic Survey Scope of Works Report

Expected Survey Commencement Date:
April 2022

Project Number:
11781

Report Status:
Final

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Distribution

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BP Alternative Energy Investments Limited,

[REDACTED]
[REDACTED]
[REDACTED]

For attention of

[REDACTED]
[REDACTED]

SERVICE WARRANTY

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GLOSSARY OF TERMS AND ABBREVIATIONS

Benthic	Relating to the seabed	Mud	Sediment grains <63µm (includes Silt and Clay)
Biogenic	Produced by living organisms	NMBAQC	North East Atlantic Marine Biological Analytical Quality Control
Cefas	Centre for environment, fisheries and aquaculture science	OCP	Organochlorine pesticides
Clay	Sediment grains <3.9µm in diameter	OSPAR	Oslo and Paris convention
CM	Central Meridian	OTU	Operation taxonomic unit
Defra	Department for environment, food and rural affairs	PAH(s)	Polycyclic aromatic hydrocarbon(s)
EBS	Environmental Baseline Survey	PCBs	Polychlorinated biphenyls
ECR	Export cable route	PCPT	Piezometer cone penetrometer test
EnBW	Energie Baden-Wuerttemberg	PSA	Particle Size Analysis
Fines	Sediment grains <63µm in diameter (same as Mud)	Ramsar	The Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat
GC-FID	Gas Chromatography Flame Ionisation Detection	SAC	Special Area of Conservation
GC-MS	Gas Chromatography Mass Spectrometry	Sand	Sediment grains ≥63µm and <2mm in diameter
Gravel	Sediment grains >2mm in diameter	Silt	Sediment grains ≥3.9µm and <63µm in diameter
GRS	Geographic reference system	SOW	Scope of Work
ICP-MS	Inductively Coupled Plasma Mass Spectrometry	SPA	Special Protection Areas
IUCN	International Union for Conservation of Nature	SSS	Side Scan Sonar
LAT	Lowest Astronomical Tide	THC	Total Hydrocarbon
Macrofauna	Organisms that are normally larger than the mesh size of the sieve used. In this case 0.5mm.	TOC	Total Organic Carbon
MBES	Multi-beam echo sounder	UKCS	United Kingdom Continental Shelf
MCZ	Marine conservation zone	USV	Unmanned survey vessels
MDAC	Methane Derived Authigenic Carbonate	UTM	Universal Transverse Mercator
		UXO	Unexploded ordnance
		ZOI	Zone of influence

1 INTRODUCTION

1.1 Scope of Work

bp Alternative Energy Investments Limited (hereafter bp) and Energie Baden-Württemberg (EnBW) are proposing two offshore windfarm projects in the Irish Sea, named Morgan and Mona (Figure 1.1). The offshore windfarm projects will be accompanied by an export cable route (ECR) for Morgan and an ECR for Mona to connect each of the offshore windfarms to the National Grid. The current ECR scoping areas for Morgan and Mona are shown in Figure 1.1. Within these scoping areas, more defined ECR corridors will be refined.

In order to inform the spatial planning and design of the array as well as to inform environmental impact assessments and the consenting process, a series of phased surveys are planned (bp Solutions, 2021). In 2021, initial surveys were conducted, such as a bathymetry, geophysical, geotechnical and an environmental survey in the Morgan and Mona potential array areas. A zone of influence (ZOI) was delineated, covering each array area plus a buffer of one tidal excursion, thereby representing the maximum distance suspended sediments would travel from the Morgan and Mona potential array areas in one tidal cycle prior to deposition on slack water. In 2022, surveys will cover the Morgan and Mona ZOI and ECRs and comprise:

- a third party ECR bathymetry survey (conducted by XOcean) involving multibeam echosounder (MBES) data acquisition.
- a supplementary geophysical survey conducted by Gardline offshore, Titan nearshore and involving remote-controlled small unmanned survey vessels (USV) to acquire magnetometer, SSS, MBES and SBP data as required at proposed environmental and geotechnical sampling locations to confirm clearance of obstacles and UXOs.
- an environmental survey conducted by Gardline using imagery and grab sampling to provide benthic characterisation of habitats, species and any contaminants along the ECRs and Morgan and Mona ZOI. This includes the identification of any environmentally significant habitats.
- a shallow geotechnical survey conducted by Gardline along the proposed ECRs, to establish porewater pressure using a piezometer cone penetrometer test (PCPT) and sampling with a vibrocore.

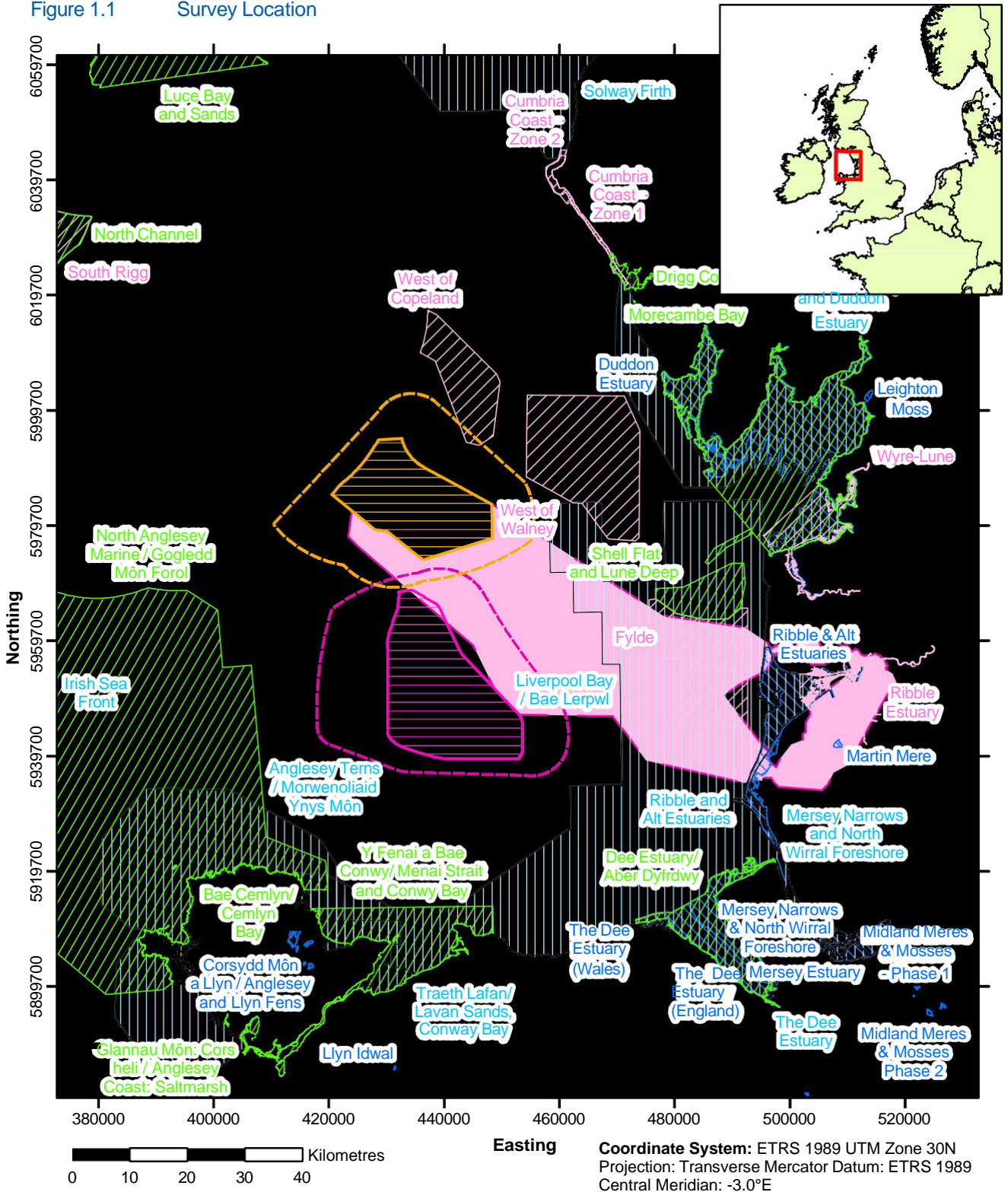
The information acquired will be used to refine the project location and help to inform selection of the final ECR for each potential array area. This survey will also supplement the 2021 survey and provide detailed survey of the ECRs.

The aim of this document is to detail the intended environmental survey plan for the benthic characterisation across both ZOI survey areas and proposed ECRs. It will look to detail the intended operations, sampling locations, sampling equipment, analysis and reporting. This document has been created in line with aspects of the monitoring guidance for marine benthic habitats which apply to initial habitat reconnaissance (Nobles-James *et al.*, 2018; Natural Resources Wales, 2021a).

In addition to this plan and as part of the project, an archaeological desk-based assessment (DBA) is being conducted by Coastal and Offshore Archaeological Research Services (COARS, issue pending) to identify potential heritage features and assign appropriate areas of exclusion through a written scope of investigation. These exclusion zones range from 50m to 100m depending upon the type of archaeological feature and will be avoided for any environmental sampling or geotechnical investigations. Further, the DBA outlines a protocol for archaeological discoveries that will be followed should any finds be encountered outside these exclusions. The results of this, as well as indications of potential archaeological features encountered in the geophysical data, once it is acquired, will be

used in any final station planning throughout the project to prevent impact to archaeological important features. In lieu of the latest DBA (COARS, issue pending), the findings of the previous DBA (COARS, 2021) have been considered in the current report.

Figure 1.1 Survey Location



Key	
	Morgan Potential Array Area
	Mona Potential Array Area
	Morgan ZOI
	Mona ZOI
	Penwortham ECR Scoping Area
	Bodelwyddan ECR Scoping Area
	SACs with Marine Components (JNCC, 2020a)
	MCZs (Natural England and Defra, 2020)
	SPAs with Marine Components (JNCC, 2020b)
	Ramsar Sites (JNCC, 2019)

1.2 Expected Sediments, Protected Species and Habitats

Following a review of the available EMODnet data (EMODnet Geology, 2021), broad scale expected sediments within the Morgan and Mona potential array and ZOI areas, and proposed ECR scoping areas are thought to comprise of coarse-grained sediments, sand, mixed sediment, and small areas of rock or other hard substrata. Inside the potential array areas, the main EUNIS classifications expected are deep circalittoral coarse sediment (A5.15) and deep circalittoral mixed sediment (A5.45) (EMODnet, 2019). Within the Morgan and Mona ZOIs there are areas identified as suitable for the EUNIS biotope complex A5.451 (Polychaete-rich deep *Venus* community in offshore mixed sediments). The previous survey conducted at the Morgan and Mona sites (Gardline, 2022b) found that EUNIS biotope A5.451 'Polychaete-rich deep Venus community in offshore mixed sediment' was dominant, although EUNIS biotope complexes A5.44 circalittoral mixed sediment and A5.14 circalittoral coarse sediment were also present, together with EUNIS biotopes A5.355 *Lagis koreni* (trumpet worm) and *Phaxas pellucidus* (transparent razor shell) in circalittoral sandy mud and an isolated occurrence of A5.445 *Ophiothrix fragilis* (common brittlestar) and/or *Ophiocomina nigra* (black brittlestar) brittlestar beds on sublittoral mixed sediment. In nearshore areas, which coincide with the proposed ECR scoping areas, the expected EUNIS classifications of sediment vary from those expected in the potential array areas. Sediments are expected to be finer with EUNIS classifications such as circalittoral mud (A5.37) and circalittoral fine sand (A5.25) (EMODnet, 2019), with some areas of rock closer to shore (A4.1), although data on sediment type within around 1km of the coastline is unavailable (EMODnet, 2019).

Available bathymetry data (EMODnet Bathymetry Consortium, 2020) indicated that water depths ranged from approximately 5m to 60m MSL including the ECR scoping areas. Generally, depths increase from north-east to south-west across the potential array areas and the seabed gradually shoals along each ECR scoping area. The previous survey within the potential array areas (Gardline, 2022b) recorded depths ranging from 27.5m to 50.0m and a general seabed slope of less than 1°. Both potential array areas were previously found to have occasional sand waves trending north-south, which could potentially extend into the ZOIs. The Morgan potential array area was characterised by a central channel that was orientated north-east to south-west and a shallower channel in the same orientation in the south-east of the potential array area. Based on available bathymetry data (EMODnet Bathymetry Consortium, 2020), this previously noted central channel extends and deepens into the north-east region of the Morgan ZOI, with water depths across the channel ranging from 30m to 55m. The Mona potential array area was previously found to exhibit broad shoal areas in the central south-east and south-east, separated by a shallow channel (Gardline, 2022b). Using broadscale bathymetry data (EMODnet Bathymetry Consortium, 2020) of the ZOIs, it is thought these channels extend outside of the potential array areas. This general seabed morphology is likely to exhibit a range of habitats given the variation in entrainment of current flow and relative relief. Until further information from the geophysical acquisition is completed, this has been used as the basis for initial station selection.

Modelled metocean data provided by bp for a previous report (Gardline, 2021) indicated that the predominant current direction in the Mona potential array area is on an east to west axis. In addition to this direction, the Morgan potential array area also shows current flow on a north-east to south-west axis, which may influence the distribution of sediments.

In terms of notable species and habitats expected to occur within the Morgan and Mona potential array areas, five species which also contribute to the formation of protected habitats were identified from data within the OBIS register (OBIS, 2021) and Gardline internal datasets; *Arctica islandica* (ocean quahog), *Ammodytes tobianus* (lesser sand eel), *Hyperoplus lanceolatus* (greater sand eel),

Sabellaria spinulosa (ross worm) and *Modiolus modiolus* (horse mussel, see Sections 1.4 and 1.5). There were no sedentary species that are listed on the IUCN (2022) red list recorded within the survey and scoping areas (OBIS, 2019).

Further, commercially important species in terms of sand eel (Ammodytidae) and herring (*Clupea harengus*) are noted to have high intensity spawning or nursery grounds across the potential array areas and ZOIs (Cefas, 2010). As such, the survey area's suitability for spawning will be directly quantified by sediment sampling for determining particle size suitability and visual inspection for these particular species (see Sections 1.3.2, 1.4.5 and 1.4.6). Further, spawning potential (Cefas, 2010) is also noted of broadcast spawners (Atlantic cod (*Gadus morhua*, Low/High), whiting (*Merlangius merlangus*, Low), common ling (*Molva molva*, Low), European plaice (*Pleuronectes platessa*, Low/High), Atlantic mackerel (*Scomber scombrus*, Low), common sole (*Solea solea*, Low/High) and Atlantic horse mackerel (*Trachurus trachurus*, Low)). In addition, nursery grounds are also predicted for these species along with Anglerfish (*Lophius piscatorius*) and several elasmobranchs (school shark (*Galeorhinus galeus*), thornback ray (*Raja clavata*), spotted ray (*Raja montagui*) and spiny dogfish (*Squalus acanthias*)). Analysis of images from the previous survey identified elasmobranch eggs present (Gardline, 2022b). Where these species or their eggs are identified they will be recorded, though the quality/suitability of spawning potential will not be assessed as they are not actively targeted by this survey's investigation methods.

Relative to the 2021 survey area (Gardline, 2022b), the larger current proposed survey area now overlaps a Marine Conservation Zone (MCZ) in the north-east corner of the Morgan ZOI. This MCZ, West of Copeland, was designated in May 2019 under the Marine and Coastal Access Act (2009) and contains three protected habitats: Subtidal coarse sediment, subtidal sand, and subtidal mixed sediments (Defra, 2019). Since West of Copeland MCZ is newly designated, conservation and management advice are not currently available (JNCC, 2021b), although the management approach from the MCZ post-consultation advice document suggested to maintain the current favourable condition (JNCC, 2018). As an indication of the likely advice, the nearby South Rigg MCZ, which was also designated in 2019 and contains the same qualifying features as the West of Copeland MCZ, has an 'Advice on Operations' document highlighting activities to which the protected habitats are evaluated to be sensitive (JNCC, 2021a). These include disturbance to the substrate on the surface of the seabed, physical sampling (removal of substratum), and smothering and siltation rate changes. Similarly, the Fylde MCZ occurs to the east of the Mona potential array area and therefore there is a potential overlap with the ECR scoping area, when fully defined. The Fylde MCZ is designated to maintain in favourable condition subtidal sand and subtidal mud, and although there is no current advice on activity within the region, Natural England has confirmed that this survey will not have a significant impact.

Threatened and/or declining habitats (OSPAR, 2008) were reviewed using EMODnet (2020) and only one small area within the Morgan ZOI encroached on an area of recognised seapen and burrowing megafauna communities habitat, which is classified as a threatened and/or declining habitat (OSPAR, 2008), and there is potential for overlap with the ECR scoping area, when fully defined. Despite this classification, the habitat is widespread throughout the central North Sea, around the south and west coasts of Norway and around the north of the British Isles (OSPAR, 2010).

The Bodelwyddan ECR scoping area overlaps with areas of intertidal blue mussel (*Mytilus edulis*) beds, which are also classified as a threatened and/or declining habitat (OSPAR, 2008). This bivalve can form dense beds in water depths up to 10m (Holt *et al.*, 1998) and occurs principally on mixed substrata; mainly cobbles and pebbles on muddy sediments (OSPAR, 2015). There are currently no definitive guidelines on what differentiates a *M. edulis* reef from a bed or a small clump of individuals,

however, the Hendrick and Foster Smith (2006) *S. spinulosa* reef scoring system can be applied to the survey data in an attempt to determine the 'reefiness' of any areas of *M. edulis* aggregations identified within the survey area.

The Bodelwyddan ECR scoping area cross habitat identified as intertidal mudflats, which are also classified as a threatened and/or declining habitat (OSPAR, 2008). This habitat is defined as intertidal mud forming mudflats, typically in calm coastal environments with fine sediment (OSPAR, 2009a). Mudflats are often bound by saltmarshes in the upper regions and the Chart Datum is often used as the lower limit (OSPAR, 2009a). The regions are important for the functioning of estuarine systems and are highly productive; however, it is under threat and/or declining in four OSPAR regions, including region III where this survey is located (OSPAR, 2009a).

Where the ECR scoping areas near the shore, all of them coincide with at least one protected area including Special Areas of Conservation (SACs), MCZs, Special Protection Areas (SPAs) and Ramsar sites.

1.3 Environmental Survey Strategy

1.3.1 Survey Plan

Geophysical data (MBES, SSS and magnetometer) will be collected to confirm the stations are clear of UXOs, specifically for equipment that will contact the seabed. A dual frequency SSS will be used to collect data that will enhance UXO detection and environmental seabed station selection. The magnetometer will be used to acquire data needed at sample locations. If appropriate, the magnetometer data may be acquired in combination with the SSS on specific lines.

The intention is to target a total of approximately 50 stations for co-located camera and sediment sampling across both the Morgan and Mona potential array areas and ZOIs to adequately characterise the benthic community and identify any potentially sensitive features. An additional camera-only target has been selected in the Mona potential array area to revisit an area previously exhibiting a low resemblance to stony reef (Gardline, 2022b). Within the ECR scoping areas, approximately 160-240 stations will be sampled, assuming routes of c.80km in length and sampling at 1-2km intervals. Given the phased approach to data acquisition and the operational survey window, detailed geophysical data will be reviewed during the field acquisition to determine the final sampling station locations and to determine sampling intensity. For example, where the geophysical data indicate homogenous seabed sediment over an extensive area, sampling intensity may be reduced (e.g., sampling at c.2km interval), while in areas of heterogeneous seabed, greater sampling intensity may be required.

Consequently, based on available datasets, this plan has initially defined a series of provisional targets for approval (25 within the potential array areas, 25 within the ZOIs), along with details of how these will be adjusted. The spread of targets has been selected with consideration of the background data on the likely sediments, predicted habitats and previous survey locations that can be used for assessing trends. Bathymetry data (GEBCO Compilation Group, 2021) have been used to provide a further justification for the initial target selection due to the general observable features (e.g., channels). Client supplied positions from the Inspire database (wrecks), the KIS-ORCA database (wind turbines and cables) and OGA database (wells and pipelines) were used alongside known archaeological exclusion zones (COARS, 2021) to ensure targets are away from existing or relic infrastructure (OGA, 2021; 200-250m exclusion zone as appropriate) as well as archaeological features (50-100m exclusion zones depending on the feature). Stations selected for chemical samples have been carefully chosen to target a range of sediment types, depths, and current influences.

Particular attention has been paid to areas where chemicals may accumulate, such as the bottom of channels, as well as proximity to protected sites and habitats. Although these stations have been chosen to maximise coverage and aid the interpretation of results, if the sediment type found during sampling does not provide a suitable sample for chemical analysis, field personnel may decide to move to a nearby location or microsite away from patches with unsuitable sediment. These provisional targets are detailed in Table 1.1 and Figure 1.2 for the Morgan area and in Table 1.2 Figure 1.3 for the Mona area. All positional information in this report is referenced to GRS 80 Ellipsoid, ETRS 89 Datum. All grid coordinates are projected using Universal Transverse Mercator (UTM) Projection, Grid Zone 30, Central Meridian (CM) 3° W.

This plan does not include proposed targets for sampling within the ECR scoping areas. Once more defined ECRs have been established, provisional targets will be proposed to sample along the ECRs with consideration of the background data on the likely sediments and predicted habitats. Samples are anticipated to be taken at intervals of approximately 1-2km and chemistry samples at intervals of approximately 5km (depending on the presence of suitable sediments). Final target selection will be dependent on appropriate substrate and is subject to modification in order to target every sediment type or particular features of interest.

Upon investigation of the newly acquired geophysical data, the provisional targets will be adjusted by experienced environmental scientists to target representative habitats and to provide coverage to assess the current condition of any potentially sensitive features evident. The sensitive features that will be interpreted from the geophysical data will include features associated with Annex I habitats (Directive 92/43/EEC, 1992), OSPAR threatened species or habitats (OSPAR, 2008) or UK priority species or habitats for England (Natural Environment and Rural Communities Act, 2006) and Wales (Environment (Wales) Act, 2016).

As such, targets will also be assessed from the geophysical data and adjusted to ensure no significant archaeological features are impacted or UXOs or entanglement risks targeted that would endanger sampling operations. Further, based upon the geophysical data, additional stations may be added to ensure coverage of all additional habitat types or sensitive features not already adequately sampled by the initial provisional grid of targets. Stations will also be prioritised based upon this geophysical acquisition to ensure adequate information is obtained to meet the data needs for the intended development and ensuring all habitats are sampled, for example with priority attention given to areas identified as potential Annex I reef habitats. The sample analysis for these additional stations would be reviewed subject to the reason for their addition, for example, they may be imagery only if the targeted habitat is already sampled adequately by other stations or would be detrimentally impacted by sampling.

Figure 1.2 Morgan Potential Array Area and ZOI Proposed Targets Overview

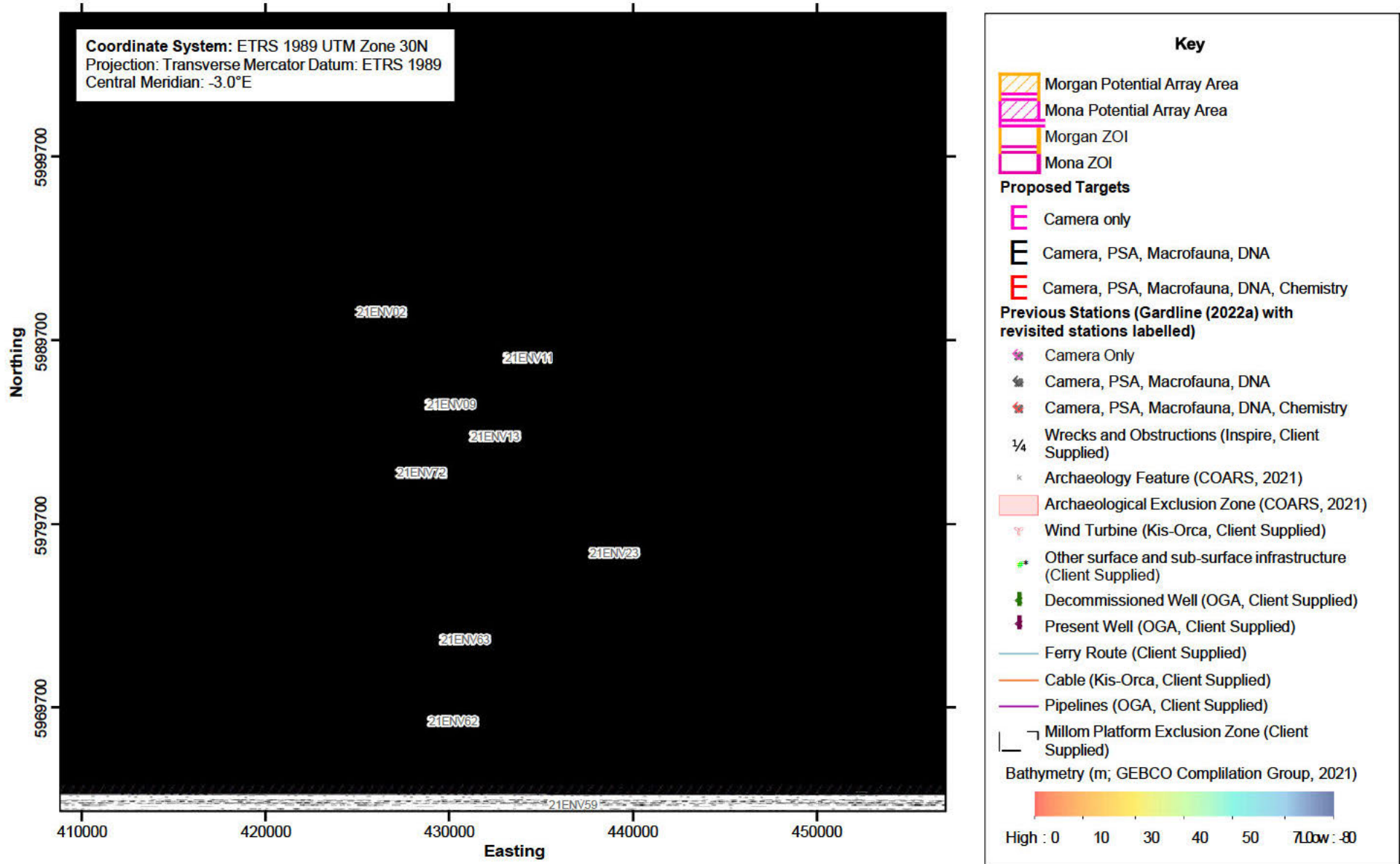


Table 1.1 Morgan Potential Array Area and ZOI Proposed Targets and Sampling Objectives

Full Station Name	Station	Easting	Northing	Broad Feature Targeted	Sample Acquisition	Area	Gardline (2022a) Station ²
BP22MOR-ENV-GS-01	ENV1	436576	5988729	Start of central deeper channel	PSA, MF, DNA, CHEM	Array	21ENV11
BP22MOR-ENV-GS-02	ENV2	430786	5982482	End of central deeper channel	PSA, MF, DNA, CHEM	Array	21ENV72
BP22MOR-ENV-GS-03	ENV3	434800	5984480	Flank of central deeper channel	PSA, MF, DNA, CHEM	Array	21ENV13
BP22MOR-ENV-GS-04	ENV4	432396	5986200	Flank of central deeper channel (100m from archaeological feature)	PSA, MF, DNA	Array	21ENV09
BP22MOR-ENV-GS-05	ENV5	435141	5977322	Edge of mixed sediment substrate	PSA, MF, DNA	Array	-
BP22MOR-ENV-GS-06	ENV6	431274	5992764	Sand substrate and Northern Shallow Region	PSA, MF, DNA, CHEM	Array	-
BP22MOR-ENV-GS-07	ENV7	426470	5985608	Coarse-grained substrate	PSA, MF, DNA	Array	-
BP22MOR-ENV-GS-08	ENV8	441260	5978234	Mud to muddy sand substrate and spawning ground potential (moved north of previous station to 100m from archaeological feature)	PSA, MF, DNA, CHEM	Array	21ENV23
BP22MOR-ENV-GS-09	ENV9	444561	5980579	South-eastern deeper region	PSA, MF, DNA, CHEM	Array	-
BP22MOR-ENV-GS-10	ENV10	438070	5981684	Shallow region south of central deeper channel	PSA, MF, DNA	Array	-
BP22MOR-ENV-GS-11	ENV11	430574	5987585	Shallow region north of central deeper channel	PSA, MF, DNA	Array	-
BP22MOR-ENV-GS-12	ENV12	443985	5984432	Shallow region in the east of site (>200m from IOM/UK interconnector cable)	PSA, MF, DNA	Array	-
BP22MOR-ENV-GS-13	ENV13	428608	5991267	Edge of shallow region in the north and edge of substrate type ¹	PSA, MF, DNA	Array	21ENV02
BP22MOR-ENV-GS-14	ENV14	445414	5992872	Deepest region of ZOI and near MCZ (>300m from existing wind turbine)	PSA, MF, DNA, CHEM	ZOI	-
BP22MOR-ENV-GS-15	ENV15	453073	5987872	Edge of seapen and burrowing megafauna habitat	PSA, MF, DNA, CHEM	ZOI	-
BP22MOR-ENV-GS-16	ENV16	453192	5976521	Close to seapen and burrowing megafauna habitat in the south-east	PSA, MF, DNA, CHEM	ZOI	-
BP22MOR-ENV-GS-17	ENV17	433183	5973416	Mixed sediment substrate ¹ (>200m of LANIS 1 cable)	PSA, MF, DNA, CHEM	ZOI	21ENV63
BP22MOR-ENV-GS-18	ENV18	418704	5984419	Coarse-grained substrate	PSA, MF, DNA	ZOI	-
BP22MOR-ENV-GS-19	ENV19	435333	5999183	Northern shallow region of ZOI and nursery area potential ¹	PSA, MF, DNA	ZOI	-
BP22MOR-ENV-GS-20	ENV20	443708	5993601	Northern flank of central deeper channel and near MCZ	PSA, MF, DNA, CHEM	ZOI	-
BP22MOR-ENV-GS-21	ENV21	416839	5978347	South-western deeper region	PSA, MF, DNA, CHEM	ZOI	-
BP22MOR-ENV-GS-22	ENV22	444501	5988189	Southern flank of central deeper channel	PSA, MF, DNA, CHEM	ZOI	-
BP22MOR-ENV-GS-23	ENV23	445035	5974393	Band of mud to muddy sand substrate ¹	PSA, MF, DNA, CHEM	ZOI	-
BP22MOR-ENV-GS-24	ENV24	427832	5995888	Intersection between coarse and sand substrate	PSA, MF, DNA	ZOI	-
BP22MOR-ENV-GS-25	ENV25	424459	5971520	Edge of ZOI at moderate depth	PSA, MF, DNA, CHEM	ZOI	-
BP22MOR-ENV-GS-26	ENV26	448470	5983030	Start of smaller deep channel in the east ¹	PSA, MF, DNA	ZOI	-

¹ Target is <500m of Ferry Route.

² For ease of comparison, the prefix 21 has been added to the stations sampled in 2021 by Gardline

Figure 1.3 Mona Potential Array Area and ZOI Proposed Targets Overview

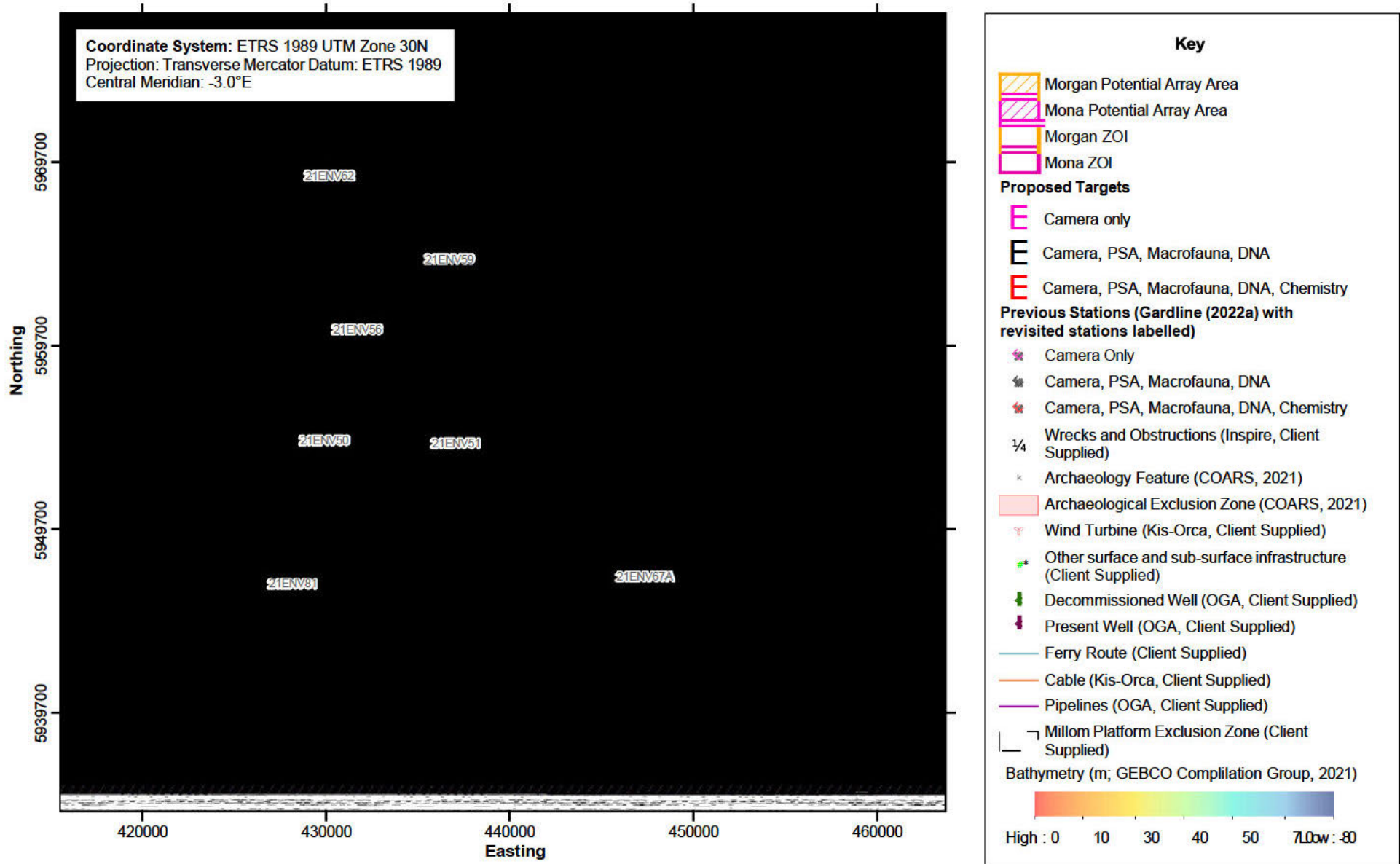


Table 1.2 Mona Potential Array Area and ZOI Proposed Targets and Sample Acquisition

Full Station Name	Station	Easting	Northing	Broad Feature Targeted	Sample Acquisition	Area	Gardline (2022a) Station ²
BP22MON-ENV-GS-27	ENV27	449860	5947112	Slight deeper channel in south-east of site ¹	PSA, MF, DNA, CHEM	Array	21ENV67A
BP22MON-ENV-GS-28	ENV28	432215	5954552	Deeper western side of site	PSA, MF, DNA, CHEM	Array	21ENV50
BP22MON-ENV-GS-29	ENV29	439035	5964418	Shallower eastern side of site	PSA, MF, DNA, CHEM	Array	21ENV59
BP22MON-ENV-GS-30	ENV30	430332	5948303	Rocky substrate	PSA, MF, DNA	Array	-
BP22MON-ENV-GS-31	ENV31	434033	5960596	Coarse-grained substrate	PSA, MF, DNA	Array	21ENV56
BP22MON-ENV-GS-32	ENV32	439700	5957360	Mixed substrate (>200m from Hibernia Atlantic Seg.C cable)	PSA, MF, DNA	Array	-
BP22MON-ENV-GS-33	ENV33	442358	5948938	Spawning ground potential for species such as herring and cod (Cefas, 2010)	PSA, MF, DNA	Array	-
BP22MON-ENV-GS-34	ENV34	450851	5941080	Shallower region in south-east of site	PSA, MF, DNA	Array	-
BP22MON-ENV-GS-35	ENV35	439422	5954389	Shallower central region and intersection between mixed and coarse substrate	PSA, MF, DNA	Array	21ENV51
BP22MON-ENV-GS-36	ENV36	437680	5945297	Shallow region in south-west of site	PSA, MF, DNA, CHEM	Array	-
BP22MON-ENV-GS-37	ENV37	432952	5967194	Deeper north region of site	PSA, MF, DNA	Array	-
BP22MON-ENV-GS-38	ENV38	445360	5942759	Southern flank of deeper channel	PSA, MF, DNA, CHEM	Array	-
BP22MON-ENV-GS-39	ENV39	454383	5952550	Mud to muddy sand substrate ¹	PSA, MF, DNA, CHEM	ZOI	-
BP22MON-ENV-GS-40	ENV40	447940	5957440	Sand substrate (>200m of Havingsten 1.5 proposed cable route)	PSA, MF, DNA, CHEM	ZOI	-
BP22MON-ENV-GS-41	ENV41	420053	5962511	Rocky substrate and deeper western region ¹	PSA, MF, DNA	ZOI	-
BP22MON-ENV-GS-42	ENV42	454780	5945922	Shallower south-eastern region and intersection between four types of substrate ¹ (>500m from Well 110/12b-5)	PSA, MF, DNA	ZOI	-
BP22MON-ENV-GS-43	ENV43	432516	5968981	Shallower northern region of Mona ZOI (also falls with Morgan ZOI)	PSA, MF, DNA, CHEM	ZOIs	21ENV62
BP22MON-ENV-GS-44	ENV44	423109	5951875	Mixed substrate	PSA, MF, DNA	ZOI	-
BP22MON-ENV-GS-45	ENV45	427673	5959733	Coarse-grained substrate ¹	PSA, MF, DNA, CHEM	ZOI	-
BP22MON-ENV-GS-46	ENV46	457320	5940881	Shallower ridge in south-east corner of ZOI (>500m from Well 110/12a-1)	PSA, MF, DNA, CHEM	ZOI	-
BP22MON-ENV-GS-47	ENV47	445017	5961797	Shallower ridge in east of ZOI	PSA, MF, DNA	ZOI	-
BP22MON-ENV-GS-48	ENV48	425610	5966083	Region of varying depth in north-west corner of ZOI	PSA, MF, DNA	ZOI	-
BP22MON-ENV-GS-49	ENV49	424578	5941874	Mixed substrate, spawning ground potential for species such as cod and whiting (Cefas, 2010) and in shallower region of south-west	PSA, MF, DNA, CHEM	ZOI	-
BP22MON-ENV-GS-50	ENV50	452597	5949533	Slight deeper channel in south-east of site	PSA, MF, DNA	ZOI	-
BP22MON-ENV-DC-51	ENV51	430533	5946737	Revisit area of low resemblance to stony reef	Camera only	Array	21ENV81

2 Target is <500m of Ferry Route.

2 For ease of comparison, the prefix 21 has been added to the Stations sampled in 2021 by Gardline

Camera investigation will comprise, as a minimum, 200m of transect in a cruciform over the intended target 0.5-1m above the seabed but will be extended to map the condition/possible extent of any encountered habitats. Should a sensitive feature such as biogenic reef be observed, then sampling will be relocated to a suitable nearby location to avoid damage of the sensitive feature and camera investigations expanded to capture the quality and extent of the feature. The expanded camera transects may be conducted as systematic additional parallel transects either side of the original where necessary for the specific sensitive feature quality assessment *i.e.*, where ross worm (*S. spinulosa*) or other biogenic reef is observed and the patchiness requires determination to establish reef resemblance (see parameters in Section 1.4.1).

The camera investigations will be broadly in line with the Epibiota monitoring operational and interpretation guidelines (Hitchin *et al.*, 2015; Turner *et al.*, 2016). Multiple photographs will be taken along each of the 200m transects using a hover and drift technique at approximately 0.5-1m above the seabed. This technique allows the frame to move progressively along the seabed as the vessel traverses the work area on its thrusters or drifts. The images should be captured remotely using a surface control unit and stored on the camera's internal memory card. Video will be actively reviewed by the environmental scientist with additional photographs of notable features acquired beyond this minimum to aid later feature assessment. Video footage will be captured throughout the transect and should be overlaid with time, position and depth, and recorded directly onto suitable media for subsequent analysis. Images will be scaled using two line-lasers fixed at a known distance (*i.e.*, 10cm) and be of sufficient quality to allow quantitative analysis.

Camera transects will be extended until a minimum of 10 quantifiable images are acquired over the targeted habitat. If the camera investigations are severely impacted by suspended sediments at a specific target (*i.e.*, after 5 mins of continuous poor visibility and/or >5 poor quality stills in a row), the investigations will be relocated to a different part of the same targeted feature of interest or a similar feature where possible.

1.3.2 Sediment Sampling Techniques and Analysis

In order to maintain consistency with previous surveys, the sampling methods will remain the same.

Due to the expectation of mixed sediments and the possible presence of ocean quahog (*A. islandica*), it is recommended that the 0.1m² Hamon grab is utilised for sample collection due to the ability to acquire deeper sediment penetration. The 0.1m² Hamon grab would allow for the sampling of *A. islandica* and greater sampling success rate in areas of mixed sediments over other grabs such as the Day grab. Furthermore, previous sampling surveys undertaken in the Morgan potential array area by Cefas (2007) in June 2007 utilised the 0.1m² Hamon grab and therefore would allow for more accurate comparisons to previous existing data.

In order to assess the survey areas for their potential as spawning areas and the associated habitat sensitivities, it is recommended that samples are acquired for particle size analysis (PSA) and analysed in accordance with NMBAQC methods (Mason, 2016). Additionally, the PSA results would be detailed further (*i.e.*, particle size distribution percentiles d10, d50, d90 etc.,) to allow its use, where required, in terms of ground truth for cabling and/or trenching activities associated with the development of the Morgan and Mona OWFs.

Acquisition of samples across the survey areas for physico-chemical analysis are advised in order to provide a baseline prior to site development. It is recommended that physico-chemical samples are analysed in accordance with Marine Management Organisation (MMO; Marine Management Organisation, 2020) specifications in addition to more detailed analysis of hydrocarbons via gas

chromatography to indicate potential source and degree of weathering. The parameters and methods to be followed are specified in Table 1.3 along with the appropriate limits of detection.

Table 1.3 Physico-Chemical Analysis Specifications

Analytes	Method	Limit of Detection
Organic Matter	Total Organic Carbon (TOC)	0.02%
Hydrocarbons, etc.	Total Hydrocarbons (THC) by IR	1000µg/kg
	Total Oil and Saturates by GC (FID for total, MS of FID for Saturates)	1µg/kg
	Polycyclic Aromatic Hydrocarbons (PAHs)	10µg/kg
Trace Metals	Metals – As, Cd, Cr, Cu, Hg, Ni, Pb, Zn (Dilute Nitric Acid or Aqua Regia via ICP-MS)	As (2), Cd (0.04), Cr (4), Cu (4), Hg (0.015), Ni (2), Pb (5), Zn (13) mg/kg
Polychlorinated biphenyls (PCBs)	25 Congeners Including ICES 7 Congeners (Solvent Extraction and GC Triple Quad)	0.08µg/kg
Organotins	Dibutyltin and Tributyltin (Acid Digest and Solvent Extraction GC-MS)	1µg/kg
Organochlorine pesticides (OCPs)	Solvent Extraction and GC Triple Quad	0.1µg/kg

The objective of physico-chemical analysis is to provide a reconnaissance of general levels of contamination across the survey areas. The initial target stations have been selected to sample across the prevailing current directions with a rough cruciform across the Morgan and Mona potential array areas and broad coverage of the ZOIs. All known wells within the potential array areas have been decommissioned, whilst within the ZOI there are three present wells: two within the north-east region of the Morgan ZOI and one in the south-east region of the Mona ZOI (OGA, 2021). Further contamination sub-samples may be acquired where the onboard environmental scientist observes potential contamination (*i.e.*, hypoxic sediments, chemical sheens or aberrant textures/scents) during the intended PSA sample acquisition.

Furthermore, the collection of macrofauna samples will assist in determining the benthic community present across the survey areas and provide additional information on the density of protected species if present. The Cefas (2007) survey sieved the macrofaunal samples over a 1mm mesh sieve prior to analysis in the laboratory. In order to produce comparable results to those reported by Cefas and the previous Gardline (2022b) survey, it is recommended that the current survey sampling efforts also utilise the 0.1m² Hamon grab with the macrofaunal samples sieved over both a 0.5mm and 1mm mesh sieves to allow comparison to wider survey datasets. The intention is to acquire two samples per station with one for analysis and one retained as a spare. Following identification, the wet weight biomass of each individual taxa will be determined (where required). As per the previous survey (Gardline, 2022a), biomass will be recorded in grams to four decimal places.

In addition to traditional macrofaunal analysis conducted to NMBAQC processing guidelines (Worsfold & Hall, 2010), Gardline proposes the use of DNA metabarcoding techniques to determine accurately the species composition of the benthic macrofaunal community present across the survey areas. The benefit of utilising DNA metabarcoding techniques is that they are able to target species of interest as well as whole community assemblages therefore providing a tailored approach to the analysis. Furthermore, DNA metabarcoding techniques can identify through operational taxonomic unit (OUT) reads data to species level accuracy, which traditional taxonomy would not be able to determine due to visual identification limitations. As the volume of material required for DNA metabarcoding is small compared to the whole grab sample requirements for traditional taxonomy,

samples can be acquired from the same grab as the PSA and chemistry samples. This will allow further targeted sampling if more evidence is needed with more targeted monitoring compared to full sampling suite analysis in the future. Appropriate sterilisation of the 0.1m² Hamon grab in addition to the containers and sub-sampling equipment will be used to ensure no contamination of the DNA samples occurs during collection and processing. The procedures that will be established and followed are in line with advice provided by Naturemetrics to the UK Marine DNA Working Group with Naturemetrics undertaking the sample analysis. Full sequences will be reported alongside the results to enable species identity to be updated as reference libraries continue to improve in the future. However, the use of OTUs will allow community assessment at species level for the purpose of monitoring potential impacts and rates of recovery for the bacterial, microfauna and meiofaunal communities. Though DNA samples will be obtained from all stations, the number analysed may be a sub-set, however, this will reflect each habitat encountered with appropriate replication. The stations that will be selected for analysis will be optimised in line with updated development plans that reflect the outcomes of the geophysical data in terms of development suitability and any geohazards.

As previously mentioned, during the acquisition of grab samples, it is advised that sampling is not attempted in areas of biogenic reef (e.g., made by ross worm (*S. spinulosa*) or horse mussel (*M. modiolus*)) due to the damage to the sensitive habitat and increased potential of damage to the grab equipment. In such instances it is recommended that the grab target and subsequent sampling is relocated to an adjacent area of seabed that is clear of biogenic reef structures. Where camera operations are limited due to increased suspended material within the water column, a contingency sampling pattern incorporating a central target surrounded by cardinal targets at a suitable distance (relative to feature targeted) is advised in order to assess the extent and quality of the biogenic reef feature.

Where individuals of ocean quahog (*A. islandica*) are identified in the acquired grab samples, it is recommended that measurements and photographs of live and complete individuals are recorded and the specimens released back to the seabed. From the measurements it is possible to denote whether the individual is a juvenile or adult as in general, age size classes are conventionally considered to be as follows: spat (<10mm), juveniles (10-50mm) and adults (>50mm; Witbaard & Bergman, 2003).

1.3.3 Sample Volume Limitations

Under the regulations stipulated by the MMO (Marine Management Organisation, 2019) a maximum volume of 1m³ of sediment extraction is permitted per station without the need for a marine licence. The total sediment extraction volume across all samples should not exceed 4m³ in Welsh coastal areas and should not exceed 50 samples within any one hectare as per the guidelines stipulated by Natural Resources Wales (NRW; Natural Resources Wales, 2021b). It is not envisaged that the maximum sample volumes stipulated by the MMO or NRW (Marine Management Organisation, 2019; Natural Resources Wales, 2021b) would be exceeded during the planned sampling efforts across the survey areas.

A maximum of three Hamon grab samples per station will be acquired.

- One will be sub-sampled to obtain samples for PSA and for metabarcoding of bacterial and infaunal communities. Where chemical contaminant sampling is required at a station it will also be sub-sampled for chemical analyses.
- Two samples will be acquired for macrofaunal processing, with one analysed and the other kept as a spare.

A 0.1m² Hamon grab is reported to obtain between 10-12l of sediment per sample. Consequently, each station where full sampling is undertaken is projected to acquire 0.036m³. Currently, there are approximately 50 stations planned within Welsh territorial waters, representing a total volume of 1.8m³ without any additional stations for additional features being targeted. Outside of Welsh waters, 50 stations will be sampled within the Morgan and Mona survey areas and ZOIs with an additional 160-240 potential stations within the ECR scoping areas, totalling a maximum of 290 stations. Overall this gives a potential total of 340 stations, which is within the total allowing for contingency applied for in the Crown Estate Seabed Survey Licence. The use of a 0.1m² Hamon grab is likely to have minimal partial sample recoveries so extracted sediment volumes are not likely to significantly vary from these estimates.

1.4 Habitat Data Analysis

1.4.1 Biogenic Reefs - *Sabellaria spinulosa*

The distinction between what is or is not a *Sabellaria* sp. 'reef' is imprecise. To try to make the process of 'reef definition' more transparent and reproducible, Hendrick and Foster-Smith (2006) produced a scoring system based on a series of physical, biological and temporal characteristics of reef features:

- physical characteristics: elevation, sediment consolidation, spatial extent, patchiness
- biological characteristics: *S. spinulosa* density, biodiversity, biotope and community structure
- temporal characteristics: longevity and stability

Upon acquisition of seabed imagery, and should *S. spinulosa* be identified, the Hendrick and Foster-Smith (2006) scoring system will be applied in an attempt to define the 'reefiness' of the areas or colonies identified within the surveyed area. The scoring criteria used are:

- spatial Extent – Area (from the geophysical data) of interpreted extent of colonies
- patchiness – Percentage cover (from video/stills footage)
- elevation – Average height of tubes within colony(ies) (from video/stills footage) as well as elevation of overall reef-like features relative to surrounding seabed (from MBES data)

Other scoring criteria; e.g., consolidation, biodiversity and longevity scores, may not be applicable as they are reliant upon time series of data, sampling observations and detailed benthic community data being available. Whilst mainly subjective, the results can allow a basic understanding of the *Sabellaria* sp. colony composition of each area to be made and a measure of its 'reefiness' to be arrived at.

The 'reefiness' scale has been based largely on results of an inter-agency workshop run by JNCC to help define and manage *S. spinulosa* reefs and reported in Gubbay (2007). During the workshop participants were asked, based on their experience, to indicate what they believed would be suitable cut off points for grading an area on a scale of low-medium-high for 'reefiness'. The best, but not unanimous, agreement which could be reached on the day is given in Table 1.4. It should be emphasized that the figures presented are considered as a starting point for wider discussion rather than accepted and fully agreed thresholds for *S. spinulosa* reef identification.

Table 1.4 Range of figures which could be used together as a measure of 'reefiness'

Measure of 'reefiness'	Not a Reef	Low	Medium	High
Elevation (cm) (average tube height)	<2	2-5	5-10	>10
Area (m ²)	<25	25-10,000	10,000-1,000,000	>1,000,000
Patchiness (% cover)	<10%	10-20%	20-30%	>30%

Where adequate seabed imagery is acquired, each photograph and frame grabs, taken at intervals from the video between photos, will be reviewed for *Sabellaria* sp. at all acquired stations. This review will determine the presence, percentage cover and approximate elevation of *Sabellaria* sp. tubes. In the aim of assessing the 'reefiness' of *Sabellaria* sp. when present, a scoring system will be created as detailed in Table 1.5 and applied to each image. This score aids where angle of incidence of specific images may make exact measurement of reef height difficult though will use observer expert judgement to approximate in these cases.

Table 1.5 *Sabellaria* Scoring System used in Image Analysis

Resemblance	Score	Criteria
No Resemblance to Reef	1	Possible scattered <i>Sabellaria</i> sp. tubes with no height
	2	Single scattered tubes of <i>Sabellaria</i> sp. present, no elevation from the seabed
Low Resemblance	3	Aggregations of <i>Sabellaria</i> sp. tubes, minimal elevation from the seabed
Medium Resemblance	4	Aggregations of <i>Sabellaria</i> sp. tubes partially elevated from the seabed
High Resemblance	5	Aggregations of <i>Sabellaria</i> sp. tubes notably elevated from the seabed

The relative proportion of these images (photographs and frame grabs) along with segmentation of the camera track into 5m intervals will be used to then determine the relative reef structure scoring in line with Jenkins, *et al.* (2018) as per Table 1.6. In addition, the patchiness coefficient for the overall transect, defined in Jenkins, *et al.* (2018), will be calculated and presented for monitoring where required.

Table 1.6 *Sabellaria* Reef Structure Matrix Assessment

Reef Structure Matrix % Segment Cover	Elevation (cm)			
	<2	2 to 5	>5 to 10	>10
	Scores			
	≤2	3	4	5
<10	No Resemblance	No Resemblance	No Resemblance	No Resemblance
10 to 20	No Resemblance	Low Resemblance	Low Resemblance	Low Resemblance
>20 to 30	No Resemblance	Low Resemblance	Medium Resemblance	Medium Resemblance
>30%	No Resemblance	Low Resemblance	Medium Resemblance	High Resemblance

1.4.2 Biogenic Reefs – *Modiolus modiolus* (Horse Mussel)

For mussel beds Gardline will use assessment criteria established from an inter-agency workshop relating to *M. modiolus* reef (Morris, 2015). Firstly, Morris (2015) identified three primary (Stage 1) factors, all of which must be met before assessing the confidence for Annex I designation (Stage 2, see Table 1.7);

- Live adult *M. modiolus* individuals are present;
- The biota/communities are distinct from the surrounding habitat; and,

- The distinct region containing *M. modiolus* is greater than 25m² in extent.

According to Morris (2015), *M. modiolus* is the foundation species in biogenic reefs that are characterised by clumped mussels and shell covering more than 30% of the substrate, which may be infaunal or embedded reefs, semi-infaunal (with densities of greater than five live individuals per m²) or form epifaunal mounds (standing clear of the substrate with more than 10 live individuals per clump), all of which support communities with high species richness (or diversity) compared to sediments of the surrounding area.

Table 1.7 Brief Guidance for Positive Identification of Annex I biogenic *M. modiolus* reef habitat

Location	Open Coast			Sheltered/Semi-enclosed		
	Unlikely	Likely		Unlikely	Likely	
Confidence in being reef habitat	Uncertain	Medium	High	Uncertain	Medium	High
Score	1	2	3	1	2	3
Percent cover of suspected biogenic reef (over an area of 25m ²)	<30%	30% to 70%	70% to 100%	<5% (as clumps)	5% to 40%	>40%
No. of individuals	<5 per m ²	5 to 9 per m ²	>9 per m ²	>3 per clump	>10 per clump	>10 per clump
Distinct acoustic signature	No	Yes	Yes	No	Yes	Yes
Elevation	No	Low (some protrusion)	High (distinct wave form/noticeably elevated)	Elevated (usually from mud)	Elevated (usually from mud)	Elevated (usually from mud)

Based on Morris (2015).

At least two 'likely' categories must be met to be considered Annex I biogenic reef or the total score for the location should add up to 6 in order to be potential Annex I biogenic reef, which would require further evidence/work.

1.4.3 Stony Reef

A multi-criteria scoring system (Table 1.8), will be used to assess the characteristics of any potential stony or bedrock reefs. Each characteristic will be scored as low, medium or high; with spatial extent (m²), substratum composition (% cover) and elevation (m) as the primary characteristics, as defined by Irving (2009). Although Irving's (2009) criteria are widely applied within the industry, further refinement of the criteria for defining areas with a low resemblance to stony reef have been published (Golding *et al.*, 2020) and these will be taken into consideration in the analysis.

Table 1.8 Stony Reef Criteria

Characteristic	Resemblance to 'Stony Reef'			
	NOT a 'Stony Reef'	Low	Medium	High
Composition	<10% cobbles/boulders	10 - <40% cobbles/boulders	40 - <95% cobbles/boulders	≥95% cobbles/boulders
		Matrix supported: dominated by sediment	Clast supported: dominated by cobbles/boulders	Clast supported: dominated by cobbles/boulders
Elevation	Flat seabed	<0.064m	0.064 - <5m	≥5m
Extent	≤25m ²	>25m ²	>25m ²	>25m ²
Biota	Dominated by infaunal species			>80% of species present composed of epifaunal species

Stony reef assessment criteria adapted from Irving (2009)

1.4.4 Sea Pen and Burrowing Megafauna Communities

Clarifications on the identification of OSPAR description of the habitat were summarised in a report by the JNCC (2014b) to improve the definition and correct identification of this habitat. These clarifications suggest that burrowed areas of mud should be deemed to be a 'sea pen and burrowing megafauna communities' habitat regardless of the presence of sea pens, if multiple sightings of burrows and/or mounds attributable to the relevant species are observed. Furthermore, although the habitat occurs predominantly in fine mud sediments, examples of the habitat have been identified in areas of sandy muds where there is clear evidence of the relevant biological assemblages (burrowing megafauna and in some examples, sea pens). Consequently, habitats can be classed as 'sea pen and burrowing megafauna communities' regardless of the grain size composition of the sediment (JNCC, 2014b). The report (JNCC, 2014b) also recommends that the definition should extend further than the habitat classification biotope 'sea-pens and burrowing megafauna in circalittoral fine mud' (Connor *et al.*, 2004) since additional biotopes are also considered to be associated with the habitat.

The clarifications (JNCC, 2014b) advocate utilising seabed video imagery and/or photographs to confirm the presence of burrows and/or mounds and sea pens, where present. Whilst from seabed grab samples, identification would confirm associated fauna and particle size analysis (PSA) data a fine mud/sandy mud habitat. The density classifications as laid out by the Marine Nature Conservation Review (MNCr) SACFOR scale (JNCC, 2013) were used to quantify these defining features (see Table 1.9). The JNCC (2014b) clarification report specifies that multiple sightings of burrows and/or mounds attributable to relevant species together with sea pens, if present, should be classified as at least 'frequent' for their size on the SACFOR scale in order to be considered a 'sea pen and burrowing megafauna communities' habitat. However, it acknowledges the inherent difficulties of identifying species from burrow type alone using ever evolving guides, such as those cited by the ICES (2011) guide. Subsequently, the overall density of burrows themselves will be assessed instead, in order to consider whether their density was a 'prominent' feature of the sediment surface and potentially indicative of a sub-surface complex gallery burrow system. JNCC have previously regarded all stations recording a mean burrow density ≥0.2 m⁻² as demonstrating the presence of 'sea pen and burrowing megafauna communities' habitat (JNCC, 2014).

Table 1.9 SACFOR Abundance Scale

Density	Size of Individuals			
	<1cm	1-3cm	3-15cm	>15cm
$\geq 10000 \text{ m}^{-2}$	S	S	S	S
$\geq 1000 \text{ m}^{-2}$ to $< 10000 \text{ m}^{-2}$	A	S	S	S
$\geq 100 \text{ m}^{-2}$ to $< 1000 \text{ m}^{-2}$	C	A	S	S
$\geq 10 \text{ m}^{-2}$ to $< 100 \text{ m}^{-2}$	F	C	A	S
$\geq 1 \text{ m}^{-2}$ to $< 10 \text{ m}^{-2}$	O	F	C	A
$\geq 0.1 \text{ m}^{-2}$ to $< 1 \text{ m}^{-2}$	R	O	F	C
$\geq 0.01 \text{ m}^{-2}$ to $< 0.1 \text{ m}^{-2}$	R	R	O	F
$\geq 0.001 \text{ m}^{-2}$ to $< 0.01 \text{ m}^{-2}$	R	R	R	O
$< 0.001 \text{ m}^{-2}$	R	R	R	R

S= Superabundant, A = Abundant, C = Common, F = Frequent, O = Occasional and R = Rare. Table amended from: JNCC (2013).

For sedentary species attached to the substratum, percentage cover should be used in preference to the density scale whenever possible.

1.4.5 Herring Spawning

Determination of spawning potential for a specific area of seabed is based on guidelines provided by Cefas (2001) and Reach *et al.* (2013 in; MarineSpace Ltd; ABPmer Ltd; ERM Ltd; Fugro EMU Ltd; Marine Ecological Surveys Ltd, 2013), summarised in Table 1.10, and a variety of measures and inferred sedimentological and hydrodynamic characteristics.

In order to be classified as 'Prime' or 'Sub-Prime' under the habitat sediment preference criteria for herring spawning (Reach *et al.*, 2013 in; MarineSpace Ltd; ABPmer Ltd; ERM Ltd; Fugro EMU Ltd; Marine Ecological Surveys Ltd, 2013), the sediment must be composed of >50% or >25% gravel (>2mm), respectively, with little (<5%) mud (<63µm, silt and clay). In general terms, the area must fall into one of three sediment types based on the modified Folk (1954) classification: gravel, sandy gravel or gravelly sand, in order to be considered suitable. As acknowledged by Reach *et al.* (2013 in; MarineSpace Ltd; ABPmer Ltd; ERM Ltd; Fugro EMU Ltd; Marine Ecological Surveys Ltd, 2013) and as previously defined by Cefas (2001), use of the modified Folk classification alone may over-estimate the suitability of an area in terms of its herring spawning potential as further consideration should be given to other environmental (physical, chemical and abiotic) parameters such as oxygenation, siltation, micro-scale morphological features (*e.g.*, ripples and ridges). Furthermore, the area must be exposed to the main flow of water and the sediments well sorted to ensure maximum oxygenation of the sediment and hence the lower layers of herring eggs; the area should be elevated with respect to the surrounding seabed.

Based on these criteria, the herring spawning potential of each station/transect, once acquired, will be graded from 'Unsuitable' to 'Prime' based on habitat sediment preference and 'Unsuitable' to 'Preferred' based on habitat sediment classification, as presented in Table 1.10.

Table 1.10 Herring Spawning Ground Potential Criteria

Criteria From	Habitat Sediment Preference ¹	Prime	Sub-Prime	Suitable	Unsuitable
Sediment Classes (Reach <i>et al.</i> , 2013 in; MarineSpace Ltd; ABPmer Ltd; ERM Ltd; Fugro EMU Ltd; Marine Ecological Surveys Ltd, 2013)	% Particle Contribution Preference	<5% muds, >50% gravel	<5% muds, >25% gravel	<5% muds, >10% gravel	>5% muds, <10% gravel
	Modified Folk classification (based on sand, mud, gravel fractions above)	Gravel and part sand gravel	Part sandy gravel and part gravelly sand	Part gravelly sand	Everything excluding gravel, sandy gravel and part gravelly sand
	% coarse sand to gravel	≥60%	40% to <60%	20% to <40%	≤20%
	Sorting coefficient and description (Folk & Ward, 1957)	≤0.5, Well	0.5 to <0.71, Moderately well	0.71 to <1.00, Moderate	≥1.00, poor to extremely poor
Further sediment Description Parameters (including those from Cefas (2001))	Wentworth (1922) Classification of mode grain size	Granule to pebble	Coarse to very coarse sand	Very fine to medium sand	Silts and clays
	Exposure	Elevated (such as raised gravel banks) relative to surrounding seabed			Flat seabed
Criteria From	Habitat Sediment Classification ²	Preferred		Marginal	Unsuitable
Sediment Classes (Reach <i>et al.</i> , 2013 in; MarineSpace Ltd; ABPmer Ltd; ERM Ltd; Fugro EMU Ltd; Marine Ecological Surveys Ltd, 2013)	Generalised Folk Classification Preference	Gravel and sandy gravel		Gravelly sand	All others

1 Colours indicate where Prime Sub-Prime Suitable or Unsuitable spawning potential criteria are met

2 Colours indicate where Preferred Marginal or Unsuitable spawning potential criteria are met

1.4.6 Sand Eel Spawning

Determination of spawning potential for a specific area of seabed has been based on guidelines laid out in Latto *et al.* (2013), as summarised in Table 1.11. To be classified as ‘Prime’ or ‘Sub-Prime’ for sand eel spawning, the sediment must be composed of >85% or >70% sand (≥63µm, <2mm), respectively, with little mud (<1% or 4%; <63µm). Although these criteria do not easily blend with the modified Folk (1954) classification; in general terms the area must fall into one of three sediment types: sand, slightly gravelly sand or gravelly sand. Beyond this, ‘Suitable’ conditions are those where the sediment is composed of >50% sand and <10% mud and while this covers parts of several modified Folk (1954) classifications, sandy gravel is generally considered the marginal seabed type.

Based on these criteria, the sand eel spawning potential of each station/transect will be graded, once acquired, from ‘Unsuitable’ to ‘Prime’ based on habitat sediment preference and habitat sediment classification, as presented in Table 1.11.

Table 1.11 Sand Eel Spawning Potential

Habitat Sediment Preference	Prime	Sub-prime	Suitable	Unsuitable
% Particle contribution preference	<1% muds, >85% sand	<4% muds, >70% sand	<10% muds, >50% sand	>10% muds, <50% sand
Folk classification based on % particle contribution preferences above	Part S, part (g)S, and part gS	Part S, part (g)S, and part gS	Part S, part (g)S, part gS, part sG, part mS, part (g)mS, part gmS and part msG.	All others (including part mS, part (g)mS, part gmS, part msG and part sG)
Habitat Sediment Classification	Preferred		Marginal	Unsuitable
Folk classification generalised	Sand, slightly gravelly sand and gravelly sand		Sandy gravel	All others

Adapted from Latto *et al.* (2013)

S	Sand	mS	Muddy sand	msG	Muddy sandy gravel
(g)mS	Slightly gravelly muddy sand	gS	Gravelly sand	gmS	Gravelly muddy sand
(g)S	Slightly gravelly sand	sG	Sandy gravel		

1.5 Other Species of Conservation Interest

The ocean quahog; *A. islandica*, is a species of conservation importance and is a long-lived species with a slow growth rate. *Arctica islandica* is on the OSPAR (2008) list of threatened and/or declining species and habitats and is listed as a low or limited mobility species under Scotland's priority marine features (JNCC, 2012). However, *A. islandica* is commonly found within this area of the Irish Sea (Oil and Gas U.K., 2010) where populations of 40-80 years old specimens have been observed, with a substantial proportion over 100 years old (OSPAR, 2009c). A review of each photograph from all stations where adequate seabed imagery is acquired will be undertaken, to determine the presence, size and density of any *A. islandica* shells or siphons observed.

Two species of lesser sand eels belonging to the genus *Ammodytes* occur in UK waters, members of the *Ammodytes* genus (specifically *A. marinus*) are listed as priority species under UK Post 2010 Biodiversity Framework (JNCC and Defra, 2012) and as a feature of conservation importance defined in relation to the MCZ network (Natural England and Joint Nature Conservation Committee, 2010). Additionally, the greater sand eel (*H. lanceolatus*) and the smooth sand eel (*Gymnammodytes semisquamatus*) also occur in UK waters as an important commercial fisheries stock, however, are listed as least concern according to the International Union for Conservation of Nature (IUCN) Red List of species (IUCN, 2022). In addition, there is also another Ammodytidae species, Corbin's sand eel (*Hyperoplus immaculatus*), that has been noted in the wider east Irish sea region (OBIS, 2021).

The angel shark (*Squatina squatina*) is listed as critically endangered on the IUCN Red List and is included in the OSPAR List of Threatened and Declining Species (OSPAR, 2017). As determined from the 2021 Status Assessment (OSPAR, 2022), *S. squatina* is a very sensitive species and has declined in abundance within OSPAR III region in which Morgan and Mona are located. Although the identified key areas for this species are not within the ZOI (Barker *et al.*, 2020; Shephard *et al.*, 2019), the Irish Sea is considered to contain a resident population (OSPAR, 2022) which is under threat and/or in decline (OSPAR, 2017). The angel shark is also protected from intentional disturbance, targeting, injuring or killing within 12 nautical miles of the Welsh and English Coast (Wildlife and Countryside Act 1981, 1981).

Four species of skate and ray, which are listed on the OSPAR List of Threatened and Declining Species (OSPAR, 2017), occur within OSPAR III region: the common skate (*Dipturus batis*), spotted ray (*Raja montagui*), white skate (*Rostroraja alba*) and thornback ray (*Raja clavata*), although *R. clavata* is not considered to be declining within the Irish Sea. The previous survey conducted in 2021 (Gardline, 2022b) only identified *R. clavata* within the survey area out of the four species listed. However, with the ZOI encompassing a larger area than previously surveyed as well as the ECR scoping areas, the potential presence of the other three species should not be discounted. A review of each photograph from all stations where adequate seabed imagery is acquired will be undertaken, to determine the presence of any skates or rays observed.

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B.2.7 Response from JNCC regarding the Benthic Survey Scope of Works Report

[REDACTED]
RPS | Energy
Goldvale House
27-41 Church Street West
Woking
Surrey
GU21 6DH

JNCC Reference: OIA-08660
Date: 22 April 2022

Dear [REDACTED],

Projects Mona and Morgan: Benthic Survey Scope of Works Report

Thank you for consulting JNCC on the bp Alternatives Energy Investments Limited and Energie Baden-Wurttemberg, Projects Mona and Morgan Benthic Survey Scope of Works Report (Revision 1, dated 1 April 2022) which we received on 1 April 2022.

The JNCC advice contained within this minute is provided (under a Discretionary Advice Service agreement). JNCC has a statutory advisory role to the UK Government and devolved administrations on issues relating to nature conservation in UK offshore waters (beyond the territorial limit). We have subsequently concentrated our comments on aspects of the document that we believe relate to offshore Welsh waters and defer to comments provided by Natural Resources Wales (NRW) for aspects relating to inshore Welsh waters and to Natural England for aspects relating to inshore and offshore English waters.

1.1 Scope of Work

Figure 1.1 Survey Location

This figure is difficult to read given the amount of information presented and the colours used. JNCC would recommend considering different colour palettes to represent the arrays, ZOIs and associated export cable routes against the marine protected areas. JNCC would also, always, request that the boundary between English and Welsh waters is represented along with the 12nm limit to allow SNCBs to clearly identify areas within their remit.

1.2 Expected Sediments, Protected Species and Habitats

JNCC acknowledge that the West of Copeland Marine Conservation Zone (MCZ) does not currently have conservation advice associated with it, we anticipate that this will be available within the next few months and will highlight when the advice becomes available. We note that Gardline has used South Riggs MCZ conservation advice as a proxy, JNCC are currently

developing a proxy process for Marine Protected Areas and should be in a position to provide an update in the coming weeks.

1.3.1 Survey Plan

It is unclear from the text whether the 50 stations for co-located camera and sediment sampling across the Morgan and Mona array areas and Zones of Influence (ZOIs) is the combined total for both projects or 50 stations per project. We would recommend that the number of sample sites not be capped at 50 and that the decision on appropriate number of sample sites be based primarily on geophysical evidence.

JNCC would appreciate if the outcome of the camera only targets in the Mona array, which are being revisited having previously exhibited low resemblance of reef could be shared.

JNCC note that until further information from geophysical acquisition is complete the information gathered to date will be used as the basis for initial station selection. JNCC assumes and recommends that any necessary changes be made on receipt of new geophysical data.

1.3.2 Sediment Sampling Techniques and Analysis

We commend bp, EnBW and Gardline on their intention to return individual *A.islandica* to the sea and recommend that individuals be returned carefully to the seabed, in a *suitable* habitat.

Please contact me with any questions regarding the above comments.

Yours sincerely,

[REDACTED]

Offshore Industries Adviser

Email: [REDACTED]

Telephone: [REDACTED]

B.2.8 Response from Natural England regarding the Benthic Survey Scope of Works Report

Date: 22 April 2022
Our ref: DAS/UDS A000566 / 387987
Your ref: Benthic and Intertidal Scope of Works



██████████
BP Alternative Energy Investments Limited

BY EMAIL ONLY

Hornbeam House
Crewe Business Park
Electra Way
Crewe
Cheshire CW1 6GJ

T 0300 060 3900

Dear ██████████

Discretionary Advice Service (Charged Advice) - UDS A000566

Development proposal: BP EnBW Morgan and Mona Offshore Wind Farm

Consultation: Benthic Ecology Survey Scope of Works and Intertidal Phase I Walkover Survey

This advice is being provided as part of Natural England's Discretionary Advice Service in accordance with the Quotation and Agreement dated 17 May 2021 to BP Alternative Energy Investments Limited.

Thank you for your consultation on the above dated and received on 01 April 2022.

The following advice is based upon the information within;

- Email from ██████████, RPS, received by ██████████ setting out the Intertidal Phase 1 Walkover Survey (dated 1 April 2022);
- Morgan and Mona – 2022 Integrated Site Survey Benthic Survey Scope of Works Report, Gardline Report Ref 11781.E00 (dated 1 April 2022).

Overarching comments

Natural England's advice in this letter is based on the document received as listed above. Natural England welcomes the Benthic Survey Scope of Works report which sets out the planned works for 2022, and builds on the advice we provided on the 2021 Benthic Survey Strategy (dated 10 June 2021). We have provided more detailed comments and advice below.

Detailed comments

Intertidal Phase 1 Walkover Survey

Natural England advises that the Intertidal Phase I Walkover Survey be set out in a report, reflecting full details once determined (i.e. location), reflecting any desk-based studies and fully referenced.

We broadly agree with the survey methodology as set out in the email from ██████████, RPS (dated 1 April 2022) in so far as it is detailed.

Natural England advise that the intertidal area is heavily designated and that there should be consideration of designated sites and their features, and that where necessary permissions for works with designated sites should be acquired.

2022 Integrated Site Survey Benthic Survey Scope of Works Report

1.1 Scope of Work

We acknowledge that the Export Cable Route (ECR) presented in *Figure 1.1 Survey Location*, includes a wide scope and that the report sets out that these scoping areas will be more defined and refined

ECR corridors will be produced. This has resulted in limited information being provided within the report on the characterisation of the ECR, as a result Natural England cannot provide advice on the adequacy of the survey scope in detail for the ECR.

Natural England welcomes the wider scope of the survey areas included in the 2022 methodology from that surveyed in 2021, primarily the Zone of Interest (Zoi) for the array areas, which has been defined as the array area plus a buffer of one tidal excursion. The Zoi should ensure that all potential direct and indirect affects from the development can be established. Additional survey sites of similar seabed type and habitat outside of the license area boundaries will also provide a control that will be important when considering any changes within the license area that result from the project.

Natural England advise that the presentation of the designated sites and ECR Scoping Areas displayed in *Figure 1.1 Survey Location* needs improvement, as in the current form Fylde Marine Conservation Zone (MCZ) is not visible against the Penwortham ECR Scoping Area. We advise that the map is reviewed and amended.

1.2 Expected Sediments, Protected Species and Habitats

The Zoi for Morgan array overlaps with West of Copeland MCZ designated for three protected features. Please note that the General Management Approach set out for each of the three protected features post-designation is;

- Subtidal sand – maintain in favourable condition;
- Subtidal coarse sediment – recover to favourable condition;
- Subtidal mixed sediments – recover to favourable condition¹.

Natural England are content for the use of South Rigg MCZ conservation advice to be used in consideration of West of Copeland MCZ in the absence of a site specific conservation advice package. The distribution and composition of the habitats will differ between the sites, so site specific advice in the Supplementary Advice on Conservation Objectives is unlikely to apply to West of Copeland MCZ and the General Management Approach for the same features may differ between the two sites.

1.3.1 Survey Plan

Natural England cannot make further comment on whether the proposed survey scope is appropriate, as there is no clarity on the survey sampling stations within the ECR scoping areas within the report.

While there is information set out in *Table 1.1 Morgan Potential Array Area and Zoi Proposed Targets and Sampling Objectives* and *Table 1.2 Mona Potential Array Area and ZOI Proposed Targets Overview* on the feature targets for the proposed sampling stations locations, there is no information showing the location of the indicative habitats within the area, from desk-based review or the 2021 survey outputs. Without further detail showing the indicative habitats within the array areas, which would assist in advising if the sampling stations are of suitable resolution for characterisation, we are limited on the advice we can provide on if the survey stations as proposed in the report will provide sufficient robust evidence.

We welcome the assurance that the survey scope remains flexible to be adjusted based on data acquisition and adjustments made to ensure additional sample stations can be supported to ensure that there is appropriate coverage of all habitats types and sensitive features beyond those in the initial provisional grid of targets.

The sampling stations should be suitably located and representative to allow ground truthing of the indicative habitats and enable the development of a robust habitat map. Should habitats encountered differ from those expected based on the geophysical data acquired then we would expect to see an increase in sample stations to ensure that all potential habitats are sampled and mapped in order to enable a full assessment of potential impacts resulting from development. The stations should ensure sampling of all habitats and particularly transitions between habitats is evidenced to provide a true understanding of what is present in the area.

¹ [West of Copeland Marine Conservation Zone \(31 May 2019\)](#)

We welcome that camera survey consist of both stills and video are undertaken and extended to map condition, and advise it should also cover the boundary extents, of habitats and biogenic reefs. This will ensure that impacts on these features can then be robustly assessed against potential impacts of the development.

1.3.2 Sediment Sampling Techniques and Analysis

We support that the survey sampling methods remain the same as with those set out and agreed by Natural England for the previous surveys in 2021, allowing for data comparison with the previous surveys and existing Cafas data, where available.

We welcome the additional information on the analysis of the physio-chemical samples in accordance with Marine Management Organisation specifications and hydrocarbons analysis as set out in the report and *Table 1.3 Physico-Chemical Analysis Specifications*.

We welcome that eDNA procedures will be in line with those set out to the UK Marine DNA Working Group and that full sequences will be submitted to support updates to reference libraries.

Natural England welcomes the avoidance of sensitive habitats (i.e. *Sabellaria* sp.) with the grab in order to avoid damage to the sensitive conservation interest features. We further welcome the detail for recording *Arctica islandica* and support the return to the seabed of live individuals acquired in grab samples.

1.4.1 Biogenic Reefs – *Sabellaria spinulosa*

Natural England acknowledges that our previous advice provided on the 2021 Benthic Survey Strategy has been followed and that the relative reef structure scoring will be in line with the approach set out in Jenkins *et al.* (2018)².

1.4.3 Stony Reef

We welcome that Golding *et al.* (2020)³ refinement of the criteria for defining areas with low resemblance to stony reef will be taken into consideration in the analysis.

1.5 Other Species of Conservation Interest

Natural England welcomes the consideration of species of conservation interest as set out, and supports that as the survey area has been extended from the 2021 surveys to incorporate the Zol and the ECR that no species should be ruled out if not present in 2021 surveys.

For clarification of any points in this letter, please contact me using the details provided below.

Yours sincerely

████████████████████
Strategic Coastal Lead Adviser
Coast and Marine Team
Cheshire, Greater Manchester, Merseyside & Lancashire Area Team
████████████████████

The advice provided in this letter has been through Natural England's Quality Assurance process.

² Jenkins, C., Eggleton, J., Barry, J., O'Connor, J., Advances in assessing *Sabellaria spinulosa* reefs for Ongoing monitoring. Ecology and Evolution, 2018; 8:7673–7687

³ [Golding, N., Albrecht, J., and McBreen, F., Refining the criteria for defining areas with a 'low resemblance' to Annex I stoney reef, 2020; ISSN 0963-8091](#)

The advice provided within the Discretionary Advice Service is the professional advice of the Natural England adviser named below. It is the best advice that can be given based on the information provided so far. Its quality and detail is dependent upon the quality and depth of the information which has been provided. It does not constitute a statutory response or decision, which will be made by Natural England acting corporately in its role as statutory consultee to the competent authority after an application has been submitted. The advice given is therefore not binding in any way and is provided without prejudice to the consideration of any statutory consultation response or decision which may be made by Natural England in due course. The final judgement on any proposals by Natural England is reserved until an application is made and will be made on the information then available, including any modifications to the proposal made after receipt of discretionary advice. All pre-application advice is subject to review and revision in the light of changes in relevant considerations, including changes in relation to the facts, scientific knowledge/evidence, policy, guidance or law. Natural England will not accept any liability for the accuracy, adequacy or completeness of, nor will any express or implied warranty be given for, the advice. This exclusion does not extend to any fraudulent misrepresentation made by or on behalf of Natural England.

Cc [REDACTED]

B.2.9 Response from NRW regarding the Benthic Survey Scope of Works Report



Morgan and Mona 2022 Integrated Site Survey: Benthic Survey Scope of Works

[REDACTED]
Senior Marine Advisor

21st April 2022

Introduction

This advice is provided in response to the **Morgan and Mona 2022 Integrated Site Survey: Benthic Survey Scope of Works Report, dated 1st April 2022 (Final) Strategy.**

NRW advice in this document is provided (under a Discretionary Advice Service agreement) in respect of a proposal which will require an application for which Natural Resources Wales is a Statutory Consultee.

The customer acknowledges that the content of any advice or assistance provided by NRW is advisory only and that it shall not be deemed to bind or in any other way restrict NRW in performing its statutory functions.

The recipient acknowledges that:

- any advice given or materials or documentation provided by NRW do not constrain or bind NRW in respect of its statutory functions or its role as a statutory consultee or any decision NRW may make in relation to any application for a licence or permit;
- any advice given by NRW does not bind NRW in respect of any future representations it may make as statutory consultee or any decision NRW may make in relation to any application for a licence or permit;
- any views or opinions expressed by NRW are without prejudice to the consideration NRW may be required to give to any application or any future representations as statutory consultee or any decision NRW may make in relation to any application for a licence or permit;
- the final decision as to any representations made by NRW as statutory consultee will be based on all the relevant information available to NRW at the time it makes such representations;
- NRW cannot and does not give any guarantee as to the representations it may make as statutory consultee; and,
- any advice given by NRW may be overtaken by changes in available information, law, policy and guidance relevant to the subject matter of the advice.

Specialists Consulted:

Benthic Ecology
Physical Processes
Marine Water Quality
Marine WFD
Marine Fish

Advice

Benthic Ecology:

Key Issues:

None

Detailed Comments:

- NRW Advisory (A) agree in general with the sampling strategy that has been proposed.
- NRW (A) agree that areas where the geophysical data indicates homogenous seabed sediment over an extensive area, sampling intensity may be reduced, while in areas of heterogenous seabed, greater sampling intensity may be required.
- In general, NRW (A) advise a minimum of one sample station per broadscale habitat (EUNIS L3/L4), and where the indicative habitat areas are extensive, the minimum number of sample stations per habitat type should be increased accordingly to provide sufficient coverage of that habitat type.
- NRW (A) note that the plan does not include proposed targets for sampling within the Export Cable Route (ECR) scoping areas as the final ECR has not yet been defined. NRW (A) broadly agree with the sampling at 1–2km spacing, but advise that in nearshore / intertidal areas, the sampling frequency may need to be greater than this.
- NRW (A) welcome the intention of the applicant to sample the Zone of Influence (ZOI) and agree with the buffer that has been applied, based on the maximum tidal excursion. However, NRW (A) seek clarification on the following:
 - NRW (A) note that no sampling stations are proposed on the southern ZOI buffer side of the array. Clarification is sought as to why no samples are being proposed here – will this section be covered by the ECR surveys?
 - The spacing between the proposed sample stations in the ZOI seems to be large (up to 10km between some stations). As noted above, NRW (A) advise a minimum of one sample station per broadscale habitat (EUNIS L3/L4), and where the indicative habitat areas are extensive, the minimum number of sample stations per habitat type should be increased accordingly to provide sufficient coverage of that habitat type.
- NRW (A) welcome the avoidance of sensitive features such as biogenic reef. If sensitive habitats (i.e. *Sabellaria spinulosa* reef, *Sabellaria alveolata* reef, *Modiolus* etc.) are encountered during grab sampling, NRW (A) advise that any replicate grab samples should be moved a sensible distance from the sensitive habitat e.g. 50m, or at the

discretion of the monitoring officer, based on survey specificity and sensitivity of the habitat.

- If a grab fails due to the presence of *Sabellaria spinulosa* reef, NRW (A) recommend that the following data is collected to help determine the distribution of the habitat:
 - Photographs should be taken of the grab upon retrieval:
 - Photograph the grab contents within the bucket (it may be necessary to find a more appropriate vessel to take the photo e.g. if the bucket is too deep, or use the sieve – it is unlikely that there will be a large amount of material). These photos should be taken from numerous angles to enable assessment of occupancy/live tubes
 - Photograph the sample once it has been sieved, to include:
 - A general sieved sample photograph, as usual
 - Photographs taken from numerous angles to enable assessment of occupancy/live tubes
 - Where there are numerous aggregations – photographs of the individual aggregations.
 - A photographic scale
 - The following data collection measurements are also recommended:
 - Estimate of average tube height, by measuring tubes in a few places and putting them into the following categories:
 <2cm, 2–5cm, 5–10cm, >10cm
 - Estimate of tube consolidation following the Limpenny *et al.* (2010) “reefiness” criteria
 - Measure of how deep the *S. spinulosa* is within the sediment, if relevant (this will need to be done prior to sieving.)
 - Name any obvious epifauna/infauna or provide a general description
- NRW (A) welcome the use of DNA metabarcoding techniques alongside traditional macrofauna analysis – it will be interesting to compare the results of both techniques. NRW (A) also welcome the proposal to submit the full sequences as this will help to fill data gaps in reference libraries.
- NRW (A) are content with the approach for the Intertidal Phase 1 Walkover Survey outlined separately in the Morgan Mona 2022 Benthic Ecology Survey Scope of Works advice request email received 01/04/22 at 18:09.

Physical Processes:

Key Issues:

None

Detailed Comments:

- NRW (A) welcome the recommendation that sediment samples for PSA are analysed in accordance with NMBAQC methods (Mason, 2016) and that the PSA results would be detailed further (i.e. particle size distribution percentiles d10, d50, d90 etc.).

- NRW (A) advise that the sediment samples are also analysed to determine the percentage of fines <63 microns (silt and clay) if the sediment sample and drop-down camera photos indicate the presence of fines.

Water Quality:

Key Issues:

None

Detailed Comments:

- The report defines a set of survey locations and identifies a subset which will be analysed for chemicals (Fig 1.3). Given the offshore location NRW (A) agree with the spread of sites for chemicals. The report also discusses giving consideration to sediment type, which is appropriate as coarser grained sediments do not typically harbour contaminants. NRW (A) also agree with the physico-chemical analysis specifications given in Table 1.3 and further advise that the results of these should be compared to CEFAS action levels.
- The survey does not discuss sampling along the ECR in detail as the route is not sufficiently defined at present. However, it is anticipated that samples will be taken at intervals of approximately 1–2 km, with chemical subsamples taken every 5 km. Whilst NRW (A) agree with the sampling for the offshore section, we would advise a higher frequency of chemical sampling nearshore (i.e. every 2 km) where the chance of sediment contamination is greater.
- Furthermore, in relation to the ECR, NRW (A) advise sediment sampling of the beach where landfall will be made (if within 2 km of a designated bathing water). This sampling would provide analysis of the bacterial content of the sediment to assess the risk to the Bathing Water quality.

Marine WFD:

Key Issues:

None

Detailed Comments:

- It should be noted that it is highly likely that it is only the ECR component of the scheme which will have potential interactions with WFD water bodies.
- The report presents the proposed benthic characterisation for the array areas and the zone of influence of the project, which are sufficiently offshore that they are outside of, and have no interactions with, any WFD water bodies. No information relating to the characterisation of the ECR scoping area is provided within the report, as it is stated that the ECR is not sufficiently defined at present. Sampling at 1–2 km spacing has been suggested – NRW (A) advise that further inshore, the frequency of sampling is likely to need to be greater than this, depending on the ECR when further defined. This is of particular relevance to nearshore/intertidal areas.

- Assuming that the methodology for characterisation of the ECR will remain unchanged, NRW (A) welcome acquisition of samples for PSA to support the grab sampling. NRW (A) welcome the methodology as set out in Section 1.3.3, that the PSA sample is a replicate at each macrofauna sample, as opposed to a sub-sample from the macrofauna sample, to ensure the sampling is WFD compliant.
- Avoidance of high sensitivity habitats including biogenic reef is welcomed.

Marine Fish:

Key Issues:

None

Detailed Comments:

- NRW (A) welcome the intention to use the sediment sampling to quantify areas suitable for herring spawning and sandeel habitat and would advise that the results are used in conjunction with BGS Folk Classifications to model suitable habitats, as per the GIS-based methodology developed for the marine aggregate sector by MarineSpace Ltd. *et al.*, (2013).
- NRW (A) further advise that any sandeel, or other fish, encountered in the analysis of the grab samples are also recorded and used in the assessment.

References:

Limpenny, D.S., Foster-Smith, R.L., Edwards, T.M., Hendrick, V.J., Diesing, M., Eggleton, J.D., Meadows, W.J., Crutchfield, Z., Pfeifer, S., and Reach, I.S. 2010. Best methods for identifying and evaluating *Sabellaria spinulosa* and cobble reef. Aggregate Levy Sustainability Fund Project MAL0008. Joint Nature Conservation Committee. 134 pp.

MarineSpace Ltd, ABPmer Ltd, ERM Ltd, Fugro EMU Ltd and Marine Ecological Surveys Ltd, 2013. Environmental Effect Pathways between Marine Aggregate Application Areas and Atlantic Herring Potential Spawning Habitat: Regional Cumulative Impact Assessments. Version 1.0. A report for the British Marine Aggregates Producers Association. [Online] Available at: [Microsoft Word - Herring Habitat Assessment v1.0 20141216 \(marinespace.co.uk\)](https://www.marinespace.co.uk/1255/psa-guidance_update18012016.pdf)

Mason, C., 2016. NMBAQC's Best Practice Guidance Particle Size Analysis (PSA) for Supporting Biological Analysis. [Online] Available at: http://www.nmbaqcs.org/media/1255/psa-guidance_update18012016.pdf

B.3. Benthic ecology, Fish and shellfish and Physical processes EWG meeting 2

B.3.1 Meeting minutes

MINUTES OF MEETING



Security Classification:
Project Internal

Partners in UK offshore wind

MOM Number : 20221129_Morgan and Mona EP_BE, FSF, PP EWG02 **REV. No.** : F03

MOM Subject : Morgan generation and Mona Evidence Plan Benthic, fish and shellfish and physical processes expert working group meeting 2.

MINUTES OF MEETING

MEETING DATE : 29/11/2022

MEETING LOCATION : Microsoft Teams

RECORDED BY : [REDACTED] (RPS)

ISSUED BY : [REDACTED] (RPS)

PERSONS PRESENT:

- [REDACTED] – bp (MP)
- [REDACTED] – bp (IG)
- [REDACTED] – RPS (KL)
- [REDACTED] – RPS (ST)
- [REDACTED] – RPS (KR)
- [REDACTED] – RPS (LS)
- [REDACTED] – RPS (AP)
- [REDACTED] – RPS (TH)
- [REDACTED] – RPS (NS)
- [REDACTED] – MMO [REDACTED]
- [REDACTED] – MMO (RG)
- [REDACTED] – Natural England (AuB)
- [REDACTED] – Natural England (LB)
- [REDACTED] – Natural England (EW)
- [REDACTED] – JNCC (JW)
- [REDACTED] – NRW (LR)
- [REDACTED] – NRW (RN)
- [REDACTED] – NRW (JI)
- [REDACTED] – NRW (LN)
- [REDACTED] - NRW (IN)
- [REDACTED] – Cefas (GE)
- [REDACTED] – Cefas (PM)
- [REDACTED] – Cefas (PW)
- [REDACTED] – Cefas (JW)
- [REDACTED] – TWT (BC)
- [REDACTED] – IoM (PD)

APOLOGIES

- [REDACTED] – bp (GV)

ITEM NO:	DISCUSSION ITEM:	Responsible party	Date
1.	<p><u>Project update (presented by IG)</u></p> <p>bp are working with EnBW in a 50/50 partnership (the Applicants) to develop the Morgan Offshore Wind Project Generation Assets ('Morgan (Generation Assets)') and the Mona Offshore Wind Projects ('Mona'), which are being progressed as two separate projects.</p> <p>Morgan (Generation Assets) is the northern project located in English waters, and Mona is the southern project located mostly in Welsh waters. Together, they will have a combined capacity of 3GW.</p> <p>The Morgan Offshore Wind Project and the Morecambe Offshore Windfarm (developed by Cobra Instalaciones Servicios, S.A. and Flotation Energy plc) have been scoped into the Pathways to 2030 workstream under the Offshore Transmission Network Review (OTNR). Under the OTNR, the National Grid Electricity System Operator is responsible for conducting a Holistic Network Design Review to assess options to improve the coordination of offshore wind generation connections and transmission networks. The output of this process concluded that the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm should share a transmission assets route corridor to a shared grid connection location at Penwortham in Lancashire.</p> <p>Both projects support the Holistic Network Design Review conclusions and intend to collaborate on a shared route corridor. The Morgan and Morecambe Transmission Assets project will be subject to a separate DCO. This consenting approach will provide a formal structure for the projects to collaborate, allows for integrated consideration of cumulative effects and streamlining the process with a single consent which should be simpler for stakeholders.</p> <p>The Applicants therefore intend to set up a separate Evidence Plan Process (EPP) to cover the Morgan and Morecambe Transmission Assets. The Mona and Morgan (Generation Assets) EPP will progress as planned and be separate from the Morgan and Morecambe Transmission Assets EPP.</p> <p>Mona is being taken forward as a separate DCO including both the generation and transmission assets.</p> <p>The individual Morgan (Generation Assets) and Mona PEIR submissions will be at the end of Q1 2023. The two PEIR submissions have been aligned to allow the Applicant to properly consider the cumulative effects between the projects.</p> <p>The Morgan and Morecambe Transmission Assets PEIR is likely to be submitted in Q3 2023.</p>		

<p>2.</p>	<p><u>Project updates: cable corridor (Presented by KL)</u></p> <p>The slides present a reminder of the overview of the constraints in the Mona Offshore Cable Corridor as presented to the Steering Group in July 2022. The project engineers have not yet been able to fully consider the site specific and geophysical and geotechnical surveys along the Mona cable route. The intention is that the project design updates will be discussed with the wider EWG next year. Does the whole EWG want to be involved in that discussion or should this be a meeting with NRW?</p> <p>It is not feasible to avoid the Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC. The Mona Offshore Cable Corridor goes through the edge of Constable Bank and the northeast corner of the SAC (with no overlap with the known Annex I features within the SAC – though this will be confirmed through site specific surveys).</p> <p>KL noted (via slides presented from the Steering Group meeting in July 2022) the constraints in the nearshore area which has led to the routing of the cable within Constable Bank and the SAC.</p> <p>KL noted that all assessments etc in the presentation are initial outputs and may be tweaked slightly between the EWG and PEIR. It should also be noted that for the Constable Bank and the SAC the assessment outputs are based on the worst case scenario and we would be looking to refine the project envelope based on the sites specific geophysical and geotechnical data (currently being analysed).</p>	<p>EWG members to feedback on if they would like to be involved in a discussion on the Mona Offshore Cable Corridor and engineering discussions re Constable Bank and the SAC (given this is primarily in NRW (A)'s remit).</p>	<p>Complete</p>
<p>3.</p>	<p><u>Mona and Morgan generation Physical processes (Presented by NS)</u></p> <p>We have undertaken a very similar process between the Morgan generation assets and the Mona Offshore Wind Project therefore this section on physical processes will cover both projects. The project that best demonstrates the methodology being outlined will be presented.</p> <p>The modelling that has been undertaken is proportionate to the assessment to determine likely significant effects. It has been split into physical processes receptors and physical processes as a pathway to other impacts that are considered in other topic assessments e.g. increases in suspended sediments which is assessed in benthic ecology.</p> <p>The study area has been extended from that presented in the scoping report to one spring tidal excursion from the Mona or Morgan Array Areas. The model domain covered a much greater area to ensure that if any impacts did go beyond one spring tidal excursion, then they would be captured.</p> <p>A technical report will be included as an annex in the Preliminary Environmental Information Report (PEIR) for each of the two projects which will show the full detail of the model development and outputs. The models were calibrated to ensure they were fit for purpose, and this is presented in a number of sections in the technical report of the PEIR.</p> <p>Impacts on the wave climate were assessed for long term and short-term return period events. The sediment transport is governed by the</p>		

residual current and modelling quantified this over the spring tidal cycle. We have used EMODnet data and site-specific data to identify the sediment types and they were classified using the British Geological Society database.

Modelling approach for the operations phase

The slides present the indicative layout that was used to undertake the modelling. We have applied changes to the bathymetry where the scour and cable protection would be included.

JI- What is the resolution of the model.

NS- It varies across the sites within the array areas. It goes down to 5m so it will pick up the cable protection, but the infrastructure features will be represented by 'sub-cell structures'.

KL- This resolution is for the array areas. For the PEIR, we don't have the site-specific data for the offshore cable corridors.

For the Mona offshore cable corridor we have used 2m resolution data which is 3 years old. The influence on wave climates depends on the direction of the waves and alignment of the wind turbines. We have also modelled the impact on the combined waves and tides. Currents increased in front of the structures and decreased in the lee of the structure.

JI- What is the water depth and the Morgan and Mona Array Areas?

KL- 45-50m across the Morgan and Mona Array Areas.

To model suspended sediment plumes we have modelled seabed preparation activities, drilling for piled foundations and cable trenching. Under calm conditions the suspended sediment concentrations in the Irish Sea are 5mg/l. In storm conditions this goes up to 30mg/l. We have chosen a selection of modelled pile-locations based on the alignment with each other and the tides in order to assess the maximum design scenario (MDS) and the full range of potential conditions. It has been assumed that the sediment is the finest representative material as this will create the largest plumes. This all adds up to several layers of precaution in the assessment.

The conclusions of the modelling were that sediments will remain within the sediment cell.

JI-does the model include for scour protection?

NS- The scour protection is included in the model. The need for scour protection is part of the design of the projects so we haven't modelled with and without scour protection.

Constable Bank

We have used the 2019-2020 UKHO data for the model for the Mona Offshore Cable Corridor. The site-specific data will be available to verify the data used in the modelling for the purposes of the Environmental Statement. The site-specific data for the section of the Mona Offshore Cable Corridor that runs through the Constable Bank

	<p>has been reviewed early and it looks almost identical to the 2019 UKHO data which is what has been used for modelling in the PEIR. When you look at the older data, the net movement of the bank is almost nothing. This gives us confidence on how deep the cables need to be buried to avoid the mobile sediments of the bank.</p> <p>JI-What are the heights of the sandwaves?</p> <p>NS- The largest ones are about 5m. From the analysis of the previous surveys, the sandbank itself is stable, it's just the sandwaves that are mobile.</p> <p>KL- This is one of the data sets that the cable engineers are reviewing to understand which of the sandwaves would need clearance works and how to install the cable below the mobile seabed layer. The cable routing has been undertaken specifically to reduce the overlap with the main bank feature for environmental considerations and practical engineering considerations.</p> <p>Modelling has been undertaken assuming dredging along the whole Mona Offshore Cable Corridor at an average depth of 5.1m, at 100m/h along a 104 wide route to take off all the mobile sediment features. This a conservative worst case scenario.</p> <p>We have also modelled cable trenching along the Mona Offshore Cable Corridor. Suspended sediment concentrations increase as trenching comes closer to shore as water depth decreases. We have modelled a 3m wide, 3m deep v-shaped trench at an installation rate of 450m/h.</p> <p>JI- Do you have any indication of the cable protection measures that might be needed along the Mona Offshore Cable Corridor? Would cable protection been required on the Constable Bank?</p> <p>KL-The MDS that has been considered in the PEIR does not include the engineer's consideration of the site-specific data. There are provisions for cable protection in the Mona Offshore Cable Corridor particularly with regards to Benthic Ecology.</p> <p>JI- Need to be mindful of the change to the seabed and change to sediment transport even if the cable protection is buried. Would it cause a change to the sandwaves on the bank?</p> <p>NS- As it's a sandbank, you would likely be able to achieve the burial depth required. However material is mobile, the protection (if required) may initially present a barrier to sediment movement, but the sediment will find its way over the barrier as there is high bed load movement.</p> <p>JI- NRW would be interested in how far away the cable protection would need to be from Constable Bank before there is no impact to the sediments on the bank.</p> <p>The cumulative assessment study area has considered in excess of two spring tidal excursions. Within the cumulative assessment, we undertake a "two stage" screening to identify cumulative projects and</p>		
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	<p>impacts. Where impacts of the project alone are considered as being negligible then that impact will be screened out of the assessment.</p>		
<p>4.</p>	<p><u>Mona Benthic ecology</u></p> <p><u>Mona Benthic baseline (presented by TH)</u></p> <p>The 2021 environmental survey covered the Mona Array Area. The 2022 environmental survey covered the Mona Array Area zone of influence and the Mona Offshore Cable Corridor. The surveys have consisted of grab sampling, drop down video, particle size analysis, sediment chemistry analysis and eDNA.</p> <p>For the PEIR, the Mona Array Area has been characterised by the site-specific data. The Mona Offshore Cable Corridor has been characterised by desk top data. The site-specific survey data for the Mona Array Area zone of influence and the Mona Offshore Cable Corridor will be consulted on with the EWG in summer 2023 and incorporated into the final Environmental Statement.</p> <p>The site-specific surveys showed that the benthic communities in the Mona Array Area were dominated by the polychaete-rich deep Venus community in offshore mixed sediments (PoVen) biotope. A habitats assessment also showed low resemblance stony reef at five stations in the Mona Array Area. An assessment for presence of the seapens and burrowing megafauna communities habitat concluded that it is highly unlikely that any habitat across the Mona array area constitutes anything other than a negligible resemblance to this habitat.</p> <p>An intertidal phase 1 survey was undertaken in 2022 at the Mona landfall location. The intertidal survey recorded a variety of communities. The majority were a mosaic of biotopes dominated by infaunal polychaetes and bivalves. In the west there is an extensive <i>Sabellaria alveolata</i> reef. The reef was estimated to be 47,473m². However, not all that area falls within the Mona Offshore Cable Corridor. In addition, small pockets of <i>Sabellaria alveolata</i> that were not part of the main reef and were not classified as reef, were recorded in the east of the survey area on groynes. Piddocks with sparse fauna were noted close to low water. A small patch of blue mussel beds were recorded close to low water in the west of the survey area, adjacent to the <i>Sabellaria alveolata</i> reef.</p> <p>The landfall overlaps with the Pensarn Site of Special Scientific Interest (SSSI) however the features of the SSSI are all above mean high water springs (MHWS), so this site has been considered under the terrestrial ecology EIA. Constable Bank and the Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC overlap with the Mona Offshore Cable Corridor. The Little Ormes Head SSSI and the Great Ormes Head SSSI fall within the boundary of the SAC, which is a higher designation classification, therefore the features of the SSSI have been considered in the assessment of impacts on the SAC. The features of the SAC which have been taken forward into the assessment in the PEIR</p>		

	<p>chapter are Annex I subtidal and intertidal reefs and Annex I sandbanks which are covered by water at low tide.</p> <p>LN- For the other features of the Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC that haven't been taken forward to the assessment, has the physical process modelling shown that the impacts on physical process doesn't reach those features.</p> <p>AP- Yes, the increase in suspended sediment concentrations doesn't reach the other features of the SAC as mapped by NRW. This will be re reviewed once we have the site-specific data for the Mona Offshore Cable Corridor. The assessment for PEIR adopts a precautionary approach that assumes that Annex I reefs and Annex I sandbank features could be affected, although the NRW mapping indicates no direct overlap with these features.</p> <p><u>Mona Benthic impact assessment (presented by AP)</u></p> <p>We have updated the list of impact included in the EIA from those that were presented in the scoping report. We have included those that were requested in the scoping opinion (e.g. EMF, heat from cables and remobilisation of sediment bound contaminants).</p> <p>LN- Is secondary scour and impacts on adjacent habitats being considered.</p> <p>AP- Modelling has been undertaken with the scour protection in place so the impact assessment of changes in physical processes includes the impact of scour protection.</p> <p>LN – Noted. Please ensure any potential impacts from habitat alteration are assessed in the benthic chapter by drawing from the information presented in the physical processes chapter.</p> <p>PD- How do you assess the connection between the potential habitat alterations and shellfish ecology e.g. if a different habitat has presented, how will this affect shellfish populations?</p> <p>KL- We align the different receptor groups. The fish and shellfish assessment does draw on the benthic ecology assessment and the marine mammal and birds assessments draw on the fish and shellfish assessment. The fish and shellfish assessment does consider the habitat alterations and what that means for the populations. For some species or groups of species, there will be benefits, while others (e.g. those associated with soft, sandy sediments) there will be negative implications.</p> <p>Accidental pollution has been scoped out. It was agreed to be scoped out in the scoping opinion. Accidental pollution will be controlled via standard management plans.</p> <p>The impact assessment methodology has been undertaken in line with the CIEEM 2022 guidance¹.</p>		
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¹ CIEEM (2022) Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater, Coastal and Marine. September 2018 version 1.2 updated April 2022.

	<p><u>Mona Preliminary assessment outputs for subtidal important ecological features (IEFs)</u></p> <p>The preliminary outputs of the impact assessments for temporary habitat disturbance, long term habitat loss and increased SSC/sediment deposition on subtidal important ecological features IEFs were presented.</p> <p>All of the Isle of Man Marine Nature Reserves and Marine Conservation Zones (MCZ) are outside of the zone of influence from SSCs so while they are considered in the benthic ecology technical report they have not been taken forward to assessment.</p> <p>We presented a preliminary MCZ screening in in the scoping report which concluded that no MCZs would be affected. We have considered the updated physical processes modelling and underwater sound modelling for mobile features of MCZs and still conclude that no MCZs required a full MCZ assessment.</p> <p>PD- Will those clarifications be included in the assessment. That would make it clear that the process has been followed.</p> <p>AP- yes, we have a section of the chapter on designated sites which explains the reasoning for why sites have not been taken forward to the assessment.</p> <p><u>Mona Preliminary assessment outputs for Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC and Constable Bank</u></p> <p>The Mona Offshore Cable Corridor doesn't overlap with any of the features of the SAC, as mapped by NRW. We will revisit this when we have the site-specific data. This will be included in the assessment for the Environmental Statement and HRA.</p> <p>LN- When the assessments are carried out, indirect impacts from changes in physical processes impact on SAC features need to be considered.</p> <p>AP-We have been precautionary and have assumed in the assessment that there is overlap with the two SAC features taken forward to the assessment.</p> <p>The assessment on the features of the SAC and Constable Bank is precautionary as not all cables within these areas will required sandwave clearance.</p> <p>LN- Work has been done by NRW to update the guidance on how low resemblance rocky reef should be considered as Annex I features.</p> <p>GE- Will any of the infrastructure remain <i>in situ</i> after decommissioning?</p> <p>AP- The assumption is the foundations and cables will be removed but cable and scour protection will be left <i>in situ</i>. This has been considered in the assessment as a permanent habitat change. We can't be certain about the decommissioning plan at this time, but the worst case has been assessed.</p>	<p>NRW to provide updated guidance on how low resemblance rock reef features should be considered as annex I features.</p>	<p>Completed</p>
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	<p><u>Mona Preliminary assessment outputs for intertidal IEFs</u></p> <p>The preliminary outputs of the impact assessments for temporary disturbance resulting from the installation of cables via open cut trenching at the landfall were presented. Effects associated with cable installation through the piddock habitat have been assessed as long term habitat loss.</p> <p>Bp/EnBW are investigating measures to reduce the impact on the sensitive features at the landfall e.g. micro siting around the <i>S. alveolata</i> reef.</p> <p>LN- The peat and clay exposures with piddocks and the blue mussel beds are protected under the Environments (Wales) Act (Section 7 habitat) and should be considered alongside the reef for micrositing around.</p>	<p>The applicant to consider micrositing around the blue mussel beds and peat and clay exposures with piddocks.</p>	<p>In progress</p>
<p>5.</p>	<p><u>Mona Fish and shellfish (presented by KL)</u></p> <p>The fish and shellfish study area has been updated to include the whole Isle of Man waters as per the scoping opinion.</p> <p>The additional data sources provided in the scoping response have been incorporated into the baseline characterisation.</p> <p>The site-specific data shows that the sediments are mixed, gravelly, and muddy. The Mona Array Area is not suitable for sandeel however there is lots of suitable habitat within the wider study area.</p> <p>There is important herring spawning grounds to the north of the Mona Array Area. Sediments are unsuitable for herring within the Mona Array Area. Additional data collected on herring larvae and spawning evidence from Northern Irish Herring Larvae Survey. These indicate that the extent of spawning grounds align well with the Coull <i>et al.</i> (1998) mapping.</p> <p>PD- Have the angel shark areas off north Wales been considered?</p> <p>KL- They have not been specifically included. They weren't included as the Mona Array Area and the Mona Offshore Cable Corridor are not in areas considered important for that species.</p> <p>IN- NRW have some records for angel shark but they are further inshore and around the Llyn Peninsula.</p> <p>Accidental pollution, underwater sound from operational wind turbines and underwater sound from vessels have been scoped out. Modelling of the proposed large wind turbines has been undertaken and the modelling shows similar results to previous studies which show little effects on fish and shellfish. Injury impacts will only occur if fish remain in close proximity to the wind turbines for long periods of time; behavioural effects not predicted to be significant based on evidence of a wide range of fish using wind farms from post construction monitoring. We have not taken this forward to the assessment as it is not going to cause a significant effect.</p>	<p>NRW to provide records of angel shark in the Irish Sea</p>	<p>Completed</p>

	<p>IN- Did they model direct drive or geared turbines. Newer turbines are direct drive which have a lower noise impact so this could be added to the justification for scoping out.</p> <p>KL- RPS to take this away.</p> <p><i>Post meeting note: Underwater sound modelling for the operational wind turbine generators has been based on the methodology presented in Tougaard et al. (2020)². The model is based on data acquired from wind farms using gear box technology.</i></p> <p><u>Mona Underwater sound</u></p> <p>We consider SELpk and SELcum. The assessment criteria for injury and behavioural effects have been taken from Popper <i>et al</i> 2014³. The modelling includes a ramp up procedure, initial strikes through the soft start process to allow fish and marine mammals to move away from the area. The SELcum considered both fleeing fish and stationary fish as requested by the EWG.</p> <p>When undertaking the impact assessment, we consider more information than the qualitative fields defined by Popper <i>et al</i> 2014, including published literature on the effects of impulsive noise on fish and shellfish.</p> <p>IN- Are spawning areas for cod considered.</p> <p>KL- We do specifically consider cod, we discuss the general habitats for cod and other species that don't have the same close link to sediment types as herring and sandeels.</p> <p>GE- Will simultaneous and concurrent piling be modelled if that is a potential construction plan.</p> <p>KL- We have modelled simultaneous and concurrent piling and we will be presenting the injury ranges for both in the PEIR.</p> <p>We are considering both the temporal and spatial implications for piling impacts. We have noticed that for the Awel y Mor documents, they have presented impacts as a factor of area and time. They have used km²h. Has this approach been agreed with stakeholders, it is likely to be something that is recommended for the Morgan Generation Assets and Mona Offshore Wind Projects?</p> <p>GE- We generally expect to see spatial and temporal maximum design scenarios presented, however we don't provide specific advice on how to do this.</p>		
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² Jakob Tougaard, Line Hermanssen, and Peter T. Madsenb (2020) How loud is the underwater noise from operating offshore wind turbines? The Journal of the Acoustical Society of America 148, 2885 (2020); doi: 10.1121/10.0002453

³ Popper, A. N., Hawkins, A. D., Fay, R. R., Mann, D., Bartol, S., Carlson, Th., Coombs, S., Ellison, W. T., Gentry, R., Halvorsen, M. B., Lokkeborg, S., Rogers, P., Southall, B. L., Zeddis, D. G. and Tavalga, W. N. (2014) ASA S3/SC1.4 TR-2014 Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI. Springer and ASA Press, Cham, Switzerland.

	<p>IN – The slides presented that the sensitivity of herring to underwater sound is medium. We would assume that herring have the highest sensitivity to underwater sound.</p> <p>KL- When we assign sensitivity, we look at vulnerability and recoverability which is in line with the MarESA approach. Herring is vulnerable to underwater noise, but it has high recoverability, so they are considered to have medium sensitivity. We also look at the importance of receptors in this sensitivity classification, but the medium sensitivity is largely due to the recoverability of populations following piling.</p> <p>MMO have advised in the Morgan Scoping Opinion that we should be considering the 135dB SELs from Hawkins, A. D. and Popper, A. N. (2016)⁴. We consider this to be highly precautionary, especially considering that the impulsive nature of the sound will dissipate and become continuous with distance from the source, the fact that response to sound does not necessarily mean avoidance and that the paper noted that experiments were undertaken in very quiet environments (in contrast to the Irish Sea). Also the authors of the paper noted that this noise level should not be used to define sound exposure criteria.</p> <p>Taking a risk based approach, considering both the spatial extent of the noise contours (assuming the maximum hammer energy) and the duration of piling (i.e. approx. 70 days), we are not predicting this impact to be significant.</p> <p><i>Post meeting note from Cefas: In respect of the comment by ██████ ██████ ‘When we assign sensitivity, we look at vulnerability and recoverability which is in line with the MarESA approach. Herring is vulnerable to underwater noise, but it has high recoverability, so they are considered to have medium sensitivity. We also look at the importance of receptors in this sensitivity classification, but the medium sensitivity is largely due to recoverability of populations following piling’. In reference to the ‘high recoverability’ of herring, we assume that ██████ means recoverability of herring populations. If this is the case, the Applicant must provide appropriate peer-reviewed literature to support this statement. Herring are considered to be highly sensitive to noise and vibration in terms of physiological and behavioural effects. It should be noted that physiological effects caused by changes in pressure from explosions and impulsive sounds such as piling include death and potential mortal injuries such as barotrauma, blood gases coming out of solution, rapid expansion and contraction of swim bladders, damage to tissue and organs, and potential rupture of the swim bladder (Popper et al., 2014). Barotrauma can result in lethal injury through either immediate, or delayed mortality (McKinstry et al. 2007). Whilst some physical injuries such as fin hematomas, capillary dilation, and loss of sensory hair cells are potentially recoverable, they can still lead to death either through a decreased level of fitness or through predation and disease</i></p>		
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Hawkins, A. D. and Popper, A. N. (2016) A sound approach to assessing the impact of underwater noise on marine fishes and invertebrates. ICES Journal of Marine Science, 74 (3): 635-651.

(Halvorsen, 2011 & 2012). For these reasons, herring, as a receptor, are considered to have low recoverability to underwater noise from pile driving, explosions and other impulsive sounds.

Post meeting note from Cefas: In respect of the comment by [REDACTED] [REDACTED] 'MMO have advised in the Morgan Scoping Opinion that we should be considering the 145dp SELs from Hawkins, A. D. and Popper, A. N. (2016). We consider this to be highly precautionary especially considering that the impulsive nature of the sound will dissipate and become continuous with distance from the source, the fact that response to sound does not necessarily mean avoidance and that the paper noted that experiments were undertaken in very quiet environments (in contrast to the Irish Sea). Also the authors of the paper noted that this noise level should not be used to define sound exposure criteria.' The recommendation was for modelling to be carried out based on a 135dB threshold (rather than 145dB) as this is recommended by Cefas fisheries advisors as a conservative indicator for determining the impact range in which clupeid species (including herring) are likely to exhibit behavioural responses. The 135dB threshold is based on research by Hawkins et al. (2014), who exposed wild schooling sprat to short sequences of repeated impulsive playback sounds at different sound pressure levels, to resemble that of a percussive pile driver. Observed behavioural responses included the break-up of fish schools. The sound pressure levels to which the fish schools responded on 50% of the presentations were 163.2 and 163 dB re 1 µPa (peak-to-peak), and as a result the concluded single strike sound exposure level was 135 dB re 1 µPa² ·s. 11. Cefas Fisheries and Noise and Bioacoustics advisors recognise that this is a conservative threshold as the Hawkins study was carried out in an enclosed, quiet coastal sea loch, where fish were not accustomed to heavy disturbance from shipping and other sounds (Hawkins et al., 2014). However, sprat is a clupeid species, closely related and anatomically similar to herring, and similarly sensitive to underwater sound (sprats also possess a swim bladder involved in hearing). Given an absence of other peer-reviewed empirical evidence of behavioural responses in clupeid fishes to support an alternative threshold for impulsive noise, Hawkins et al., (2014) is currently considered the best available scientific evidence by Cefas Fisheries and Underwater Noise specialists, and as such a 135dB threshold is deemed appropriate.

Post meeting correction: The MMO Scoping response states "For the purpose of modelling behavioural responses in herring at their spawning ground, the MMO recommend the inclusion of a 135dB threshold based on startle responses observed in sprat by Hawkins et al. (2014)." The statement that the MMO have recommended a 145db threshold was a typing error in the meeting minutes that has now been corrected. A 135db threshold was what was presented in the EWG meeting and PEIR chapter, noting the caveats discussed above.

6.	<p><u>Next steps (presented by KL)</u></p> <ul style="list-style-type: none"> • Meeting minutes to be circulated 2 weeks following the EWG. • Agreement logs to be circulated following EWG. • Meeting to discuss Constable Bank and Menai Strait SAC. • Meeting to discuss Morgan Generation assessment outputs – Q1 2023. <p>The applicant is seeking agreement on:</p> <ul style="list-style-type: none"> • Agreement on approach to baseline characterisation for physical processes, benthic ecology and fish and shellfish ecology. • Agreement on impacts scoped out for benthic ecology and fish and shellfish. • Agreement on approach to noise modelling and assessment for fish and shellfish following clarifications provided in EWG. 		
7.	<p><i>Post Meeting note: PD Provided additional data sources from Isle of Man Government via email to ST and KL on 29/11/2022. RPS to look to include in PEIR where possible and if not, in the final application.</i></p>		

B.3.2 Response from Natural England regarding the meeting minutes

Date: 11 January 2023
Our ref: DAS/UDS A000566 412777
Your ref: Benthic ecology, fish and shellfish, and physical processes EWG02



██████████ and ██████████
BP Alternative Energy Investments Limited

c/c ██████████ and ██████████
RPS/ Energy

Hornbeam House
Crewe Business Park
Electra Way
Crewe
Cheshire
CW1 6GJ

0300 060 3900

BY EMAIL ONLY

Dear ██████████

Discretionary Advice Service (Charged Advice) – UDS A000566

Development proposal: BP EnBW Morgan and Mona Offshore Wind Farm

Consultation: Benthic ecology, fish and shellfish, and physical processes EWG02

This advice is being provided as part of Natural England's Discretionary Advice Service in accordance with the Quotation and Agreement dated 17 May 2021 to BP Alternative Energy Investments Limited.

The following advice is based upon the information within Benthic Ecology, Fish and Shellfish Ecology and Physical Processes Expert Working Group (EWG) Meeting 2 (attended on 29th November 2022) and subsequent meeting notes provided 14th December 2022 by ██████████ ██████████.

Natural England was asked to provide advice upon:

- Agreement on broad approach to characterisation for Benthic Ecology
- Agreement to the scoping of impacts for the EIA and HRA for Benthic Subtidal and Intertidal Ecology
- Agreement to the scoping of impacts for the EIA and HRA for Fish and Shellfish Ecology
- Agreement on approach to noise modelling and approach to assessment following clarifications provided in EWG

Detailed comments

Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards

Natural England has been leading the 'Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards' project, funded by Defra's Offshore Wind Enabling Actions Programme (OWEAP).

The project is providing up-front best practice advice on the way data and evidence is used to support offshore wind farm development and consenting in English waters, focussing on the key ecological receptors which pose a consenting risk for projects, namely seabirds, marine mammals, seafloor habitats and species and fish.

The project aims to facilitate the sustainable development of low impact offshore wind by increasing clarity for industry, regulators and other stakeholders over data and evidence requirements at each stage of offshore wind development, from pre-application through to post-consent.

The advice documents are currently stored on a SharePoint Online site, access to the SharePoint site needs to be requested from neoffshorewindstrategicsolutions@naturalengland.org.uk. Please allow up to three working days for requests to access the site to be granted. Natural England is currently reviewing ways of making the advice more accessible and open access.

1. Agreement on broad approach to characterisation for Benthic Ecology.

Natural England broadly agree with the approach to characterisation for benthic ecology as presented at the expert working group meeting on 29th November 2022.

2. Agreement to the scoping of impacts for the EIA and HRA for Benthic Subtidal and Intertidal Ecology

Natural England broadly agree with the scoping of impacts for the EIA and HRA for Benthic Subtidal and Intertidal Ecology, as presented at the expert working group meeting on 29th November 2022.

3. Agreement to the scoping of impacts for the EIA and HRA for Fish and Shellfish Ecology

Natural England broadly agree with the scoping of impacts for the EIA and HRA for Fish and Shellfish Ecology, as presented at the expert working group meeting on 29th November 2022.

4. Agreement on approach to noise modelling and approach to assessment following clarifications provided in EWG

Natural England agree to the approach to noise modelling and approach to assessment as presented at the expert working group meeting on 29th November 2022.

For clarification of any points in this letter, please contact me using the details provided below.

Yours sincerely,

██████████
Marine and Coastal Lead Adviser
Coast and Marine Team
Cheshire to Lancashire Area Team

The advice provided in this letter has been through Natural England's Quality Assurance process

The advice provided within the Discretionary Advice Service is the professional advice of the Natural England adviser named below. It is the best advice that can be given based on the information provided so far. Its quality and detail is dependent upon the quality and depth of the information which has been provided. It does not constitute a statutory response or decision, which will be made by Natural England acting corporately in its role as statutory consultee to the competent authority after an application has been submitted. The advice given is therefore not binding in any way and is provided without prejudice to the consideration of any statutory consultation response or decision which may be made by Natural England in due course. The final judgement on any proposals by Natural England is reserved until an application is made and will be made on the information then available, including any modifications to the proposal made after receipt of discretionary advice. All pre-application advice is subject to review and revision in the light of changes in relevant considerations, including changes in relation to the facts, scientific knowledge/evidence, policy, guidance or law. Natural England will not accept any liability for the accuracy, adequacy or completeness of, nor will any express or implied warranty be given for, the advice. This exclusion does not extend to any fraudulent misrepresentation made by or on behalf of Natural England.

Cc commercialservices@naturalengland.org.uk

Annex 1

European Protected Species

A licence is required in order to carry out any works that involve certain activities such as capturing the animals, disturbance, or damaging or destroying their resting or breeding places. Note that damage or destruction of a breeding site or resting place is an absolute offence and unless the offences can be avoided (e.g. by timing the works appropriately), it should be licensed. In the first instance it is for the developer to decide whether a species licence will be needed. The developer may need to engage specialist advice in making this decision. A licence may be needed to carry out mitigation work as well as for impacts directly connected with a development. Further information can be found in Natural England's ['How to get a licence'](#) publication.

If the application requires planning permission, it is for the local planning authority to consider whether the permission would offend against Article 12(1) of the Habitats Directive, and if so, whether the application would be likely to receive a licence. This should be based on the advice Natural England provides at formal consultation on the likely impacts on favourable conservation status and Natural England's [guidance](#) on how the three tests (no alternative solutions, imperative reasons of overriding public interest and maintenance of favourable conservation status) are applied when considering licence applications.

Natural England's pre-submission Screening Service can screen application drafts prior to formal submission, whether or not the relevant planning permission is already in place. Screening will help applicants by making an assessment of whether the draft application is likely to meet licensing requirements, and, if necessary, provide specific guidance on how to address any shortfalls. The advice should help developers and ecological consultants to better manage the risks or costs they may face in having to wait until the formal submission stage after planning permission is secured, or in responding to requests for further information following an initial formal application.

The service will be available for new applications, resubmissions or modifications – depending on customer requirements. More information can be found on [Natural England's website](#).

B.3.3 Response from Cefas regarding the meeting minutes

From: [REDACTED]
To: [REDACTED]
Cc: [REDACTED]
Subject: RE: Morgan Mona BE, FSF, PP EWG02 meeting
Date: 10 January 2023 14:01:45
Attachments: [image002.png](#)
[image003.png](#)

CAUTION: This email originated from outside of RPS.

Dear [REDACTED]

We sought input from Cefas regarding the draft meeting minutes you provided and have provided comments on the draft minutes below based on the advice we have received from Cefas. Apologies that this is being provided after 6 January – Cefas provided their comments to my colleague [REDACTED] and not to myself, and he was on leave when their comments were provided.

1. In respect of the comment by [REDACTED] *'When we assign sensitivity, we look at vulnerability and recoverability which is in line with the MarESA approach. Herring is vulnerable to underwater noise, but it has high recoverability, so they are considered to have medium sensitivity. We also look at the importance of receptors in this sensitivity classification, but the medium sensitivity is largely due to recoverability of populations following piling'*. In reference to the 'high recoverability' of herring, we assume that [REDACTED] means recoverability of herring populations. If this is the case, the Applicant must provide appropriate peer-reviewed literature to support this statement. Herring are considered to be highly sensitive to noise and vibration in terms of physiological and behavioural effects. It should be noted that physiological effects caused by changes in pressure from explosions and impulsive sounds such as piling include death and potential mortal injuries such as barotrauma, blood gases coming out of solution, rapid expansion and contraction of swim bladders, damage to tissue and organs, and potential rupture of the swim bladder (Popper *et al.*, 2014). Barotrauma can result in lethal injury through either immediate, or delayed mortality (McKinstry *et al.* 2007). Whilst some physical injuries such as fin hematomas, capillary dilation, and loss of sensory hair cells are potentially recoverable, they can still lead to death either through a decreased level of fitness or through predation and disease (Halvorsen, 2011 & 2012). For these reasons, herring, as a receptor, are considered to have low recoverability to underwater noise from pile driving, explosions and other impulsive sounds.
2. In respect of the comment by [REDACTED] *'MMO have advised in the Morgan Scoping Opinion that we should be considering the 145dp SELs from Hawkins, A. D. and Popper, A. N. (2016). We consider this to be highly precautionary especially considering that the impulsive nature of the sound will dissipate and become continuous with distance from the source, the fact that response to sound does not necessarily mean avoidance and that the paper noted that experiments were undertaken in very quiet environments (in contrast to the Irish Sea). Also the authors of the paper noted that this noise level should not be used to define sound exposure criteria.'* The recommendation was for modelling to be carried out based on a 135dB threshold (rather than 145dB) as this is recommended by Cefas fisheries advisors as a conservative indicator for determining the impact range in which clupeid species (including herring) are likely to exhibit behavioural responses. The 135dB threshold is based on research by Hawkins *et al.* (2014), who exposed wild schooling sprat to short sequences of repeated impulsive playback sounds at different sound pressure levels, to resemble that of a percussive pile driver. Observed behavioural responses included the break-up of fish schools. The sound pressure

levels to which the fish schools responded on 50% of the presentations were 163.2 and 163 dB re 1 μ Pa (peak-to-peak), and as a result the concluded single strike sound exposure level was 135 dB re 1 μ Pa² ·s. 11. Cefas Fisheries and Noise and Bioacoustics advisors recognise that this is a conservative threshold as the Hawkins study was carried out in an enclosed, quiet coastal sea loch, where fish were not accustomed to heavy disturbance from shipping and other sounds (Hawkins *et al.*, 2014). However, sprat is a clupeid species, closely related and anatomically similar to herring, and similarly sensitive to underwater sound (sprats also possess a swim bladder involved in hearing). Given an absence of other peer-reviewed empirical evidence of behavioural responses in clupeid fishes to support an alternative threshold for impulsive noise, Hawkins *et al.*, (2014) is currently considered the best available scientific evidence by Cefas Fisheries and Underwater Noise specialists, and as such a 135dB threshold is deemed appropriate.

References

Halvorsen M.B., Casper B.M., Woodley C.M., Carlson T.J., Popper A.N. (2011) Predicting and mitigating hydroacoustic impacts on fish from pile installations. NCHRP Res Results Digest 363, References 66 Project 25–28, National Cooperative Highway Research Program, Transportation Research Board, National Academy of Sciences, Washington, D.C.


Halvorsen M.B., Casper B.M., Woodley C.M., Carlson T.J., Popper A.N. (2012) Threshold for onset of injury in Chinook salmon from exposure to impulsive pile driving sounds. PLoS ONE 7(6):e38968.

Hawkins, A., Roberts, L., & Cheesman, S., 2014. Responses of free-living coastal pelagic fish to impulsive sounds. *The Journal of the Acoustical Society of America*, 135, 3101–3116. <https://doi.org/10.1121/1.4870697>.

McKinstry C., Carlson T., Brown R. (2007) Derivation of a mortal injury metric for studies of rapid decompression of depth-acclimated physostomous fish. PNNL-17080, Pacific Northwest National Laboratory, Richland, WA.

Popper, A.N., Hawkins, A.D., Fay, R.R., Mann, D.A., Bartol, S., Carlson, T.J., Coombs, S., Ellison, W.T., Gentry, R.L., Halvorsen, M.B., Løkkeborg, S., Rogers, P.H., Southall, B., Zeddies, D.G. & Tavolga, W.N., 2014. Asa S3/Sc1.4 Tr-2014 Sound Exposure Guidelines for World Class Science for the Marine and Freshwater Environment Pakefield Road, Lowestoft, Suffolk, NR33 0HT | www.cefas.co.uk | +44 (0) 1502 562244 V8 JL_15/03/2022 Fishes and Sea Turtles: A Technical Report Prepared by ANSI-Accredited Standards Committee S3/Sc1 a (Springerbriefs in Oceanography).

Kind regards


ase Officer | Marine Management Organisation
@ Lancaster House | Hampshire Court | Newcastle upon Tyne | NE4 7YH
8  IC  | 

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B.3.4 Response from JNCC regarding the meeting minutes

From: [REDACTED]
To: [REDACTED]
Cc: [REDACTED]
Subject: RE: Morgan Mona BE, FSF, PP EWG02 meeting
Date: 04 January 2023 12:31:36
Attachments: [image001.jpg](#)
[image002.jpg](#)
[image003.png](#)
[image004.png](#)
[image005.jpg](#)
[image006.png](#)
[image007.jpg](#)
[image008.gif](#)
[image009.gif](#)
[image010.jpg](#)
[Morgan Mona BEFSFPP EWG Agr Log F02 JNCC FINAL.xlsx](#)

CAUTION: This email originated from outside of RPS.

Hi [REDACTED]

Please see JNCC's response to the EWG actions below. I have also attached the updated agreement log.

EWG members to feedback on if they would like to be involved in a discussion on the Mona Offshore Cable Corridor and engineering discussions re Constable Bank and the SAC (given this is primarily in NRW (A)'s remit) (06/01/23)

Given our offshore remit, JNCC does not feel it necessary that we be involved in conversations regarding Constable Bank and Menai Strait and Conwy Bay SAC.

We are content with the minutes and have no comments to make.

Kind regards,

[REDACTED] (sent on behalf of [REDACTED])

[REDACTED] BSc(Hons)
Offshore Industries Adviser
Marine Management Team
JNCC, Inverdee House, Baxter Street, Aberdeen, AB11 9QA
Tel: [REDACTED]
Email: [REDACTED]

JNCC have been monitoring the outbreak of COVID-19 closely and developed a response plan. As a result, the vast majority of our staff are working from home and adhering to the government's advice on social distancing and travel restrictions. Whilst we are taking these actions we are available for business as usual. We will respond to enquiries as promptly as possible. However, there may be some delays due to the current constraints and we ask for your understanding and patience.



jncc.gov.uk

B.3.5 Response from NRW regarding Low Resemblance Stony Reef

From:



Subject:

Low Resemblance Stony Reef

Date:

29 November 2022 17:18:56

CAUTION: This email originated from outside of RPS.

Many thanks for the presentation of information at today's BE FSF PP EWG – we recognise and appreciate the substantial amount of work that has been undertaken across the receptors discussed today.

As per one of our actions, please find below NRW's updated paragraph re. Low resemblance stony reef:

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:

- 1. the associated biological community is composed of a diverse mix of epibiota, including erect and / or branching forms, and / or*
- 2. the substrate is relatively stable and allows longer lived or slow growing epibiota to persist.*

We will respond with regards provision of data on Angelshark in due course.

Kind regards,



Cyfoeth Naturiol Cymru / Natural Resources Wales

Ffôn/ Phone: *Please contact me initially via email or Teams*



Yn falch o arwain y ffordd at ddyfodol gwell i Gymru trwy reoli'r amgylchedd ac adnoddau naturiol yn gynaliadwy.

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cyfoethnaturiol.cymru / naturalresources.wales

[Twitter](#) | [Facebook](#) | [LinkedIn](#) | [Instagram](#)

Croesewir gohebiaeth yn Gymraeg a byddwn yn ymateb yn Gymraeg, heb i hynny arwain at oedi.

Correspondence in Welsh is welcomed, and we will respond in Welsh

without it leading to a delay.

B.4. Benthic ecology, Fish and shellfish and Physical processes EWG meeting 3

B.4.1 Meeting minutes

MOM Number : 20230314_Morgan and Mona EP_BE, FSF, PP EWG03 **REV. No.** : F02

MOM Subject : Morgan Generation and Mona Offshore Windfarms Evidence Plan: Benthic, fish and shellfish and physical processes Expert Working Group meeting 3.

MINUTES OF MEETING

MEETING DATE : 14/03/2023

MEETING LOCATION : Microsoft Teams

RECORDED BY : [REDACTED] (RPS)

ISSUED BY : [REDACTED]

PERSONS PRESENT:

- [REDACTED] – RPS (KL)
- [REDACTED] – RPS (LS)
- [REDACTED] – RPS (AP)
- [REDACTED] – RPS (KR)
- [REDACTED] – RPS (TH)
- [REDACTED] – bp (GV)
- [REDACTED] – bp (MP)
- [REDACTED] – bp (SR)
- [REDACTED] – Natural England (KB)
- [REDACTED] – Natur and)
- [REDACTED] – Natural England (LB)
- [REDACTED] – NRW (LN)
- [REDACTED] – NRW (LR)
- [REDACTED] – NRW (JI)
- [REDACTED] – NRW (IN)
- [REDACTED] – MMO ([REDACTED])
- [REDACTED] – MMO (MS)
- [REDACTED] – Cefas (SB)
- [REDACTED] – Cefas (PM)
- [REDACTED] – Cefas E)
- [REDACTED] – Cefas (JW)
- [REDACTED] – Cefas (PW)
- [REDACTED] – JNCC (JWhyte)
- [REDACTED] – Cefas (CR)
- [REDACTED] – The Wildlife Trust (BC)
- [REDACTED] – IoM (PD)

ITEM NO:	DISCUSSION ITEM:	Responsible party	Date
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<p>1.</p>	<p>The agenda will focus on Morgan Generation Assets and will not cover physical processes, as this was covered in detail in the EWG02.</p> <p><u>Project update (presented by GV)</u></p> <p>PEIR finalisation is currently underway for Morgan Gen and Mona, and we are on target to submit the PEIR applications mid-April. S42 will commence from mid-April through May and there is a 47-day consultation period, ending early June.</p> <p>In addition to addressing consultation responses, a key point for activities post PEIR will be providing feedback on the benthic ecology data from the Zone of Influence (ZoI) for Mona and Morgan Generation, and cable corridor for Mona. This 2022 data will not be included in the PEIR, so we will consult post PEIR on this additional data, in a post PEIR EWG. We will confirm how this may or may not affect the conclusion of the impact assessment and this will be presented in the next EWG, rather than in any PEIR documentation.</p> <p>Key milestones: We have completed the Scoping stages and are about to submit PEIR applications for both Morgan Generation and Mona. DCO applications for both projects are anticipated Q1 2024.</p> <p>Morgan/Morecambe Transmission Assets PEIR application is planned for Q3 2023 and the DCO application is anticipated to be submitted in Q3 2024.</p>	<p>-</p>	<p>-</p>
<p>2.</p>	<p><u>Feedback and Actions from EWG02 (presented by KL and AP)</u></p> <p>Cefas feedback – KL noted that there was a query on recoverability regarding the underwater noise assessment on fish and shellfish populations; KL agreed that for a lot of injury effects, recovery would not be expected, however, mitigation measures such as soft starts will minimise the risk of injury/mortality such that these will not result in significant effects on populations. The recovery discussed was referring to behavioural effects and we will cover this in more detail later on in the EWG.</p> <p>KL raised the use of 135dB SEL_{ss} (SEL single strike) metric – there was an error in the draft meeting minutes for EWG02, it should have read 135dB, not 145dB, and this has now been corrected. We have presented SEL_{ss} noise levels in the PEIR, but the use of the 135 dB noise level is heavily caveated. The study this noise level has come from was undertaken in a very quiet environment and the authors of the report also note that this level should not be used as a threshold for deciding what is/is not significant disturbance. We believe that our preferred approach in the PEIR is adequately precautionary and the presentation of the SEL_{ss} noise contours and specifically application of the 135 dB SEL_{ss} noise level is heavily caveated in the PEIR. This will be discussed later in presentation.</p> <p>AP discussed NRW guidance provided following the last EWG on when low resemblance stony reef can be considered as an Annex 1 feature. During the last EWG RPS presented low resemblance stony reef in Mona Array Area. RPS will consider the guidance on low resemblance stony reef and this will be incorporated in the Environmental Statement (not PEIR); to be discussed at next EWG.</p>	<p>-</p>	<p>-</p>

<p>3.</p>	<p><u>Benthic Ecology Baseline (presented by TH)</u></p> <p>Two site-specific surveys (grab, drop down video and eDNA) have been undertaken for the Morgan Generation project so far; a 2021 survey of the Morgan Array Area, and a 2022 survey of the Zone of Influence (Zol). The PEIR includes the results of the 2021 array survey, and incorporates desktop data to characterise the Zol. The final Environmental Statement will incorporate the 2022 Morgan Generation Zol data.</p> <p>Subtidal biotopes maps in the Mona Array Area have been used in wider context. The Morgan Array Area is dominated by polychaete rich biotopes, with some areas of coarse sediment. There is circalittoral sandy mud biotope to the east of the Morgan Array Area. The habitat assessment identified two stations in the Morgan Array Area Zol which showed low resemblance stony reef. All stations within the Morgan Array Area were assessed to see if they were representative of the seapens and burrowing megafauna communities habitat. Video and image analysis of burrow density found there was no evidence of any species associated with 'sea pen and burrowing megafauna communities' habitat supporting the conclusions the determination that it is highly unlikely that any habitat across the Morgan survey area constitutes anything other than a negligible resemblance to this habitat. The 2022 survey data will be reported in the next EWG, later in the summer, and reported in the final application.</p> <p>There are 25 designated sites within the Morgan Generation benthic subtidal and intertidal ecology study area. Only 2 have the potential to be affected by impacts from the Morgan Generation Assets, and only indirectly and are not expected to be significant.</p> <p>IEFs have been assigned for subtidal habitats, and for the features of the West of Walney MCZ and West of Copeland MCZ. Representative biotopes have been used in the assessment to help define the sensitivities using the MarESA.</p>	<p>-</p>	<p>-</p>
<p>4.</p>	<p><u>Benthic Ecology Assessment (presented by AP)</u></p> <p>Impacts have been scoped into the assessment based on the Scoping Report, but have also been updated to take on board the scoping opinion comments received from the Planning Inspectorate and the SNCBs. Three further impacts have been scoped in based on feedback received; disturbance/remobilisation of sediment-bound contaminants; electromagnetic Fields (EMF) from subsea electrical cabling; and heat from subsea electrical cables.</p> <p>The remainder of the presentation is focused on just a few of what we perceive to be the key impacts: temporary habitat disturbance during conduction, long term habitat loss during construction/operations and maintenance (O&M) and increased SSC and deposition during construction.</p> <p>Only one impact has been scoped out - accidental pollution. The risk is managed by standard post consent plans. This was agreed in the Scoping Opinion for Benthic ecology.</p> <p>Impact assessment approach – this is the same as presented previously for Mona and follows CIEEM 2019 guidance. Firstly, identify IEFs (which are identified in the Technical Report); secondly define the magnitude of each impact based on the MDS and PDE from engineering (defined in the chapter); next, define the sensitivity of the receptor; and lastly conclude the significance of the impact in EIA terms based on the assessment matrix shown in the slide pack.</p>	<p>-</p>	<p>-</p>

Temporal subtidal habitat disturbance is likely to be highest during construction and therefore this is the focus of the presentation. This may result from sandwave clearance, jack up events, pre-lay preparation, anchor placement and cable installation. Low resemblance reef IEF does not occur within the Morgan Array Area and the West of Walney MCZ and West of Copeland MCZ do not overlap with the Array Area, therefore these are not assessed for this impact. The MDS for this impact is for up to 87.36km² of temporary habitat disturbance. Effects will be localised, temporary and intermittent during the 4 year construction period. In our assessments we've drawn on OWF monitoring and best available data which suggests that sediments will recover which will support the recovery of associate benthic communities over time. As a result, the magnitude of this impact is therefore low and sensitivity of IEFs are low to medium.

Long-term subtidal habitat loss will occur during the construction, and O&M phases of the project, but will reach peak during O&M. The assessment has been combined and assessed for both phases. The MDS for long-term habitat loss is 1.52km². The magnitude for long-term habitat loss is low due to the spatial extent of the impact, and the sensitivity is high because the sedimentary habitats are fully replaced with hard substrate as a result of the installation of structures. Habitat alteration may occur and this is assessed in the benthic chapter as a separate impact which considers the effects of colonisation.

Increased SSC and sediment deposition will be at its highest during the construction phase. The assessment for benthic ecology is fully informed by physical processes modelling and the Technical Report which supports that. During sandwave clearance, increased SSC will be greatest during the deposition phase of this activity, with the plume predicted to extend for a tidal excursion (~20km in extent) with average increases of <500mg/l. Sedimentation will be low and may reach up to 0.5mm in the immediate vicinity, and one day following the cessation of the clearance operation levels of typically <0.01mm, are present at circa 100m distance from the release. During drilling for foundation installation, the maximum extent of a plume was predicted to extend 22km, but increases in SSC are considerably lower than for sandwave clearance. Based on modelling, the magnitude of the impact is low and sensitivity of subtidal habitat IEFs within the Morgan Array Area is negligible to low. There is potential, during flood tide and wind from the southwest, that plumes generated during construction in the east of the Morgan Array Area could extend to the western edge of the West of Walney and West of Copland MCZs. Significant dispersion is however predicted to occur prior to reaching the MCZs, with concentrations predicted to be well below 1mg/l. The magnitude of the impact on the IEFs of the MCZs is deemed to be negligible. The output of the modelling also demonstrated that the IoM Marine Nature Reserves (MNRs) are outside the Zol so are not considered further in the assessment.

The Cumulative Effects Assessment (CEA) takes into account the Morgan Generation Assets and other projects within the CEA study area (up to 50km buffer around the Morgan Array Area). The study area for interactive/synergistic cumulative impacts (i.e. increase in suspended sediment concentration (SSC) and changes in physical processes) was defined by the physical processes CEA study area which is defined as two tidal excursions.

Projects which are fully constructed and operational are considered part of the baseline and are not included in the CEA (unless they have ongoing impacts such as maintenance). A number of impacts assessed as being of negligible significance for the Morgan Generation Assets alone have not been considered within the CEA.

	<p>A MCZ Screening report will be submitted along with PEIR which refines the preliminary screening submitted with scoping. This takes into account physical processes modelling and underwater sound modelling and considers all potential features of MCZs. Ten MCZs were identified through receptor specific screening criteria based on the Zol. West of Copeland and West of Walney MCZ are located just over 7km from the Morgan Array Area. Physical processes modelling looked at implications on MCZs and has shown that increases in SSC in the vicinity of the West of Walney MCZ and the West of Copeland MCZ are predicted to very low and in the region of <1mg/l. Sedimentation will also be de minimis at this distance. The conclusion of the screening is that the Morgan Generation Assets is not capable of affecting (other than insignificantly) the protected features of any MCZ, therefore no sites are proposed to be taken forward to Stage 2 assessment.</p> <p><u>Questions/Comments</u></p> <p>PM – Noted that this all sounds positive. Cefas may have queries later in terms of where the grab imagery data and eDNA will be shown.</p> <p>KL – All grab sample analysis is presented in PEIR TR; for the final application the technical report will be updated with ZOI and export cable data. Raw data can be provided on request.</p> <p>AP- An overview of the eDNA analysis is included for reference in an appendix to the PEIR TR but is not used to inform the assessment for PEIR. The main characterisation comes from grab and drop down video.</p>		
5.	<p><u>Fish and Shellfish Baseline (presented by KL)</u></p> <p>The baseline and assessment presented is for Morgan Generation only; please note there is a lot of repeated information for the baseline from the previous EWG, as it is similar to Mona. The study area is the same as Mona and extended to the west to include the Isle of Man, based on Scoping responses. Morgan and Morecambe Transmission Assets are being considered separately in their own Evidence Plan.</p> <p>Spawning and nursery habitats in the study area are drawn from Cefas habitat mapping and recent NRW references (as provided following Scoping).</p> <p>Sandeel baseline – There is a mix of suitable and unsuitable sediments for sandeel spawning across the Morgan Array Area, and a reasonable amount of mud and therefore mixed sediments – not ideal for sandeel. However, there is extensive suitable habitats in the wider Fish and Shellfish Ecology study area.</p> <p>Herring baseline – Site specific survey data shows that the Morgan Array Area is mostly unsuitable for herring, as there is not enough gravel and too much mud for spawning. Adjacent to the Morgan Array Area there is suitable spawning habitat (Coull <i>et al.</i>, 1998). The PEIR Technical Report will be updated with cable corridor data and we will give the EWG early sight of that ahead of DCO application.</p> <p>Scallop baseline – Identified as important/key species in the Scoping report/opinion, and by stakeholders. Queen scallops fishing grounds have been identified across the Morgan Array Area (noting there are expected to be similar habitats in the wider area). Suitable habitats for both king and queen scallop species occur across the Fish and Shellfish study area.</p> <p>Designated sites with fish and shellfish features are incorporated into the MCZ and LSE Screenings. Slides show the key species being considered.</p>		

	IEFs baseline has been broadly split out into marine fish, shellfish and diadromous species presented on slides.		
6.	<p><u>Fish and Shellfish Assessment (presented by KL)</u></p> <p>Seven impacts are scoped into the assessment for fish and shellfish, as presented at the last EWG and in the Scoping Report. Accidental pollution has been scoped out as a potential impact on fish and shellfish ecology, for the same reasoning as benthic ecology. The potential impact of underwater sound has been scoped out from wind turbines during O&M and from vessels during all phases. We maintain the point of view that this is scoped out due to site specific modelling which show noise levels are generally low level and evidence that fish do continue to populate wind farm areas, which suggests no significant effects on populations.</p> <p>The impact assessment methodology is the same as discussed under the benthic ecology slides, with the assessment based on magnitude and sensitivity. For the assessments we use a wide range of sources to ensure the best available data supports the assessments, including data from other OWFs (Beatrice cod and sandeel monitoring is a good example).</p> <p>Impact Assessment – Underwater sound assessment approach and modelling. Modelling has been undertaken by Seiche to understand the construction monopile and pin piling noise emissions. Injury ranges are based on Acoustical Society of America (ASA) criteria, and are broken down to mortality, recoverable injury, TTS and behaviour. We have looked at both fleeing and static fish (as relevant) based on stakeholder feedback.</p> <p>Behavioural impacts – based on qualitative behavioural responses to noise and thresholds (Popper <i>et al.</i> 2014) using ‘near field’ (tens of metres), ‘intermediate field’ (hundreds of metres) and ‘far field’ (kilometres) and the relative risk levels indicated by Popper <i>et al.</i> 2014). However, alongside these qualitative risks, we have also tried to quantify these using best available data on fish behavioural responses to noise and particularly impulsive noise. KL noted that TTS is often used as a proxy for behavioural disturbance (threshold of 186 dB SEL), and we have presented TTS ranges for the various fish grouping within the impact assessment but with regard to behavioural responses we’ve looked at other metrics too, noting their limitations.</p> <p>KL presented a breakdown of the MDS for Underwater Sound. In short summary, monopiles are the highest hammer energy, and pin piles are the longest duration – all details will be included in the PEIR.</p> <p>Initial assessment outputs – Cod and Sandeel (max monopile hammer energy at North piling location). Modelling showed injury out to 634m, and mortality out to 297m for Cod. For Sandeel, modelling showed an injury range out to 386m, and mortality out to maximum 120m. It should be noted these are the maximum hammer energies; for initial strikes the ranges are much smaller.</p> <p>For behavioural effects, the assessment looked at the degree of overlap with spawning grounds. We focussed largely on the SPLpk metric for assessing behavioural effects and particularly when looking at mapping of noise contours. A wide range of literature was reviewed and presented in the PEIR on behavioural effects of noise on fish and based on this, we consider the 160 dB SPLpk contour as a good starting point for making risk based decisions on significant behavioural effects, noting there is no agreed threshold. For some species, this threshold is likely to be highly conservative (e.g. salmon and flatfish), but for the more sensitive species, we consider this to be a reasonable, but conservative starting point. The maps shown present the SPLpk contours for the maximum hammer</p>	<p>Visual representation of the cumulative piling scenario, and noise mitigation measures to be presented at the next EWG</p>	<p>Q2 2023</p>

energy for monopile – all other scenarios, the noise contours will be smaller. When assessing impacts on cod and sandeel, we looked at the overlap of spawning habitats, the duration of piling and monitoring data from other wind farms (e.g. recent monitoring from Beatrice wind farm).

Initial assessment outputs – Herring (max hammer energy for monopile and pin piling). Figures show the western most location, for which the noise contours overlap most with herring spawning grounds – so the “worst case” for herring spawning. Locations further east and with lesser hammer energies would result in less overlap with herring spawning ground. Piling will be short term and intermittent over 2 year period, and the PEIR concludes that in the long term herring are expected to recover. However, we acknowledge there is a risk of significant effects on herring spawning if piling occurs during spawning period, particularly in the most westerly part of the Morgan Generation Array Area. In the PEIR, we have noted that the project is currently undertaking work on minimising effects on herring spawning (also relevant for marine mammals). This could include for example spatial restrictions or noise abatement, but this is a work in progress for the project and will be reported to the EWG following S42 consultation.

MMO advised on Morgan that we also consider this 135 dB SEL₅₅ threshold (Hawkins *et al* 2014). As per Feedback and Actions on EWG02 above, KL noted that this is not appropriate as a threshold. The author of the report which reported behavioural changes at this level, states this should not be used as standard threshold for determining behavioural effects. We are of the opinion that the approach taken to the assessment (i.e. using SPL_{pk} and using 160 dB SPL_{pk} as a guide for making risk based decisions) is a more scientifically robust and defensible position based on best available scientific data for where behavioural effects may occur. The 135 SEL₅₅ is highly precautionary, we think this overestimates the risk of behavioural responses. We have presented these contours in the PEIR at the request of the MMO, but they come with a heavy caveat that they are over-conservative.

GE - Has a worst case scenario of two vessels piling at the same time been modelled? From an advice point of view, we would want to see a visual representation of the cumulative scenario as cumulative piling may lead to larger contours than just two contours together. If this is included in the UWS part of the PEIR, that will be fine.

KL – yes, ranges for injury for cumulative scenario are modelled; includes TTS ranges. We have presented one piling event in this EWG, as this extends over the largest area of herring spawning ground. We haven't presented cumulative piling scenarios in the PEIR figures, but we can present that at the next EWG along with what we're working on with regards to noise mitigation too; recommend for GE to review FSF and UWN TR side by side.

Initial assessment - Diadromous fish – KL noted that the focus of the impact assessment is looking at the potential barrier effects and disruption to migration. Magnitude and sensitivity are predicted to be low due to the distance from the Morgan Array Area. Noise contours demonstrate that barrier effects are unlikely to occur. If using 160 dB re 1µPa SPL_{pk} as a guide, the contours show that even at the highest hammer energies there is negligible risk of barrier effects for diadromous fish. It should be noted these noise levels are likely to be highly conservative for salmon and lamprey, which are less sensitive to underwater noise.

IN – when you have timing of upstream migration it's often taken from coastal migration and you're quite far offshore so those periods can shift out but it's not clear how long by. KL agreed; there is some uncertainty with regard to how diadromous fish use the marine environment,

	<p>however, key impact is on fish migration as this is a critical part of their life cycle.</p> <p>Initial assessment - Scallops. Scoping opinions have been incorporated into PEIR. Scallops have been included as an IEF and in the shellfish assessment for each impact. There is limited information available regarding the effects of underwater sound on invertebrates, but we have included a detailed review of available information, including one study which found that giant scallop behaviour was affected, but activity returned to baseline levels after cessation. However, KL noted that any effects on shellfish would be much less extensive than those on fish receptors..</p>		
7.	<p><u>Cumulative Effects Assessment – Method and Impacts (presented by KL)</u></p> <p>Projects within a 50km buffer of the Morgan Generation Assets have been scoped in for direct physical impacts, and 100km for underwater noise.</p> <p><u>Questions and comments</u></p> <p>CR – There is nothing to stand out as an issue at this stage and no concerns.</p> <p>KL – Acknowledged, that’s good to know.</p> <p>GE – Is modelling based on 160 dB SPL_{pk} for Diadromous fish?</p> <p>KL – For injury effects, we’re using the Popper <i>et al.</i> (2014) thresholds for Group 1-4 fish species, and this is set out in the Underwater Sound Technical Report, and the Fish and Shellfish PEIR. For behavioural effects, we have referred to a range of studies, but we have used the 160 dB SPL_{pk} as a guide for considering whether there is potential for disruption of migration/ barrier effects on diadromous fish.</p> <p>GE – We will review once we receive the PEIR.</p> <p>LB – Shads have been considered as Diadromous with 160 dB SPL_{pk} for behavioural effects, whilst Herring have been considered with 135 dB SEL_{ss}? Have you considered lining Shad up with Herring given they’re the same group?</p> <p>KL – 135dB SEL_{ss} has been presented for Herring, but as previous, this is heavily caveated that we don’t agree with that approach. We think that 160 dB SPL_{pk} as a guide to assessing risk is much more realistic, adequately precautionary and scientifically robust and as such our approach is largely based on that (noting that you get similar ranges for TTS, which has been used in other applications as a proxy for behavioural effects).</p> <p>LB – We will review once we receive the PEIR.</p> <p>KB – Regarding the CEA: licence area 457 are submitting a renewal of marine licence for marine aggregate dredging. They have submitted a scoping report but are not submitting an EIA until Q3 of 2024.</p> <p>KL – Thank you. We will review ahead of final DCO Application, if available at that time.</p> <p>IN - How is cumulative piling with Morgan Gen and Mona likely to occur, across the spawning seasons?</p> <p>KL – In terms of CEA this is quantitative in the PEIR between Morgan Generation and Mona and looks at total piling days. We should be able to include quantitative assessment with Morecambe in final assessment too</p>	<p>Stakeholders to review Underwater sound technical report alongside the Fish and shellfish technical report when reviewing the PEIR</p>	<p>Q2 2023</p>

	once their PEIR becomes public- this would be included in the final DCO application.		
8.	<p><u>Approach to Agreement (presented by KL)</u></p> <p>Revisited Evidence Plan template and remits, as presented on slide #47.</p> <p>The focus now is on the approach to agreement as part of the EPP remit and building towards the statement of common ground that will be submitted with or soon after the application for consent. When you read the PEIR we would appreciate it if you could think about agreement on the baseline and assessments, keeping in mind the agreements we are aiming for, for the application.</p> <p>If you do not agree with what is in the PEIR, please focus on what the Applicant can provide to get agreement. It is important to note that the HRA and EIA process are a step in the process to agree how the Applicant can build these projects with minimal impact to the environment. The Applicant is looking to get as much agreement as possible before the application submission and examination.</p>	<p>Stakeholders to consider, when reviewing the PEIR, agreement process for baseline and assessments, keeping in mind the agreements we are aiming for, for the final application.</p>	
9.	<p><u>Next steps</u></p> <p>Agreement log and minutes within 2 weeks.</p> <p>Review of PEIR by the EWG in April and May.</p> <p>Next EWGs in June/July.</p>		

B.5. Benthic ecology, Fish and shellfish and Physical processes EWG meeting 4

B.5.1 Meeting minutes

MINUTES OF MEETING



Security Classification: Project Internal

Partners in UK offshore wind

MOM Number : 20230711_Morgan and Mona BE, FSF, PP **REV. No.** : F02

MOM Subject : Morgan and Mona Evidence Plan BE, FSF, PP EWG meeting 4

MINUTES OF MEETING

MEETING DATE : 11/07/2023

MEETING LOCATION : Microsoft Teams

RECORDED BY : ██████████ (RPS)

ISSUED BY : ██████████ (RPS)

PERSONS PRESENT:

- ██████████ – bp (GV)
- ██████████ – bp (SR)
- ██████████ – bp (MP)
- ██████████ – bp (DH)
- ██████████ – RPS (KL)
- ██████████ – RPS (ST)
- ██████████ – RPS (AP)
- ██████████ – RPS (NS)
- ██████████ – RPS (LS)
- ██████████ – JNCC (JW)
- ██████████ – NE (KB)
- ██████████ – NE (EW)
- ██████████ – NRW (LR)
- ██████████ – NRW (JI)
- ██████████ – NRW (LVN)
- ██████████ – IoM (PD)
- ██████████ – TWT (GJC)
- ██████████ – TWT (BS)
- ██████████ – MMO (AP)
- ██████████ – Cefas (SB)
- ██████████ – Cefas (GE)

ITEM NO:	DISCUSSION ITEM:	Responsible party	Date
	<p><u>Project updates (presented by GV)</u></p> <p>Statutory consultation on the Mona and Morgan Generation PEIRs ended on 4th June. The Applicant appreciates all the feedback; we are currently reviewing all the responses and how they can be addressed. From the statutory consultation feedback and parallel activities, the Applicant has been considering a number of project updates. There are several updates to the project description envelope that are expected to be included in the application.</p> <p>The Applicant is looking to reduce the Mona Array Area and the Morgan Generation Array Area. They are expected to be reduced from what was</p>		

	<p>presented in PEIR and lie wholly within the array areas presented in the PEIR. The Mona Array Area is anticipated to be reduced by approximately 33% and lie wholly within Welsh offshore waters. The Morgan Array Area is anticipated to be reduced by approximately 10%. The primary driver for these reductions is shipping and navigation, specifically ensure safety of navigation. The need for changes for the project design envelope has been highlighted through engagement with a number of the ferry companies in the Irish Sea. The reductions have also been driven through consultation with aviation and other sea users receptors.</p> <p>The layout principles for both Mona and Morgan Generation are expected to be updated to increase the spacing requirements between offshore structures, the specific updates will be communicated in due course. These updates are to address concerns from commercial fisheries.</p> <p>The Applicant is anticipating that monopile foundations will be removed from the project design envelope. The foundation options remaining will be gravity base or jackets (which may be pin piled or suction bucket foundations). This is being driven by the ground conditions. The Applicant expect there to be a mixed foundation solution taken forward to the application, likely to be a mix of jacket and gravity base foundations.</p> <p>The smallest wind turbine option is being removed from the project design envelope due to feedback from the supply chain that this turbine option will not be available at the time of construction. The maximum rotor diameter will also increase from 280m to 320m and this is also based on feedback from the supply chain on the parameters for the wind turbines that will be available at the time of construction.</p> <p>The Applicant is also reviewing the parameters for the design envelope following the statutory consultation responses. Any updated parameters will be fully explained and justified within the application.</p> <p>The Applicant is also reviewing the cable protection and sandwave clearance parameters. We do not have final confirmation but we are expecting that neither cable protection nor sandwave clearance will be required within the Menai Strait and Conwy Bay SAC and Constable Bank. This will be reviewed and confirmed in time to be included in the application.</p>		
	<p><u>Section 42 responses- overarching (presented by KL)</u></p> <p>The Applicant and RPS have been working through all the S42 responses, looking to the project design envelope and the environmental assessment. There were a couple of key responses that we wanted to raise to the EWG.</p> <p>There were several requests for the project to undertake assessments for historic projects where quantitative information required to include them in the cumulative and in-combination assessments is not available. The cumulative and in-combination assessment can only be undertaken on publicly available data and it may not be appropriate to undertake analysis for other projects. There is also no precedent for that type of analysis – this was discussed at the Offshore Ornithology EWG last week.</p> <p>The IoM offshore windfarm is in the early stage of the planning process and we expect the scoping report to be published in the autumn. We will incorporate the information in the public domain into the cumulative and in-combination assessment for Mona and Morgan Generation, in line with the Tiered approach.</p>		

	<p>PD- Are the projects only considering projects in the public domain in the cumulative assessment?</p> <p>KL- We have based the assessment on publicly available information within the PEIR and we will do the same for the application. For example, for the IoM wind farm, we are expecting the scoping report to be published in the Autumn and we would therefore include it in the assessment. We will only be able to include the information included in the scoping report, we cannot make an assumption on what that project design may be. This is in line with the tiered approach which is set out in the Planning Inspectorate guidance.</p> <p>GV-The Applicant is consulting with Orsted on the IoM wind farm. Orsted are looking into whether they can provide the Applicant with early sight of information that will be in the scoping report.</p> <p>PD- Noted it is good to hear there are discussions ongoing with Orsted.</p> <p>KL noted there were a few comments on the site specific data available to be included in the PEIR. The benthic data for the Mona Offshore Cable Corridor and the zone of influence for the Mona and Morgan Array Areas will be presented in this EWG. For marine mammals and offshore ornithology, the 24months of survey data for Morgan Generation will be presented and discussed in the October EWG meetings for those topics.</p> <p>Natural England provided comments on the Morgan Generation and the Morgan and Morecambe Offshore Wind Farms: Transmission Assets (Transmission Assets) applications to ensure that a whole project assessment is undertaken.</p> <p>Are there specific topics or receptors that are of particular concern for the cumulative assessment for Morgan Generation and the Transmission Assets together? The Applicant is considering how human topic cumulative impacts are addressed and we have strategies for those impacts.</p> <p>For Morgan Generation, we will be undertaking a whole project assessment within the cumulative effects assessment (CEA). The Transmission Assets will be included within the CEA as a separate section so it clearly defines the impact of the Morgan Offshore Wind Project as a whole project.</p> <p>We can only base the CEA on information in the public domain. These projects are subject to separate consent applications so there will always be difficulty regarding what information is available at the time of application. However, that is why the tiered approach to CEA was developed and adopted and we feel the approach set out in the slides adequately addresses the concerns raised.</p> <p>We will circulate the slides after the meeting so you can review the approach to CEA in full. Please can the stakeholders provide their feedback in writing with the meeting minutes.</p>	<p>Stakeholders to provide their feedback on the approach to the CEA for Morgan Generation and whether there are specific topics or receptors that are of particular concern</p>	<p>Complete</p>
	<p><u>Benthic ecology Section 42 responses (presented by AP)</u></p> <p>Thank you for providing your responses to the PEIR. A number of comments were applicable to both Mona and Morgan Generation Assets. One comment was regarding difficulty to comment on the conclusions of</p>		

the PEIR without the 2022 survey data on the Mona Offshore Cable Corridor and zone of influence (ZOI) survey data. This data has now been analysed and is being included in the benthic technical report and chapter. We will send the EWG the updated benthic technical report for your review ahead of the final application.

S42 Response: The MMO identified inconsistencies in the reporting of the sediment contamination data. This will be corrected in the updated benthic technical report and chapter but, broadly, levels of contamination are low.

S42 Response: The MMO commented that the Particle size analysis (PSA) was not undertaken by an accredited laboratory. We have investigated this and the PSA was undertaken by Ocean Ecology who are an MMO accredited laboratory.

S42 Response: The MMO suggested a separate sediment and water quality chapter. We have reviewed this and think that we can address this through improving the sign posting of where information is included across the chapters already included so a separate sediment and water quality chapter will not be included with the applications.

S42 Response: The JNCC requested that the removal of scour and cable protection was assessed. The project position is that best practice for decommissioning will be followed and scour and cable protection may not be removed however the benthic ecology chapter will be updated to assess the decommissioning of cable and scour protection.

S42 Response: There were several comments regarding the requirements for monitoring. The assessment is being updated to take into account the updated project description. The requirement for monitoring will then be re-assessed.

S42 Response: NRW had concern over impacts to the peat and clay habitat with piddocks. We are looking at the project design with the engineers to reduce the impact on these habitats. However the Mona landfall is heavily constrained with the *Sabellaria* reef to the west and the Traeth Pensarn SSSI to the east. Further consideration is being given to horizontal directional drilling (HDD).

S42 Response: NRW commented that the Dee Estuary SAC was screened into the ISAA but was not included in the EIA assessment. For the application, we are proposing to screen out the Dee Estuary SAC from the ISAA on the basis of the physical processes modelling and that there is no pathway to impact for this SAC.

LVN- It would be good to see more information on the methodology for the open cut trenching option. It was not clear in the PEIR how the trench was going to be infilled. It would be good if more detail could be added to clarify the worst case.

AP- Noted, this can be included in the project description and relevant detail added to the benthic chapter.

Fish and shellfish S42 responses (presented by LS)

S42 Response: There were several responses to the PEIR to request more up to date data sources for baseline characterisation. This will be considered for the application and we will include more detail on the Irish

	<p>Sea Ground fish data. The 2022 Mona offshore cable corridor and zone of influence site specific data will also be included.</p> <p>S42 Response: There was a request from the MMO to present herring and sandeel substrate suitability assessment to include heat maps following the MarineSpace methodology (Reach <i>et al.</i>, 2013¹; Latto <i>et al.</i>, 2013²). RPS's key concern with this approach is that it may downplay the importance of the Isle of Man herring spawning ground due to the low larval counts compared to those seen in the North Sea for which the MarineSpace tool was developed. We will present the sediment data as 'preferred' and 'marginal' habitat alongside the folk classification.</p> <p>S42 Response: The MMO highlighted that quantifying impacts to spawning grounds based upon percentage overlap is not recommended. We agree with that recommendation based upon spawning ground boundaries not being defined "limits" of spawning activity. This comment will be carried forwards into the application. (see Post-meeting note on page 8)</p> <p>S42 Response: The Applicant also received some general comments on the definition of Important Ecological Features, magnitude and sensitivity. These will all be reconsidered for the application to ensure we are using an appropriate approach.</p> <p>S42 Response: There were other comments requesting further information on the effect ranges for concurrent piling. We propose to present noise contours for concurrent piling to support the assessment.</p> <p>KL- This was particularly in relation to the cumulative SEL TTS thresholds and ranges associated with these.</p> <p>GE- All the comments and discussion from the meeting with the MMO and Cefas on their initial PEIR feedback regarding feedback on the MarineSpace approach to heatmapping should be considered. It was noted that the MarineSpace approach is not ideal for numbers in the Irish Sea, where abundances were much lower. The Applicant should look at adapting this approach where possible. It would be useful to look at the NIHLS larval data as a 10-year dataset and to provide contour mapping based on this, which may highlight some particular "hot spots". In addition, using additional sources to support the substrate classification such as Cefas' OneBenthic tool to extract more PSA data from the region (where available) to provide characterisation beyond the surveyed areas.</p> <p>LS – this is something we can look into for inclusion within the Environmental Statement where appropriate.</p> <p>KL-There were also comments on how the grab sample data is presented. We have been asked to presented it as an appendix of the herring and sandeel sediment suitability classification alongside the folk classification.</p> <p>LS – This is something we can include. Benthic ecology will also be including the PSA data, but perhaps we can present the relevant data with the substrate classification for sandeel and herring to allow easy interrogation by stakeholders.</p>	<p>EWG to confirm approach to assessment of underwater sound for fish and shellfish</p>	<p>Complete</p>
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¹ Reach, I. S., Latto, P., Alexander, D., Armstrong, S., Backstrom, J., Beagley, E., Murphy, K., Piper, R. and Seiderer, L. J., 2013. Screening Spatial Interactions between Marine Aggregate Application Areas and Atlantic Herring Potential Spawning Areas. A Method Statement produced for BMAPA. 40pp.

² Latto, P. L., Reach, I.S., Alexander, D., Armstrong, S., Backstrom, J., Beagley, E., Murphy, K., Piper, R. and Seiderer, L. J., 2013. Screening Spatial Interactions between Marine Aggregate Application Areas and Sandeel Habitat. A Method Statement produced for BMAPA. 40pp.

	<p>LS- The MMO and NRW have provided differing advice on the preferred approach to underwater sound thresholds for the fish and shellfish assessment. The MMO have recommended the 135dB SELss threshold as per Hawkins <i>et al.</i>, (2014) for herring. NRW preference is to present SELcum/TTS. As mentioned in previous EWG meetings, SELss is not considered an appropriate metric on its own, given the lack of comparable data available, meaning reliance on a single source, and for herring, the Hawkins <i>et al.</i>, (2014) study itself not being considered applicable outside of acoustically quiet environments. Hawkins and Popper’s 2014 review of the Hawkins <i>et al.</i>, (2014) study also highlighted that 135dB SELss is not considered appropriate for use as a behavioural response threshold.</p> <p>We propose to present the information re. the 135dB SELss (with heavy caveats as per the author’s own recommendation), alongside the larger pool of evidence using SELcum (TTS) and SPLpk to ensure consideration of a range of sources.</p> <p>Other projects, such as Awel y Mor, used a combination of TTS (SELcum) and SPLpk to undertake a robust assessment of UWN impacts to herring. We have also considered SELss, and given the uncertainties with regards to general UWN modelling and thresholds, consider that reference to multiple sources is the best approach, with the actual effects being somewhere in-between these modelled values.</p> <p>Please can the EWG confirm this approach is acceptable.</p> <p>KL- We have taken a precautionary approach for the underwater sound modelling, in reality the worst case scenario modelled (i.e. maximum hammer energy) will not occur throughout the full duration of the construction period. A combination of thresholds and metrics for static and mobile receptors will be looked at including SPLpk, TTS (SELcum) and SELss. But need to acknowledge that the noise contours (with conservatism built into them) are only part of the assessment; consideration should also be based on the duration of piling operations, the temporary nature of the impact and the monitoring data available for key fish species (e.g. monitoring for cod spawning undertaken at Beatrice wind farm³).</p> <p>SB- Cefas do not have an underwater advisor present at this meeting, but we will take this away and feedback.</p> <p>LR- NRW do not have a fish specialist on the call but we will also take this away and feedback. Following initial feedback from our fish specialist, NRW (A) recognise that there is a lack of good evidence for behavioural impacts on noise and there are no threshold values for different groups of fish. We welcome the intention to include the 135 SELss in addition to presenting the SELcum/TTS. NRW (A) will base our advice on the use of TTS SELCum, but recognise that this is a threshold for physiological effects, so it should be acknowledged that the behavioural effects are likely to be larger.</p> <p>GE: Cefas recognise the limitations of the Hawkins <i>et al.</i>, (2014) study, and presenting the SELcum information for behavioural responses with the caveats mentioned is reasonable. It needs to be recognised that TTS is a physiological response not a behavioural response to noise. Also, even if monopiles are being removed from the project description for the Mona</p>	<p>EWG to confirm if the use of a combination of TTS (SELcum) and SPLpk to undertake a robust assessment of UWN impacts to herring</p>	<p>Complete</p>
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³ BOWL (2021b) Beatrice Offshore Wind Farm Post-Construction Cod Spawning Survey – Technical Report. Available at: https://marine.gov.scot/sites/default/files/bowl_-_post-construction_cod_spawning_survey_-_technical_report_redacted.pdf.

<p>and Morgan Generation, the pin piles remaining in the project description need to be assessed cumulatively with monopiles from other projects.</p> <p>RF: It is recognised that this is a conservative approach.</p> <p>S42 Response: Feedback was received to indicate that based on the underwater noise modelling outputs, cumulative effects of underwater noise through piling are expected to be significant for herring and cod.</p> <p>Considering the design changes previously discussed (particularly removal of the monopile option), we do not anticipate a significant cumulative effect, however the noise modelling is being re-run based upon the new design parameters, and the data will be fully assessed to determine any potential significant effects. Measures will be considered where necessary to mitigate, and there will be further consideration of requirements as part of the final application in line with Defra workstreams.</p> <p>S42 Response: The Applicant also received feedback requesting that noise abatement is considered for the application. Further consideration of requirements as part of the final application will be in line with Defra workstreams. KL noted that although these are being developed largely for marine mammals, fish would also benefit from noise abatement technologies which reduce noise levels at source.</p> <p>S42 Response: NRW suggested that the assessment for underwater sound should not be based on soft starts or ramp ups. Regardless of the benefits of soft start and ramp ups, these measures will be part of the construction schedule therefore assessing impacts without these measures is not a realistic scenario. With implementation of these measures the noise level entering the marine environment from the baseline will be considerably lower than going straight into “full-power” piling and a gradual build-up of sound is likely to prevent sudden trauma. For some fish and shellfish species these measures will be of benefit (and individuals may “flee”), whereas others may not move away; the reality is likely somewhere in the middle of the information presented regarding the two extremes for static and fleeing receptors. Fish and shellfish is such a broad group of organisms that it is impossible to assign a one-size-fits-all approach to mitigation and responses, and as such we consider it appropriate to present data for both static and fleeing receptors.</p> <p>GE: Cefas agree that modelling including soft starts and ramp ups is fairly standard and agree that this approach is acceptable.</p> <p>LR: NRW will take this offline and feedback.</p> <p>S42 Response: There was a response recommending piling restrictions for Mona and Morgan Generation for herring and cod spawning. Given the changes in the project design, the underwater sound modelling will be updated for the Environmental Statement. Given the increased distance of the Mona Array Area from Isle of Man herring spawning area, we predict that the impact from pile driving at the Mona Array Area will be minor.</p> <p>Initially we are looking for agreement from the MMO and NRW on sensitivity classification for cod to underwater sound. The MMO suggested that cod should be high sensitivity but NRW agreed with the current classification of medium sensitivity. Given the demonstrated recoverability of cod (i.e. from Beatrice³), and the extensive scale of the mapped spawning grounds, despite the increased sensitivity to UWN of cod when compared to other species (except group 4 fish), the sensitivity is</p>	<p>NRW to feedback regarding justification for basing assessment on soft starts and ramp up procedures</p>	<p>Complete</p>
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	<p>considered medium.GE – Cefas maintain that cod should be classed as high sensitivity to underwater sound. Further, recommendations for piling restrictions will be made if considered necessary based upon the information presented within the Environmental Statement.</p> <p>LR- NRW (A) agree with the MMO that cod should be considered as having high sensitivity to noise. We base this on the extensive cod spawning grounds in Liverpool Bay, the use of cod vocalisation in courtship display and cod stocks being low in the Irish Sea.</p> <p>KL- Sensitivity to noise for behavioural responses has been considered as medium as there is sufficient evidence from monitoring data, such as Beatrice offshore wind farm³, that following piling, cod spawning does still occur. Recoverability is a key element to sensitivity.</p> <p>Post-meeting note:</p> <p><u>Heat mapping</u></p> <p>The Applicant proposes the following approach to the characterisation of herring spawning potential, based on a modification of the heat-mapping approach outlined by Reach <i>et al.</i> (2013)¹:</p> <ul style="list-style-type: none"> • Presentation of 10 years of annual herring larval data as “bubble” plots, with one map per year, displayed with Coull <i>et al.</i> (1998)⁴ high and low intensity herring spawning ground polygons. • Presentation of aggregated 10-year herring larval data as a contour plot, displayed with Coull <i>et al.</i> (1998)⁴ high and low intensity herring spawning ground polygons. • Presentation of site-specific survey PSA data; each sampling point will be classified as preferred/marginal/unsuitable based upon the proportions of fines, sands and gravels. Data points will be displayed with EMODnet⁵ Folk Classification⁶ polygons for preferred and marginal substrates for herring spawning and Coull <i>et al.</i> (1998)⁴ high and low intensity herring spawning ground polygons. • Presentation of site-specific survey PSA data alongside regional PSA data extracted from the Cefas OneBenthic tool⁷; each sampling point will be classified as preferred/marginal/unsuitable based upon the proportions of fines, sands and gravels. Data points will be displayed with EMODnet⁵ Folk Classification⁶ polygons for preferred and marginal substrates for herring spawning and Coull <i>et al.</i> (1998)⁴ high and low intensity herring spawning ground polygons. <p>The Applicant proposes the following approach to the characterisation of sandeel, based on a modification of the heat-mapping approach outlined by Latto <i>et al.</i> (2013)²:</p>	<p>EWG to confirm acceptance of this proposed approach for characterisation of herring spawning potential</p> <p>EWG to confirm acceptance of this proposed approach</p>	<p>Complete</p>
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⁴ Coull, K.A., Johnstone, R, and Rogers, S.I. (1998) Fisheries Sensitivity Maps in British Waters. UKOOA Ltd: Aberdeen.

⁵ European Marine Observation and Data Network (EMODnet) (2023) Seabed habitats. Available: <http://www.emodnet-seabedhabitats.eu/>.

⁶ Folk, R.L. (1954) The distinction between grain size and mineral composition in sedimentary rock nomenclature, *Jour. Geology*, 62, 344–359.

⁷ <https://opencscience.cefas.co.uk/obdash/>

	<ul style="list-style-type: none"> • Presentation of site-specific survey PSA data; each sampling point will be classified as preferred/marginal/unsuitable based upon the proportions of fines, sands and gravels. Data points will be displayed with EMODnet⁵ Folk Classification⁶ polygons for preferred and marginal substrates for sandeel spawning and mapped high and low intensity sandeel spawning and nursery grounds from Ellis <i>et al.</i> (2012)⁸. • Presentation of site-specific survey PSA data alongside regional PSA data extracted from the Cefas OneBenthic tool⁷; each sampling point will be classified as preferred/marginal/unsuitable based upon the proportions of fines, sands and gravels. Data points will be displayed with EMODnet⁵ Folk Classification⁶ polygons for preferred and marginal substrates for sandeel spawning and mapped high and low intensity sandeel spawning and nursery grounds from Ellis <i>et al.</i> (2012)⁸. 	for characterisation of potential sandeel habitation and spawning	Complete
	<p><u>Physical processes-Section 42 comments (presented by NS)</u></p> <p>We will be taking on board general comments regarding the presentation of results to make it easier to interpret the results e.g. adding scale bars to the figures and overlaying receptors.</p> <p>More work is being undertaken to refine the project design. The modelling and assessment for the PEIR used a realistic pragmatic approach. We will be revisiting all the assessments and assumptions being made for the final application in view of a more comprehensive project description and refined PDE.</p> <p>S42 Response: One of the comments received was regarding cable exposure in the intertidal area. The assessment is based on the project design so this will be updated as the project design is refined. Similarly, for cable exposure with regards to sandwave migration, engineers are reviewing parameters with respect to cable routes and geophysical survey data.</p> <p>The Applicant has a commitment to minimise cable protection. Cable protection will only be placed on the seabed where trenching depths cannot be achieved. The modelling was undertaken for a realistic worst case scenario of a continuous length of cable protection in a location that was perpendicular to the prevailing current and where less favourable ground conditions were indicated (moraine deposits). We will check the modelling against the updated project design to ensure the modelling assumptions are still valid.</p> <p>S42 Response: There were several comments regarding sandwave clearance. By way of clarification, the project is not proposing to infill the troughs between sandwaves but side-cast material which ensures sediment supply is available for sandwave reformation and sufficient burial depth is achieved within the troughs and cables are not readily exposed on reformation. Within the context of the suspended sediment modelling, the maximum parameters in terms of width, depth and length have been used assuming that whole volume would be mobilised rather than a typical sandwave clearance volume. Engineering design currently underway will determine more detail in which areas and volumes clearance may be</p>		

⁸ Ellis, J.R., Milligan, S.P., Readdy, L., Taylor, N. and Brown, M.J. (2012) Spawning and nursery grounds of selected fish species in UK waters. Scientific Series Technical Report. Cefas Lowestoft, 147: 56 pp.

	<p>required based on engineering constraints, ground conditions and seabed morphology. It is anticipated that current scoping principles will endure. However, it is noted that if this is not the case further assessment may be required; a sandwave migration/reformation study may only be undertaken when the location is identified as these characteristics are site specific and event driven. Stakeholders also kindly provided advice on approaches to assessment and potential mitigation should this be required following more detailed design assessment.</p> <p>KL- We are working with the Rochdale envelope approach as there needs to be some flexibility. The modelling is still very conservative however it needs to represent a realistic scenario.</p> <p>LR- NRW will take this away and provide comments.</p> <p>The project has a commitment to provide scour protection. There is a recognition that this may lead to secondary scour however the detailed, site specific, provision of these measures will be, by definition, designed to minimise this. Assessment of secondary scour was, by agreement, scoped out however we have received comments to the contrary. This is likely to relate to the lack of detail in placement of material and there was no commitment to not place cable protection in sensitive areas such as on Constable Bank in PEIR. If the project can commit to no cable protection on Constable Bank and in the SAC then we consider that this can still be scoped out and dealt with in the context of detailed design.</p> <p>S42 Response: Other issues included provision of information on the fate of HDD drilling muds for benthic assessments. It was noted that intertidal trenching modelling has been included in the PEIR and, as these areas comprise silt fractions, model data can therefore be used to indicate the dispersion of drilling mud.</p> <p>Provisional assessment of the PSA data has indicated that the modelling assumptions with regards to sediment grading remain valid. This was anticipated as data was available from a range of sources to support the modelling, such as BGS.</p> <p>Within the application further information will be provided to demonstrate the rationale for modelled scenarios, such as the selection of meteorological conditions, tide only simulations and concurrent drilling of piles.</p>	<p>NRW to provide feedback on approach to the physical processes for the application</p>	<p>Complete</p>
	<p><u>Benthic ecology updated baseline (presented by AP)</u></p> <p>We should be able to provide an updated benthic ecology technical report which contains the data analysis of the Mona offshore cable corridor and the Mona array area zone of influence in advance of the application. We will be in touch on how and when we will be providing this.</p> <p>Further offshore environmental surveys were undertaken in summer 2022. They covered the Mona and Morgan Array Area ZOI and the Mona offshore cable corridor. Grab sample and drop down video were used and the sample strategy was agreed with the SNCBs ahead of the survey. The 2022 subtidal surveys also resurveyed 5 sample stations in the Mona Array Area and 6 sample stations in the Morgan Array Area. Of the 2022 sample stations, 43 were analysed for sediment chemistry. The 2022 survey data will analysed with the 2021 survey data for the array area ZOIs. The Mona offshore cable corridor has been analysed as a separate data set but will be</p>		

presented in the same technical report. The analysis has been undertaken in PRIMER as per PEIR.

An additional survey at the Mona landfall was also undertaken in 2023 to cover the gap in coverage from the 2022 intertidal survey due to the change in shape of the landfall and also to revisit the extent of the *Sabellaria* reef.

The results presented below are preliminary outputs. We are fairly confident in these results but they may change through the review process.

Mona Array Area ZOI

The sediments in the Mona array area ranged from muddy sandy gravel to muddy sand. The results of the biotope classification were overlaid on the EMODnet 2019 data map to provide further context for the biotopes. In the north west of the Mona ZOI the mixed sediments are characterised by a variety of polychaetes such as *Syllis armillaris*, *Pholoe inornate* and *Lysidice unicornis* which has led to the SS.SMx.OMx.PoVen (hereafter PoVen) biotope being assigned. Where the community is a bit broader the circalittoral mixed sediment biotope has been assigned.

All metals were below the Cefas Action Level 1 (AL1) and Action Level 2 (AL2) except cadmium which exceeded AL1 at a single station (but was below AL2). Arsenic exceeded the Canadian Threshold Effect Level (TEL) at all stations but was below the PEL and Cefas ALs. Concentrations of PCBs and PAHs were below all relevant thresholds. Organotins were below the limit of detection at all stations.

In the south west the sediment continues to be mixed but contains a larger echinoderm component, specifically the communities were dominated by *Ophiothrix fragilis*, with each sample station assigned the OphMx biotope. This biotope also occurred in the south east of the Mona ZOI.

The east of the Mona ZOI had a greater variety of sediments. The sediments in the east of the Mona array area are predominantly coarse with broad communities. The PoVen biotope is also present in the east at the boundary between sediment types. One station in the south east of the ZOI was characterised by an abundance of sand and fine sediment and was subsequently assigned the circalittoral fine sand biotope.

Mona Offshore Cable Corridor

In the Mona offshore cable corridor the majority of sediment samples are classified as gravelly muddy sand and sand (both 26%). Sediments in the section of the Mona Offshore Cable Corridor closest to the Mona Array Area were predominantly gravelly muddy sand. Sample stations in the centre of the Mona Offshore Cable Corridor were typically coarser including stations which were classified as gravel as well as sandy gravel. The stations closest to the landfall location were mostly sand with the shallowest station being slightly gravelly sand.

All metals were below the AL1 and AL2 except arsenic which was above the AL1 and Canadian TEL at three stations (but below the AL2 and PEL). Concentrations of PCBs and PAHs were below all relevant thresholds. Organotins were below the limit of detection at all stations.

A variety of biotopes have been preliminarily assigned in the Mona Offshore Cable Corridor.

<p>In the north, adjoining the Mona Array Area and ZOI the community was dominated by polychaetes and bivalves leading to the assignment of the PoVen biotope which extended across a significant portion of the north of the Offshore Cable Corridor.</p> <p>The sediment becomes dominated by sand as the cable moves further south towards the coast, although still mixed in places. Broad sand, coarse and mixed sediment based biotopes have been identified at different locations along the Mona Offshore Cable Corridor however in the southern half of the cable corridor the communities become more distinct and are influenced more by bedforms. Three distinct communities can be identified, in turquoise is the SS.SSa.IFiSa.NcirBat characterised as a mix of sand, muddy sand and coarse sediment and taxa were dominated by polychaetes as well as some key crustacea such as <i>Bathyporeia guilliamsoniana</i>. The biotope SS.SMx.CMx.KurThyMx was assigned due to the presence of the characterising species such as <i>Kurtiella bidentata</i>. Closest to the coast the communities were characterised by sand and mud as well as the characteristic fauna <i>Fabulina fabula</i> and <i>Magelona johnstoni</i> which has led to the assigning of the SS.SSa.IMuSa.FfabMag biotope.</p> <p>Habitat assessments were conducted where potentially fragile or protected habitats were identified. All stations within the Mona Offshore Cable Corridor were classified overall as having no resemblance to stony reef. All stations within the Mona Offshore Cable Corridor were classified overall as having no resemblance to Fragile Sponge and Anthozoan Communities on Subtidal Rocky Habitats.</p> <p>On the basis of the desktop data included in the PEIR, Annex I sandbanks and reefs were the only Annex I habitats that had the potential to occur within the section of the Mona Offshore Cable Corridor that overlaps with the Menai Strait and Conwy Bay SAC. However, the surveys have shown that no Annex I habitats were recorded within the section of the Mona Offshore Cable Corridor that overlaps with the Menai Strait and Conwy Bay SAC. We are confident that there will be no direct impact on any feature of the SAC and that indirect impacts (e.g. increases in SSC) will not result in a significant effect on any feature. Therefore there will be no adverse effect on the integrity of the site.</p> <p>KL- We are hopeful we can avoid cable protection within the SAC, although if the project is not able to completely rule out cable protection in the SAC, we consider that there will be no adverse effect on the integrity of the site as there are no direct impacts on the SAC features. We would like to confirm if the stakeholders agree to confirm that we do not need to develop a without prejudice compensation case.</p> <p>LVN- That is good news that there will be no direct impacts to the SAC features. We agree that if no Annex I habitats are directly or indirectly affected then there would be no adverse effect on integrity. We would however like to review the latest data before the application submission.</p> <p>KL- The updated benthic technical report will come out to the EWG to review ahead of the application. Comment is noted regarding indirect effects on designated features; the final application will have further justification, where required, on indirect effects.</p> <p><u>Mona 2023 intertidal survey</u></p>	<p>SNCBs to feedback on whether they agree there will be no adverse effect on the integrity of the Menai Straights and Conwy Bay SAC and therefore a without prejudice compensation case is not required.</p>	<p>Complete</p>
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The Mona 2023 intertidal survey comprised a Phase 1 walk over of the area within the site which had not been surveyed in 2022 as well as revisiting some of the other key habitats. The survey identified no new biotopes at the Mona landfall, instead this section connected biotopes which had already been identified.

The survey area contained barren littoral shingle (LS.LCS.Sh.BarSh) in the upper shore. The mid-shore contained the *Macoma balthica* and *Arenicola marina* in littoral muddy sand biotope (LS.LSa.MuSa.MacAre) which became a mosaic of the LS.LSa.MuSa.MacAre and the *Lanice conchilega* in littoral sand biotope (LS.LSa.MuSa.Lan) in the lower shore.

In the survey area two pipes were also identified on the upper shore.

The intertidal survey re-mapped the extent of the *Sabellaria alveolata* reef to see if the extent has changed following the survey the previous year. The extent of the reef has not changed significantly between years although some degradation to the eastern edge was noted.

Bacterial sampling for *E.coli* was also conducted, as requested by NRW, in the west of the site at nine stations over two transects (each sampling the upper, middle and lower shore) with a focus on any fine sediments which are more likely to hold on to contamination. Levels of *E.coli* were below the limit of detection (LOD) of the analyses used (i.e. <10 cfu/g) in all samples.

Morgan Array Area ZOI

Across the Morgan ZOI sediments ranged from muddy sandy gravel to gravelly muddy sand. Sand was the main component of 86% of samples in the Morgan ZOI.

The sediment composition illustrates a similar trend to what was observed in the array area with samples in the south west of the ZOI being much more mixed with a higher proportion of gravel whereas sediments in the north east contained a higher proportion of fine sediment but did not contain any gravel.

All metals were below the AL1 and AL2 except arsenic which was above the AL1 at two stations and exceeded TEL at 8 stations (but was below AL2 and PEL). Concentrations of PCBs and PAHs were below all relevant thresholds. Organotins were below the limit of detection at all stations.

The Morgan subtidal survey in the ZOI identified a variety of biotopes many of which connect with what was previously identified in the Array Area.

In the south and west of the ZOI the PoVen biotope was dominant due to the variety of polychaetes identified in the samples in this area such as *Scoloplos armiger*, *Scalibregma inflatum* and *Pholoe inornate* as well as bivalves like *Kurtiella bidentata* and *Mediomastus fragilis*. Also in the south east of the Morgan ZOI was a site with high abundance of *Ophiothrix fragilis*, therefore this sample station was assigned the SS.SMx.CMx.OphMx biotope.

In the north of the Morgan ZOI the sediments were dominated by sand and faunally characterised by a greater number of echinoderms such as *Echinocyamus pusillus* as well as the bivalve *Abra* leading to the assigning of the SS.SSa.CFiSa.EpusOborApri biotope.

	<p>In the east of the ZOI the seabed has a greater proportion of fine sediment. Some of the samples in this area exhibited a broad community which couldn't be defined beyond the SS.SMu.CSaMu biotope. Others however could be characterised by the species <i>Kurtiella bidentata</i> and <i>Amphiura filiformis</i> which has led these samples to be allocated the biotope SS.SMu.CSaMu.AfilKurAnit.</p> <p>Two habitat assessments were undertaken for the Morgan array area ZOI. No sample stations were found to resemble the Sea Pen and Burrowing Megafauna Communities. No sample stations were found to resemble the Fragile Sponge and Anthozoan Communities on Subtidal Rocky Habitats. There was also no evidence of any potential stony reef.</p>		
	<p><u>Fish and shellfish updated baseline (presented by LS)</u></p> <p>Some of the comments within the S42 responses reflected some omissions or some areas which needed a bit more baseline context, therefore further information sources will be used to update the current baseline characterisation within the Environmental Statement. These include PSA and visual observations (where applicable) from the 2022 survey and more detailed review of the Northern Irish/Irish Sea Groundfish Survey data to provide more present-day context for the historic fish and shellfish surveys referred to demonstrate continued applicability in supporting baseline characterisation. More information will also be drawn from the Bangor University/AFBI scallop stock assessment, and some recent publications by Bangor University regarding shellfish maturity and stocks.</p> <p>Heat Mapping: The substrate classification criteria from the MarineSpace methods is applied to all PSA data collected from site-specific benthic surveys, and is interpreted alongside other data sources, e.g. mapped spawning grounds, herring larval data, and broadscale EMODnet substrates. Using heat maps, the importance of the loM herring spawning ground may be reduced, due to very low larval counts. Therefore, this data is not considered conducive to heat mapping (see discussed earlier in the EWG meeting).</p> <p>No site-specific information is available overlapping the area of mapped loM herring spawning grounds, therefore we would be reliant on the information presented already, based upon broadscale datasets/NINEL herring larval data and are unlikely to be able to increase the resolution of potential spawning grounds through this process. Site specific data collected within the array and along the export cable reflects the presence of patchy sediments, in line with expectations for the area. Discrete variances are unlikely to be represented well with heat mapping.</p> <p>For sandeel and herring, we present the EMODnet broadscale seabed substrates with both the mapped spawning grounds from Ellis <i>et al.</i>, 2012 and Coull <i>et al.</i>, respectively, and the site specific data (now shown as preferred, marginal, unsuitable to support collective interpretation (latest charts are shown on the next couple of slides (slides 38 and 39))). The inclusion of multi-year larval data on the herring spawning suitability chart will not particularly add to the interpretation, as the points are generally consistent with the mapped spawning grounds, and will complicate the image, given the number of sampling points presented from the site specific survey.</p>		

	<p>We consider that the information, whilst not presented as a heat map, is adequately interpreted to provide a robust characterisation of the suitability for herring spawning and sandeel habitation/spawning.</p> <p>As discussed previously, we will look at using aggregated 10-year herring larval data and contour mapping to seek to highlight potential herring spawning “hot-spots” within the Isle of Man herring spawning ground, and will also integrate PSA data from the OneBenthic tool into our substrate suitability assessment where applicable.</p> <p>LR- NRW agree that the spawning heat maps are not required.</p> <p>The updated sandeel and herring substrate suitability maps are presented, including the 2022 survey data for the Array Zone of Influences (ZoIs) and the Mona Export Cable Corridor. The Array and ZOI data was variable for sandeel with areas of preferred, marginal and unsuitable substrates. The Mona Export Cable Corridor showed largely preferred substrates for sandeel with unsuitable substrates encountered at the northern and southern limits of the route.</p> <p>For herring, the Array areas, ZOI and export cable corridor were largely unsuitable, with occasional occurrences of marginal and preferred substrate. For both herring and sandeel this highlighted the variable nature of the <i>in-situ</i> sediments, when compared to the broadscale substrate classifications. With areas considered marginal or preferred in the broadscale substrate classifications, revealed to be unsuitable at a finer scale.</p>		
	<p><u>Agreement logs (presented by KL)</u></p> <p>The latest agreement logs were circulated in May and it would be useful if stakeholders could review their positions within those agreement logs and update them now the PEIR has been reviewed. Parallel to that the Applicant and RPS is working through the statutory consultation responses and looking at where we consider agreement has been reached. If stakeholders can provide feedback on agreement logs to date and then following the EWGs, we will circulate the meeting minutes two weeks after the meeting but the agreement logs may be a week or so behind that to incorporate the statutory consultation feedback.</p>	<p>Stakeholders to provide updated EWG agreement logs to reflect the information provided in the PEIR.</p>	<p>Complete</p>
	<p><u>Next Steps (presented by KL)</u></p> <p>KL noted that meeting minutes are to be circulated 2 weeks following the meeting, with agreement logs circulated after the meeting minutes.</p> <p>Next EWG meeting planned for October 2023.</p>		

B.5.2 Response from Natural England regarding the meeting minutes

Date: 11 August 2023
Our ref: DAS/UDS A009203 444374
Your ref: Morgan and Mona BE, FSF, PP EWG04 11th July 2023



[REDACTED]
RPS/ Energy
Goldvale House
27-41 Church Street West
Woking
Surrey
GU21 6DH

Hornbeam House
Crewe Business Park
Electra Way
Crewe
Cheshire
CW1 6GJ

0300 060 3900

cc [REDACTED]
RPS

BY EMAIL ONLY

Dear [REDACTED]

Discretionary Advice Service (Charged Advice): UDS A009203

Development proposal: Morgan Generation and Mona Offshore Windfarm

Consultation: Morgan and Mona BE, FSF, PP EWG04

This advice is being provided as part of Natural England's Discretionary Advice Service (DAS) in accordance with the Quotation and Agreement dated 23rd May 2023 to Morgan Offshore Wind Limited & Mona Offshore Wind Limited.

The following advice forms Natural England's response to the meeting minutes provided for the Morgan and Mona BE, FSF, PP EWG04 attended by Natural England on 11th July 2023.

Natural England were asked to provide feedback on the following points:

- EWG to confirm approach to assessment of underwater sound for fish and shellfish
- EWG to confirm if the use of a combination of TTS (SELcum) and SPLpk to undertake a robust assessment of UWN impacts to herring
- EWG to confirm acceptance of this proposed approach for characterisation of herring spawning potential
- EWG to confirm acceptance of this proposed approach for characterisation of potential sandeel habitation and spawning

Detailed comments

Approach to assessment of underwater sound for fish and shellfish

Natural England broadly agrees with the approach for the assessment of underwater sound for fish and shellfish.

Assessment of underwater noise impacts to herring

Natural England acknowledges that the applicant intends to present 135dB SELss alongside the

SELcum (TTS) and SPLpk to undertake a robust assessment of UWN impacts to herring. NE encourages this approach as it ensures consideration of a range of sources.

Characterisation of herring spawning potential



Natural England broadly agrees with the approach for characterisation of herring spawning potential.

Characterisation of potential sandeel habitation and spawning

Natural England broadly agrees with the approach for characterisation of potential sandeel habitation and spawning.

For clarification of any points in this letter, please contact me using the details provided below.

Yours sincerely,


Marine and Coastal Lead Adviser
Coast and Marine Team
Cheshire to Lancashire Area Team


The advice provided in this letter has been through Natural England's Quality Assurance process

The advice provided within the Discretionary Advice Service is the professional advice of the Natural England adviser named below. It is the best advice that can be given based on the information provided so far. Its quality and detail is dependent upon the quality and depth of the information which has been provided. It does not constitute a statutory response or decision, which will be made by Natural England acting corporately in its role as statutory consultee to the competent authority after an application has been submitted. The advice given is therefore not binding in any way and is provided without prejudice to the consideration of any statutory consultation response or decision which may be made by Natural England in due course. The final judgement on any proposals by Natural England is reserved until an application is made and will be made on the information then available, including any modifications to the proposal made after receipt of discretionary advice. All pre-application advice is subject to review and revision in the light of changes in relevant considerations, including changes in relation to the facts, scientific knowledge/evidence, policy, guidance or law. Natural England will not accept any liability for the accuracy, adequacy or completeness of, nor will any express or implied warranty be given for, the advice. This exclusion does not extend to any fraudulent misrepresentation made by or on behalf of Natural England.

Cc commercialservices@naturalengland.org.uk

Annex 1

European Protected Species

A licence is required in order to carry out any works that involve certain activities such as capturing the animals, disturbance, or damaging or destroying their resting or breeding places. Note that damage or destruction of a breeding site or resting place is an absolute offence and unless the offences can be avoided (e.g. by timing the works appropriately), it should be licensed. In the first instance it is for the developer to decide whether a species licence will be needed. The developer may need to engage specialist advice in making this decision. A licence may be needed to carry out mitigation work as well as for impacts directly connected with a development. Further information can be found in Natural England's ['How to get a licence'](#) publication.

If the application requires planning permission, it is for the local planning authority to consider whether the permission would offend against Article 12(1) of the Habitats Directive, and if so, whether the application would be likely to receive a licence. This should be based on the advice Natural England provides at formal consultation on the likely impacts on favourable conservation status and Natural England's [guidance](#) on how the three tests (no alternative solutions, imperative reasons of overriding public interest and maintenance of favourable conservation status) are applied when considering licence applications.

Natural England's pre-submission Screening Service can screen application drafts prior to formal submission, whether or not the relevant planning permission is already in place. Screening will help applicants by making an assessment of whether the draft application is likely to meet licensing requirements, and, if necessary, provide specific guidance on how to address any shortfalls. The advice should help developers and ecological consultants to better manage the risks or costs they may face in having to wait until the formal submission stage after planning permission is secured, or in responding to requests for further information following an initial formal application.

The service will be available for new applications, resubmissions or modifications – depending on customer requirements. More information can be found on [Natural England's website](#).

B.5.3 Mona and Morgan Generation Offshore Wind Projects Physical Processes Environmental Statement Modelling Strategy

MONA AND MORGAN GENERATION OFFSHORE WIND PROJECT

Physical Processes Environmental Statement Modelling Strategy

August 2023

F01



Image of an offshore wind farm

MONA AND MORGAN GENERATION OFFSHORE WIND PROJECT

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
F01	Version for EWG	RPS	bpEnBW	bpEnBW	14/08/23

Prepared by:

RPS

Prepared for:

Morgan/Mona Offshore Wind Ltd.

1 PHYSICAL PROCESSES ENVIRONMENTAL STATEMENT MODELLING STRATEGY

1.1.1.1 The physical processes modelling studies for the Mona and Morgan Generation offshore wind projects that have been undertaken to date were based on the project description and maximum design scenarios associated with the Preliminary Environmental Information Report (PEIR) for each of the respective developments. It is proposed that further modelling to update the modelling presented in the PEIR is not required because of the very limited changes anticipated to occur as a result of the reduction in envelope following design changes, which are not anticipated to change PEIR assessment conclusions.

1.1.1.2 As the projects progress, updates to the project design will be made in response to stakeholder feedback, preliminary findings and project refinement, such as those outlined below.

Area of Change	Nature of change
Array Area	Reduction in array area from red line boundary presented in PEIR. Reduced array area will sit wholly within the array area assessed in PEIR. Anticipated that Mona array area will lie entirely in Welsh waters.
Layout Principles	Relating to spacing arrangements, orientation of wind turbine rows, search area and rescue requirements, commercial fisheries activity.
Foundations	Anticipate removal of monopile foundation for wind turbines. Gravity base and jackets (pin piles and suction buckets) retained.
Wind Turbines	Removal of smallest wind turbine from envelope. Increase in rotor diameter for largest wind turbine against supply chain feedback from 280m to 320m.

1.1.1.3 For both projects, the array area has been reduced from the previous (PEIR) boundary with the same proposed types of wind turbine infrastructure. The Mona Array Area is anticipated to be reduced by approximately 33% and lies wholly within Welsh offshore waters. The Morgan Array Area is anticipated to be reduced by approximately 10%. The changes in array area will be associated with revised indicative layouts, however, given that the reductions in area are modest, lie wholly within the PEIR boundaries and the Mona and Morgan Generation PEIRs concluded that all physical processes impacts would be negligible (not significant in EIA terms) the representative/indicative layout applied within the modelling studies undertaken for the PEIR is deemed to provide appropriate information to support the physical processes assessment of the updated project for the Environmental Statement.

1.1.1.4 In some cases, the modelling of construction activities extends beyond the revised Environmental Statement boundary. These areas do however have bathymetry, tidal currents and sediment classifications consistent with those within the PEIR boundary due to the close proximity. It is considered that, given these similarities, and that the revised layout represents a modest change in terms of the physical processes assessment, the modelling undertaken for the PEIR boundary and layout remains valid and will therefore be used to inform the physical processes assessment presented for the Environmental Statement. In addition, the physical processes study area will be retained for the Environmental Statement (and not decreased in line with the array area reduction) to provide additional context to the physical processes assessment.

1.1.1.5 In line with the environmental impact assessment methodology, the updated project design envelope for each of the applications will be examined to determine the

MONA AND MORGAN GENERATION OFFSHORE WIND PROJECT

maximum design scenario for assessments. As noted within the PEIR, physical processes are comprised of tides, waves and sediment transport. These aspects are integrated, with different design parameters have varying levels of influence on each aspect. A holistic approach will therefore, be applied to assess the maximum design scenario. However, it is proposed that single unit sensitivity testing is undertaken where applicable. For example, suction bucket foundations may provide the greatest impediment at both the surface (influencing waves) and at the seabed (influencing sediment transport pathways), but a gravity base foundation may present a greater water column blockage (influencing tides). The influence of a single gravity base foundation on tidal flow would therefore not be modelled separately but will be examined by way of a sensitivity test and compared with a single suction bucket foundation.

1.1.1.6 As previously noted, the preparation of a PEIR and subsequent application is a live process with refinements being made to the project description throughout this period. For this reason, the modelled scenarios will, inevitably, vary by degrees from those ultimately assessed. However, due to the limited nature of these refinements, the modelling study remains a legitimate resource for supporting information for the Environmental Statement. Where variations occur between the modelled parameters and those assessed they will be cited within the relevant sections with reference to the applicability of the modelled data to the specific assessment. It is therefore proposed that further modelling to update the modelling presented in the PEIR is not required because of the very limited changes anticipated to occur as a result of the reduction in envelope following design changes, which are not anticipated to change PEIR assessment conclusions.

B.5.4 Response from JNCC regarding the Physical Processes Modelling Strategy

From: [REDACTED]
Sent: 24 August 2023 16:53
To: [REDACTED]
Cc: [REDACTED]
Subject: RE: Mona Morgan Gen physical processes modelling strategy

CAUTION: This email originated from outside of RPS.

Hi [REDACTED],

Thank you for the opportunity to comment on the Mona and Morgan Generation Offshore Wind Project – Physical Processes Environmental Statement Modelling Strategy (F01, dated August 2023). JNCC would not look to feedback on the Modelling Strategy and defer the NRW for comment.

Kind regards,

[REDACTED]

[REDACTED] | Offshore Industries Adviser | JNCC

Pronouns: she/her

Inverdee House, Baxter Street, Aberdeen, AB11 9QA | Tel: [REDACTED]

Working pattern: Monday to Friday

[Website](#) [Twitter](#) [Facebook](#) [LinkedIn](#)



 **JNCC Together for Nature**
We are inclusive, collaborative, innovative

B.5.5 Responses and advice note from NRW regarding the Physical Processes Modelling Strategy

From: [REDACTED]
Sent: 21 August 2023 18:03
To: [REDACTED]
Cc: [REDACTED]
Subject: RE: Morgan Generation & Mona fourth BE, FSF, PP EWG meeting

CAUTION: This email originated from outside of RPS.

Hi [REDACTED],

Thank you for your email. Regarding your points:

EWG to confirm acceptance of this proposed approach for characterisation of potential sandeel habitation and spawning (11/08/23)

I can confirm that NRW Advisory (A) agree with the proposed approach for the characterisation of potential sandeel habitation and spawning.

SNCBs to feedback on whether they agree there will be no adverse effect on the integrity of the Menai Straights and Conwy Bay SAC and therefore a without prejudice compensation case is not required (11/08/23)

NRW (A)'s benthic specialist [REDACTED] had already provided a response to this query in the meeting (as below), hence not addressing it in the action points – from the minutes:

LVN- That is good news that there will be no direct impacts to the SAC features. We agree that if no Annex 1 habitats are directly or indirectly affected then there would be no adverse effect on integrity. We would however like to review the latest data before the application submission.

Of relevance here, I recently provided a response to a similar, separate query that arose through my monthly catch-up meetings with Miriam, Gero and Paul – copied below for completeness:

Query 1: Regarding the potential need for IROPI / Compensation with respect to sandwave clearance and cable protection within the Menai Strait and Conwy Bay SAC

Provided there is no direct and/or indirect impact to Annex 1 features of the Menai Strait and Conwy Bay SAC from the placement of cable protection, NRW (A) agree that there is no requirement for compensation. Given the information presented by the applicant to date, it seems unlikely that cable protection will be placed on Annex 1 features and it is therefore unlikely that there will be any direct impact to Annex 1 features. However, NRW (A) would like to review the evidence to support the characterisation of the habitats present in the cable route and potential areas where cable protection is being proposed within the SAC, as this information was not available at the time of the PEIR submission and has not been presented since. Please also note that cable protection placed outside of Annex 1 features could also indirectly impact features within the SAC and we therefore advise that this is assessed appropriately within the Environmental Statement. At present, NRW (A) are unable to comment on this aspect as the potential locations of cable protection inside and outside the SAC have not been provided. We advise that this information is shared with NRW (A) for review, as soon as possible.

From a Physical Processes perspective and linked to our PEIR response, NRW (A) would also like further information on the height, length and width of the proposed cable protection.

From: [REDACTED]

Sent: 16 August 2023 15:27

To: [REDACTED]

Cc: [REDACTED]

Subject: RE: Morgan Generation & Mona fourth BE, FSF, PP EWG meeting

CAUTION: This email originated from outside of RPS.

Hi [REDACTED]

Please find attached our amendments to the fourth Benthic, Fish and Shellfish, Physical Processes EWG meeting minutes. Please also see our response to the Meeting Actions below:

- *EWG to confirm approach to assessment of underwater sound for fish and shellfish.* NRW Advisory (A) welcomes the intention to incorporate additional data into the baseline characterisation, and clarifying definitions for various Important Ecological Features. NRW (A) note the response to the MMO, but advise that quantifying impacts to spawning grounds for species of primary concern (such as herring and cod) as percentage overlap are included for contextualisation. We recognise the limitations in the available data and that spawning is not necessarily limited to mapped spawning grounds. Nevertheless, presenting the quantification is useful, provided the spatial scale against which the percentage of affected spawning or nursery area is calculated, is appropriate and the limitations acknowledged.
- *EWG to confirm if the use of a combination of TTS (SELcum) and SPLpk to undertake a robust assessment of UWN impacts to herring.* NRW (A) agrees with the proposed approach and welcomes the inclusion of the 135 dB SELss for information.
- *NRW to feedback regarding justification for basing assessment on soft starts and ramp up procedures.* NRW (A) recognises that soft -start and ramp up procedures are standard work practises in piling. However, as advised pre, robust evidence for fleeing behaviour is lacking, and all fish receptors should be considered to be stationary. On this basis it is NRW (A)'s view that it is not possible to verify or quantify the mitigating effect of soft start and ramp up.
- *EWG to confirm acceptance of this proposed approach for characterisation of herring spawning potential.* NRW (A) agrees with the proposed approach of using heat maps as outlined in the post meeting note.
- *EWG to confirm acceptance of this proposed approach for characterisation of potential sandeel habitation and spawning.* NRW (A) agrees with the proposed approach of using heat maps as outlined in the post meeting note.

We will provide our feedback on the approach to Physical Processes following the additional documentation / our upcoming meeting and in line with the later deadline provided.

Kind regards,

[REDACTED]

Enw / [REDACTED]

Teitl swydd / Uwch Gynghorydd Morol - Rhaglen Ynni Adnewyddadwy ar y Môr / Senior Marine Advisor - Offshore Renewable Energy Programme

Adran / Tîm Cyngor a Rheoli Ardal Morol / Marine Area Advice & Management Team



**Cyfoeth
Naturiol**
Cymru
**Natural
Resources**
Wales

Projects Mona & Morgan Generation Physical Processes Modelling Strategy

[REDACTED]
Senior Marine Advisor

21st August 2023

Introduction

This advice is provided in response to the **Physical Processes Modelling Strategy sent by email to NRW Advisory on 14th August 2023**.

NRW advice in this document is provided (under a Discretionary Advice Service agreement) in respect of a proposal which will require an application for which Natural Resources Wales is a Statutory Consultee.

The customer acknowledges that the content of any advice or assistance provided by NRW is advisory only and that it shall not be deemed to bind or in any other way restrict NRW in performing its statutory functions.

The recipient acknowledges that:

- any advice given or materials or documentation provided by NRW do not constrain or bind NRW in respect of its statutory functions or its role as a statutory consultee or any decision NRW may make in relation to any application for a licence or permit;
- any advice given by NRW does not bind NRW in respect of any future representations it may make as statutory consultee or any decision NRW may make in relation to any application for a licence or permit;
- any views or opinions expressed by NRW are without prejudice to the consideration NRW may be required to give to any application or any future representations as statutory consultee or any decision NRW may make in relation to any application for a licence or permit;
- the final decision as to any representations made by NRW as statutory consultee will be based on all the relevant information available to NRW at the time it makes such representations;
- NRW cannot and does not give any guarantee as to the representations it may make as statutory consultee; and,
- any advice given by NRW may be overtaken by changes in available information, law, policy and guidance relevant to the subject matter of the advice.

Advisors Consulted:

Marine and Coastal Physical Processes

Advice

The intention of the Physical Processes Modelling Strategy provided on 14th August 2023, is not to conduct any further modelling relating to physical processes impact assessment. **NRW Advisory (A) cannot rule out further modelling at this stage as there were a number of concerns raised during the PEIR phase that may potentially require more focused modelling.**

Please note the previous relevant comments made by NRW (A) in response to the Preliminary Environmental Information Report (PEIR), and copied below:

- With reference to *Section 1.7 Potential Environmental Changes (Numerical Modelling)*, NRW (A) confirm that the model presented to describe the physical processes (tides, waves and sediment transport) has been adequately calibrated and validated and provides a good prediction of the baseline physical processes into the nearshore zone.
- With reference to *Figure 1.65 Modelled Array and Trenching Route Indicative Layout*, the positioning of the turbine legs, inter array, interconnector cables and predicted cable protection and scour protection has been included in the physical processes modelling impact assessment for the Mona Array Area. The export cable corridor, however, has not been presented in the same way as the Array and nothing has been presented in the PEIR or supporting technical reports to show where the cable protection will be located along the export cable corridor. It is therefore not clear that the hydrodynamic simulations with the addition of the infrastructure, and the difference plots (proposed minus the baseline condition for currents, waves, littoral currents and residual currents) accurately predicts the total change that could arise along the cable corridor particularly if the cable protection is located in shallow water of the nearshore zone where wave impacts will be greater.
- With reference to *Section 1.7.2.4 Wave Climate (Post Construction)*, there is a degree of uncertainty where the cable protection will be placed along the cable corridor and it cannot be assumed at this stage that there will be no cable protection located in the nearshore zone, on the Constable sand bank system, in the Menai Strait and Conwy Bay SAC or across the intertidal, particularly if HDD is the chosen option for cable landfall which could potentially require exit pits cable protection if located between MHWS and MLWS. As such, until the cable locations are known for certain NRW (A) cannot agree that the changes to wave climate would be indiscernible from the baseline wave climate and would not have an impact on the shoreline or nearshore banks.
- With reference to *Figures 1.165 – 1.168 Modelling of SSC plumes caused by trenching across intertidal*, the model assumes that the suspended sediment plumes generated during trenching are transported by tide only currents. NRW (A) request confirmation whether the currents generated by the model include wave induced currents (alongshore currents which are generated by wave breaking at an angle to the shore) as well as tide driven currents? The transport of SSC during intertidal trenching and the sediment

deposition will be strongly dependent on the wave conditions at the time of trenching in addition to the tidal state (spring or neap, flood or ebb). Please justify why tide only currents are chosen to simulate suspended sediment transport across the intertidal if this is the case.

- Regarding *Section 1.8.4.11 Offshore export cables (SSC Plumes during Cable Installation)*, NRW (A) advise that suspended sediment transport will be driven by the prevailing wind direction and wave activity as well as the flood and ebb tidal excursion. If, for example, the trenching occurred during a northerly wind then the SSC would also be driven towards the coast in the surface waters affected by the wind driven circulation. The modelling is conducted for tide only conditions and does not include the effect of wind driven circulation, which will be important closer to the coast as the water depth shallows and the waves play a more prominent role. NRW (A) recommend revisiting the modelling and including wave effects, particularly from the North-west and North.
- With reference to *Section 6.8.4 Impacts to the wave regime due to presence of infrastructure and the associated potential impacts along adjacent shorelines*, NRW (A) do not know where along the cable corridor cable protection will be placed and the modelling does not include cable protection or protection at the cable crossings outside the Mona Array. If in the event cable protection is located in the nearshore area or across the intertidal or on Constable Bank or in the Menai Strait and Conwy Bay SAC, then the potential impact to tides, waves, sediment transport processes, seabed/beach morphology and associated potential impacts along adjacent shorelines should be assessed.
- With reference to *Sections 6.8.5.11 and 6.8.5.12 Sensitivity of receptor*, it is not known if cable protection will be placed on Constable Bank or how much sand wave clearance will be conducted. Both activities will interrupt sediment transport processes with the potential to affect the structure and function of the sand bank system. The current modelling assessment only considers the turbine foundations and scour protection at the array. A more detailed assessment is required for Constable Bank if it is deemed necessary to install cable protection.

B.5.6 Email from RPS regarding the herring larval approach and the herring larval heatmap

Cc:

Subject: Mona and Morgan Generation herring larval heat/contour mapping

Rhybudd: Deilliodd yr e-bost hwn o'r tu allan i'r sefydliad. Peidiwch â chlicio dolenni nac atodiadau agored oni bai eich bod yn cydnabod yr anfonwr ac yn gwybod bod y cynnwys yn ddiogel.

Caution: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Dear All,

Following the recent EWG for the Mona and Morgan Generation Assets in July 2023, as part of the Evidence Plan Process, we took an action to investigate the potential for heat/contour mapping for the aggregated 10-year NINEL herring larval data to see if we were able to identify any potential hot-spots/trends in the year on year data.

Prior to including this within the two respective Fish and Shellfish Ecology ES chapters, we wanted to run the draft chart by you, which is based on a kernel density heat plot. We investigated a number of options and believe this is the best fit for and most reflective of the data available, but wanted to confirm that this is what you had in mind/were expecting to see before going ahead and incorporating this into our baseline characterisation. The details and context of the action and investigation are as follows:

Cefas S42 feedback

The Cefas/MMO S42 response suggested that heat mapping be undertaken following MarineSpace (2013) guidance, combining particle size data and herring larval data. However we discussed with the EWG that this would not be appropriate due to the larval densities being too low, compared with densities typically encountered in the North Sea, on which the MarineSpace guidance was developed. As such, we proposed we undertake heat mapping using larval densities only and present particle size data along side this (as we did in the PEIR).

Heat Mapping

In the Morgan Generation Assets PEIR, we presented herring larval data over a 10 year period from the NINEL dataset, but did not combined these into one single heat map.

The Figure attached shows the full aggregated 10-year NINEL dataset, but with heat mapping of these as a kernel density map. This was produced by checking a 10 km radius around each station and considering point spatial density and herring larval density at each station. So the resulting heatmap combines the density/abundance of points as well as the value of each point. This was used to indicate levels of spawning on a qualitative high-low scale, with colour smoothing between points used to indicate wider interpolated spatial patterns in spawning.

The link below provides some information on the specific tool we used.

Heatmap (kernel density estimation): [27.1.5. Interpolation — QGIS Documentation documentation](#)

Please could you provide your feedback on the above, and attached figure, by **Wednesday 20th September 2023**.

Kind Regards, [REDACTED]

[REDACTED]
Senior Marine Consultant
RPS | Energy
Goldvale House
27-41 Church Street West
Woking, Surrey GU21 6DH, United Kingdom

T [REDACTED] F [REDACTED]
D [REDACTED] M [REDACTED]
E [REDACTED]
[Digital Business Card](#)

B.5.7 Response from NRW regarding the herring larval heat/contour mapping

From: [REDACTED] <[REDACTED]>
Sent: 12 September 2023 17:36
To: [REDACTED]
Cc: [REDACTED]
Subject: RE: Mona and Morgan Generation herring larval heat/contour mapping

CAUTION: This email originated from outside of RPS.

Dear [REDACTED],

With reference to your email below (sent 06/09/23) regarding the Herring Larval heat / contour mapping:

Thank you for providing the draft kernel density heat plot and the additional detail / context on the tool and process followed. NRW Advisory confirm that we are content with the information provided and its inclusion in the Fish and Shellfish Ecology Chapter(s) of the Environmental Statement.

Kind regards,
[REDACTED]

Enw / [REDACTED]

Teitl swydd / Uwch Gyngorydd Morol - Rhaglen Ynni Adnewyddadwy ar y Môr / Senior Marine Advisor - Offshore Renewable Energy Programme

Adran / Tîm Cyngor a Rheoli Ardal Morol / Marine Area Advice & Management Team

Croesewir gohebiaeth yn Gymraeg a byddwn yn ymateb yn Gymraeg, heb i hynny arwain at oedi.

Correspondence in Welsh is welcomed, and we will respond in Welsh without it leading to a delay.



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**Natural
Resources
Wales**

Byd natur a phobl yn
ffynnu gyda'n gilydd

Nature and people
thriving together



cyfoethnaturiol.cymru
naturalresources.wales

From: [REDACTED] >

Sent: 06 September 2023 14:52

To: [REDACTED]

B.6. Benthic ecology, Fish and shellfish and Physical processes EWG meeting 5

B.6.1 Meeting minutes

MINUTES OF MEETING



Security Classification: Project External

Partners in UK offshore wind

MOM Number : 20231012_Morgan and Mona BE, FSF, PP **REV. No.** : F02

MOM Subject : Morgan and Mona Evidence Plan BE, FSF, PP EWG meeting 5

MINUTES OF MEETING

MEETING DATE : 12/10/2023

MEETING LOCATION : Microsoft Teams

RECORDED BY : ██████████ (RPS)

ISSUED BY : ██████████ (RPS)

PERSONS PRESENT:

- ██████████ – bp (SR)
- ██████████ – bp (MP)
- ██████████ – RPS (KL)
- ██████████ - RPS (ST)
- ██████████ – RPS (AP)
- ██████████ - RPS (KH)
- ██████████ – JNCC (JW)
- ██████████ – Natural England (KB)
- ██████████ – Natural England (KC)
- ██████████ – Natural England (EW)
- ██████████ – NRW (LR)
- ██████████ – NRW (LVN)
- ██████████ – NRW (EL)
- ██████████ – NRW (NP)
- ██████████ – IoM (PD)
- ██████████ – MMO (AP)
- ██████████ – MMO (MS)
- ██████████ – Cefas (PM)

ITEM NO:	DISCUSSION ITEM:	Responsible party	Date
	<p><u>Project updates (Presented by MP)</u></p> <p>Following responses to the Mona and Morgan Generation Preliminary Environmental Information Reports (PEIRs), the project design envelope has been reviewed and updated. The Mona and Morgan array areas have been reduced in size, mainly in response to shipping and navigation and commercial fisheries consultation and assessments. The slide (slide 5) provides links to the offshore newsletters for Mona and Morgan Generation that were published in September 2023 and presents key offshore updates.</p> <p>The maximum number of wind turbines has been reduced from 107 to 96 for both Mona and Morgan Generation projects. The rotor diameter of the largest wind turbine has increased from 280 m to 320</p>		

	<p>m for both Mona and Morgan Generation. Monopiles have been removed from the list of foundation options included in the project design envelopes. Gravity base foundations and jackets on suction buckets or pin piles (drilled or driven) are retained.</p> <p>No cable protection higher than 70 cm will be installed within in the Menai Strait and Conwy Bay SAC. The percentage of export cable requiring cable protection has been reduced to not exceed 10% of the total length within the SAC. Additionally, no more than a 5% reduction in water depth will occur at any point along the export cables without prior written approval from the Licensing Authority in consultation with the MCA.</p> <p>The Mona export cables will be installed under the intertidal area from below MLWS to above MHWs onshore via trenchless techniques. Open-cut trenching within the intertidal area has been removed for the project design envelope.</p> <p>The Mona sandwave clearance volume for the inter-array cables has been reduced from 9,542,806 m³ to 4,188,876 m³ through a reduction in clearance width from 104 m to 80 m.</p> <p>The Mona sandwave clearance volume for the offshore export cables has been reduced from 12,051,955 m³ to 1,504,000 m³ through a reduction in clearance width from 104 m to 40 m and a reduction in the percentage of offshore export cable requiring clearance from 70% to 20%.</p> <p>The Morgan Generation sandwave clearance volume for the inter-array cables has been reduced from 11,843,641 m³ to 5,026,651 m³ through a reduction in clearance width from 104 m to 80 m and a reduction in the percentage of inter-array cable requiring clearance from 50% to 40%.</p>		
	<p><u>Benthic ecology assessment (Presented by AP)</u></p> <p>We wanted to run through the impacts included in the Mona benthic subtidal and intertidal ecology chapter.</p> <ul style="list-style-type: none"> • Temporary habitat loss/disturbance • Increased suspended sediment concentrations and associated deposition (including an assessment of the release of bentonite during trenchless technique activities) • Disturbance/remobilisation of sediment-bound contaminants • Long term habitat loss (including habitat alteration) • Introduction of artificial structures • Increased risk of introduction and spread of invasive non-native species (INNS) • Removal of hard substrates • Changes in physical processes • EMF from subsea electrical cabling • Heat from subsea electrical cables <p>The benthic chapter has been updated with the project design changes that have been discussed. The following project design changes are of particular importance to the benthic chapter:</p>		

- Commitment to use trenchless techniques to install the Mona export cables underneath the landfall area therefore all direct impacts to intertidal important ecological features in the intertidal area will be avoided.
- Reduction of sandwave clearance volumes for the project alone and in the Menai Strait and Conwy Bay SAC.
- Reduction of cable protection in the Menai Strait and Conwy Bay SAC.
- Comittment to no sandwave clearance outside the footprint of the cable installation tool within the Constable Bank

The assessment concluded the effects would be of negligible or minor adverse significance in EIA terms.

Since PEIR was published, a number of updates have been made to the benthic subtidal and intertidal ecology technical report.

Minor inconsistencies regarding reporting of the sediment chemistry data in the PEIR have been reviewed and corrected. Levels of contamination across the Mona Offshore Wind Project are low.

The Mona benthic technical report now includes full analysis of the site specific grab sample and DDV data for the Mona Zone of Influence as well as the Mona Offshore Cable Corridor, collected in 2022, in combination with the Morgan and Mona 2021 site specific data.

Based on this new analysis we are able to confirm that none of the Annex I habitat features of the Menai Strait and Conwy Bay SAC occur within the Mona Offshore Cable Corridor (i.e. there will be no direct impacts on these features).

The Mona benthic technical report also includes reporting of the 2023 infill intertidal survey for sections of the landfall not captured in the 2022 survey (including sediment bacterial analysis and remapping of the extent of the *S. alveolata* reef). The project has updated the project boundary in the intertidal area so it now excludes the *S. alveolata* reef. There was a previous commitment to avoid the reef with a buffer of 50 m. This boundary change confirms that there will be no direct impacts to the reef.

The Habitat Assessment has been revisited for seapens and burrowing megafauna (with the full image analysis provided by Gardline) which has led to the inclusion of a new seapens and burrowing megafauna IEF. This will be taken forward to the chapter.

The Habitat Assessment has been revisited for the Fragile sponge and anthozoan communities on subtidal rocky habitats (with the full image analysis provided by Gardline) and we are able to confirm that this habitat is not present.

Following further consultation with Gardline, low resemblance stony reef has been classified as an Annex I stony reef IEF (outside designated site) in line with the guidance in Golding et al. (2020).

AP: Are there any comments or questions on the benthic ecology technical report or updates to the assessment? (no comments from the EWG)

	<p><u>Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC HRA (presented by AP)</u></p> <p>The maximum length of Mona export cable that may be within the Menai Strait and Conwy Bay SAC has been reduced from 14 km to 8.1km. The PEIR assumed 20% of this cable may require cable protection, this has further been reduced to 10%. Therefore, this has reduced the maximum length of cables potentially requiring cable protection within the SAC from 2.8 km to 800 m. In addition, the Applicant has made the commitment that no cable protection higher than 70 cm will be installed within the SAC.</p> <p>The Applicant is looking for agreement that there will be no LSE from long term habitat loss and temporary habitat disturbance and so these impact pathways can be screened out of the ISAA for the Menai Strait and Conwy Bay SAC (i.e. due to no overlap with any designated features and so no direct impacts).</p> <p>LN- NRW has reviewed the Mona benthic subtidal and intertidal TR and agrees that there are no designated features of the SAC within the Mona Offshore Cable Corridor so there will be no LSE from long term habitat loss and temporary habitat disturbance for the Menai Strait and Conwy Bay SAC and these impacts can be screened out of the ISAA for this SAC. NRW are pleased that indirect impacts are being considered in the ISAA. Does the Applicant have further details on the specific locations of cable protection within or outside the SAC?</p> <p>KL- Aside from cable crossings (of which there are none in the SAC), cable protection will be remedial (e.g. where cables become exposed due to mobile seabed). The project will not use cable protection where burial can be successful as burial is the most effective means of protecting the cable. It is very difficult to predict where cable burial may not be successful so at the moment we do not know where cable protection may be required. The engineers have looked at the SAC in detail to refine the parameters, but we don't know exact locations.</p> <p>LN- It is very positive to see the reduction in parameters from the PEIR. As cable installation at the landfall will use trenchless techniques, will cable protection be needed at the exit pits?</p> <p>KL- We can take this away and check what is in the project descriptions and how it is included in the assessment.</p> <p>MP- We would also highlight that there is a commitment for no sandwave clearance within the Menai Strait and Conwy Bay SAC.</p> <p><i>Post meeting note: The export cable exit point in the nearshore area may have cable protection in the form of mattressing or rock bags (although as with other remedial cable protection, ideally cable protection would be avoided and cables will be buried by sediments). The width and height of the cable protection are subject to the same commitments as for the whole export cable corridor. Cable protection will be up to 10 m wide and will cause no more than a 5% reduction in water depth at any point along the export cables without prior written approval from the Licensing Authority in consultation with the MCA.</i></p>	<p>EWG to confirm that long term habitat loss and temporary habitat disturbance can be screened out of the ISAA for the Menai Strait and Conwy Bay SAC</p>	<p>Complete</p>
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	<p>The following impacts have been assessed in the HRA for the Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC HRA.</p> <p>Construction phase</p> <ul style="list-style-type: none"> • Increases in SSC and sediment deposition • Increased risk of introduction and spread of invasive non-native species (INNS) • Accidental pollution <p>Operations and maintenance phase</p> <ul style="list-style-type: none"> • Increases in SSC and sediment deposition • Changes in physical processes • Increased risk of introduction and spread of INNS • Accidental pollution <p>Decommissioning phase</p> <ul style="list-style-type: none"> • Increases in SSC and sediment deposition • Increased risk of introduction and spread of INNS • Removal of hard structures • Accidental pollution <p>We have concluded no LSE from direct impacts from heat and EMF from cables and no LSE from introduction of hard structures as there is no overlap with features of the SAC therefore no direct impacts.</p> <p>On the basis of the sediment chemistry results from the Mona Offshore Cable Corridor, disturbance of contaminated sediments has been screened out of the ISAA due to the conclusion of no LSE.</p> <p>LN- This sounds good, NRW agree with the screening out of EMF, heat and introduction of artificial structures from the ISAA. NRW will respond after the meeting on the screening of disturbance of contaminated sediments once our water quality specialist has been consulted.</p> <p>KC- If the size of the rotor diameters has been increased, is there any change to the substructure of the foundations i.e. has the foundation footprint increased.</p> <p>MP- There is no change to the size of the foundations themselves, just the option of monopiles has been removed.</p> <p>KL- There are other changes to the project design envelope that will change the overall footprint of the projects through e.g. reduction in the maximum number of wind turbines.</p> <p><i>Post meeting note: The licensing of the dredge and disposal activities within the Mona and Morgan Generation project boundaries are being included in the DCO and Marine Licence therefore the results of the sediment chemistry analysis are included in the benthic subtidal and intertidal technical report. Please can NRW confirm that the results do not also need to be provided in the NRW PS analysis results template.</i></p>	<p>EWG to confirm that resuspension of contaminated sediments can be screened out of the ISAA for the Menai Strait and Conwy Bay SAC</p> <p>NRW to confirm that the sediment chemistry results do not need to be provided in the NRW PS analysis results template</p>	<p>Complete</p> <p>Complete</p>
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	<p><u>Agreement logs (presented by KL)</u></p> <p>The agreement logs will be re-circulated with the meeting minutes for your review and update. They have been updated to take into account the discussions that have taken place since PEIR. They will outline and formalise the discussions over the last few months.</p> <p>To date, they have set out agreement on methodology and baseline characterisation and we have agreed a lot of these items. They will set out what the Applicant is looking for agreement on from now to the application. The agreement logs will look to lead the discussions over the next few months to feed into the statement of common grounds. There will be items in the agreement logs where we are asking for formal agreement as the Applicant considers them to have been agreed in discussions over the last few months and there are items which the Applicant considers still under discussion, however your comments are welcome.</p>	<p>EWG to review and update the agreement logs</p>	<p>Complete</p>
	<p><u>Next steps (presented by KL)</u></p> <p>The meeting minutes and agreement logs will be circulated two weeks following this meeting. The next EWG meeting will be held on 07 December 2023 and will run through the updated Mona assessments for fish and shellfish ecology and physical processes, updated assessment for Morgan Generation as well as looking to the statement of common grounds.</p>		

B.6.2 Response from NRW regarding the meeting minutes

From: [REDACTED]
To: [REDACTED]
Cc: [REDACTED]
Subject: RE: Morgan Mona benthic, fish and shellfish and physical processes EWG meeting 5
Date: 09 November 2023 17:32:41
Attachments: [Mona Benthic Ecology Technical Report NRW comments.docx](#)
[Mona_BE,FSE,PP_EWG_Agr_Log_F05 NRW Comments.xlsx](#)

CAUTION: This email originated from outside of RPS.

Thank you for circulating the minutes and agreement log following the fifth benthic, physical processes, fish and shellfish EWG on 12th October. Please note the following:

- Please find attached NRW Advisory comments on the Mona Offshore Wind Project Environmental Statement Volume 6, Annex 2.1: Benthic subtidal and intertidal ecology technical report.
- NRW Advisory have no comments to make on the minutes of the meeting.
- Please find attached NRW Advisory's updated Agreement Log.
- Having reviewed the Benthic Ecology Technical Report, NRW Advisory agree that there are no Annex I features of the Menai Strait and Conwy Bay SAC present in the overlap with the Mona Offshore Cable Corridor. NRW Advisory therefore agree there will be no LSE from long term habitat loss and temporary habitat disturbance so these impacts can be screened out of the ISAA. However NRW Advisory advise that indirect impacts to benthic habitats from changes in physical processes should be screened into the ISAA as these changes can also lead to potential indirect impacts on Annex I features. We understand from discussions at the EWG that this impact has been scoped in for the operation phase.
- NRW Advisory agree that resuspension of contaminated sediments can be screened out of the ISAA for the Menai Strait and Conwy Bay SAC.
- NRW Advisory confirm that the sediment chemistry results do not need to be provided in the NRW PS analysis results template.
- NRW Advisory understand that an updated HRA methodology note / long-list of projects screened into the CEA / in-combination assessment will be provided for review shortly. Following the list presented at PEIR, NRW Advisory recommended inclusion of e.g. Offshore elements of the HyNet project, so it would be useful to review the final list prior to final agreement.
- NRW Advisory are keen to include some discussion around primary and secondary scour from a Physical Processes perspective at the next EWG in December.

Please let me know if you have any queries.

Kind regards,

[REDACTED]

B.6.3 Provision of Benthic subtidal and intertidal ecology technical report

From:

Subject:

Mona benthic subtidal and intertidal ecology technical report

Date:

02 October 2023 15:10:00

Attachments:

[image001.png](#)

[Mona_F5.2.1_Environmental Statement_Benthic Subtidal and Intertidal Ecology Technical Report.pdf](#)

Dear all,

Please see attached the updated Mona benthic subtidal and intertidal ecology technical report for the Environmental Statement. The Applicant has also made the following project refinements relevant to benthic ecology.

The Applicant is looking for agreement that there will be no LSE from long term habitat loss and temporary habitat disturbance and so these impact pathways can be screened out of the ISAA for the Menai Strait and Conwy Bay SAC (i.e. due to no overlap with any designated features and so no direct impacts). Please can the EWG review the technical report, project refinements and come to the EWG on 12th October prepared to discuss this topic.

Project	Area of change	Nature of change
Both	Number of turbines	We have reduced the maximum number of turbines for each project from 107 to 96
Both	Size of turbines	The rotor diameter of the largest wind turbine has increased from 280 m to 320 m
Both	Foundations	Monopiles have been removed. Gravity base foundations and jackets on suction buckets or pin piles (drilled or driven) are retained.
Mona only	Cable protection	No cable protection higher than 70 cm will be installed within in the Conwy Bay and Menai Strait SAC. The percentage of export cable requiring cable protection has been reduced to not exceed 10% of the total length. Additionally, no more than a 5% reduction in water depth will occur at any point along the export cables without prior written approval from the Licensing Authority in consultation with the MCA
Mona only	Intertidal installation	Mona export cables will be installed under the intertidal area from below MLWS to onshore via HDD or other trenchless technique. Trenching within the intertidal area has been removed.
Mona only	Sandwave clearance- inter-array cables	Sandwave clearance volume for the inter-array cables has been reduced from 9,542,806 m ³ to 4,188,876 m ³ through a reduction in clearance width from 104 m to 80 m and a reduction in inter-array cable length.
Mona only	Sandwave clearance- export cables	Sandwave clearance volume for the offshore export cables has been reduced from 12,051,955 m ³ to 1,504,000 m ³ through a reduction in clearance width from 104 m to 40 m and a reduction in the percentage of offshore export cable requiring clearance from 70% to 20%.
Morgan Generation only	Sandwave clearance- inter-array cables	Sandwave clearance volume for the inter-array cables has been reduced from 11,843,641 m ³ to 5,026,651 m ³ through a reduction in clearance width from 104m to 80 m and a reduction in the percentage of inter-array cable requiring clearance from 50% to 40%.



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B.6.4 NRW comments on Benthic subtidal and intertidal ecology technical report



8th November 2023

Introduction

These comments are provided in response to the **Mona Offshore Wind Environmental Statement, Volume 6, Annex 2.1: Benthic subtidal and intertidal ecology technical report** received via email on 2nd October 2023.

NRW advice in this document is provided (under a Discretionary Advice Service agreement) in respect of a proposal which will require an application for which Natural Resources Wales is a Statutory Consultee.

The customer acknowledges that the content of any advice or assistance provided by NRW is advisory only and that it shall not be deemed to bind or in any other way restrict NRW in performing its statutory functions.

The recipient acknowledges that:

- any advice given or materials or documentation provided by NRW do not constrain or bind NRW in respect of its statutory functions or its role as a statutory consultee or any decision NRW may make in relation to any application for a licence or permit;
- any advice given by NRW does not bind NRW in respect of any future representations it may make as statutory consultee or any decision NRW may make in relation to any application for a licence or permit;
- any views or opinions expressed by NRW are without prejudice to the consideration NRW may be required to give to any application or any future representations as statutory consultee or any decision NRW may make in relation to any application for a licence or permit;
- the final decision as to any representations made by NRW as statutory consultee will be based on all the relevant information available to NRW at the time it makes such representations;
- NRW cannot and does not give any guarantee as to the representations it may make as statutory consultee; and,
- any advice given by NRW may be overtaken by changes in available information, law, policy and guidance relevant to the subject matter of the advice.

Advisors Consulted:

Benthic Ecology
Marine and Coastal Physical Processes

Comments

Please note that the comments below refer to the section of the export cable route that interacts with the array, the export cable route and landfall. JNCC will be advising on the array area.

- Overall NRW Advisory (A) are satisfied with the Benthic Subtidal and Intertidal Ecology Technical Report. The report is very detailed and clearly outlines the baseline characterisation survey, the results and assessments that were carried out.
- The habitats present within the offshore cable corridor section that intersects with the Menai Strait and Conwy Bay SAC have been appropriately identified. NRW (A) agree with the applicant that no Annex I features have been identified within this section of the export cable corridor.
- The Annex I *Sabellaria alveolata* reef has been re-mapped in 2023 and has not changed significantly since the 2022 survey.
- The habitat assessments carried out for the Seapens and burrowing megafauna, Annex I stony reef assessment and hard substrate Porifera have been presented in Appendix B. The presentation of these has helped NRW (A) review the assessments that were carried out.
- NRW (A) are satisfied that the habitats present within the export cable corridor and the landfall have been appropriately identified and that sufficient site-specific and desktop data has been collated to appropriately characterise the baseline benthic subtidal and intertidal ecology environment to inform the EIA.

B.7. Benthic ecology, Fish and shellfish and Physical processes EWG meeting 6

B.7.1 Meeting minutes

MINUTES OF MEETING

Security Classification: Project
External



MOM Number : 20231207_Morgan and Mona BE, FSF, PP **REV. No.** : F02

MOM Subject : Morgan and Mona Evidence Plan BE, FSF, PP EWG Meeting 6

MINUTES OF MEETING

MEETING DATE : 07/12/2023

MEETING LOCATION : Microsoft Teams

RECORDED BY : ██████████ (RPS)

ISSUED BY : ██████████ (RPS)

PERSONS PRESENT:

- ██████████ – MMO (████████)
- ██████████ – RPS (████████)
- ██████████ – Wildlife Trust (BS)
- ██████████ – NW Wildlife Trust (BC)
- ██████████ – RPS (BP)
- ██████████ – Cefas (CR)
- ██████████ – NRW (EL)
- ██████████ – Cefas (GE)
- ██████████ bp (GV)
- ██████████ – NRW (IN)
- ██████████ – Cefas (JW)
- ██████████ – JNCC (JW)
- ██████████ – NRW (JI)
- ██████████ – Natural England (KB)
- ██████████ – RPS (KH)
- ██████████ – RPS (KL)
- ██████████ – Natural England (KC)
- ██████████ – NRW (LN)
- ██████████ – RPS (LS)
- ██████████ – MMO (MS)
- ██████████ – bp (MP)
- ██████████ – RPS (NS)
- ██████████ – NRW (████████)
- ██████████ – Cefas (PMc)
- ██████████ – Isle of Man (PD)
- ██████████ – RPS (ST)
- ██████████ – bp (SR)
- ██████████ – RPS (TT)

ITEM NO:	DISCUSSION ITEM:	Responsible party	Date
1.	<p><u>Project Updates - presented by MP</u></p> <p>Assessments are being finalised right now, the Applicant is aiming to submit the Mona DCO application towards end of February 2024 and the Morgan Gen DCO application after Easter 2024. Any further comments and completion of the agreement logs before the Christmas break would be appreciated as we are now at a critical time and are unable to include anything new at this stage. All previous stakeholder comments have been considered.</p> <p>EL: will need to look at NRW internal capacity regarding the agreement logs and will keep RPS updated.</p>		
2.	<p><u>Physical Processes Assessment - presented by NS</u></p> <p>NS provided some updates on the physical processes assessment:</p> <ul style="list-style-type: none"> • Reduction in Mona Array Area from that presented in the Preliminary Environmental Information Report (PEIR) The Mona Array Area sits entirely in Welsh waters now • Updated layout of turbine rows and spacing with a minimum of 1,400m between and within wind turbine rows • Removed monopiles from the Project Design Envelope (PDE) • Removal of the smallest wind turbine, with associated increase in rotor diameter for the largest one from 280 to 320 m. <p>The Applicant has received agreement on the approach to the modelling in the PEIR. No further modelling or revised assessment is required, as the PEIR modelling assumptions are reflected in the project description.</p> <p>NS stated that there were two sets of concerns raised by NRW, one due to the location/extent/height of cable protection (particularly in shallow areas). The second was related to the trenching activities in nearshore/intertidal zone.</p> <p>Refinements and commitments of the Mona OWF project include:</p> <p><u>Cable installation</u></p> <ul style="list-style-type: none"> • Development and adherence to a Cable Specification and Installation Plan (CSIP) which includes cable burial where possible and cable protection. • Offshore export cables will be installed under the intertidal area from below MLWS to onshore via trenchless techniques. No open-cut trenching or cable protection will be required in the intertidal zone. <p><u>Seabed preparation</u></p> <ul style="list-style-type: none"> • Sandwave clearance at Constable Bank will be minimised (within the swept path of the cable burial tool which has been further reduced from 40m to 20m swept path width) and there will be no sandwave clearance in the Menai Strait and Conwy Bay SAC 		

	<ul style="list-style-type: none"> • Sandwaves will not be flattened, they will be reduced in height to allow passage of the burial tool • Material arising from drilling and sandwave clearance will be deposited back in close proximity. <p>Jl: Have you done an assessment on sandwave recoverability (particularly in the array offshore)?</p> <p>NS: We've looked at other studies (one on seabed mobility) during the EIA modelling. There was a specific seabed mobility study done as part of the engineering studies. These will be referenced, and material drawn from them will be included in the assessment in the physical processes chapter. We can certainly include a technical annex for the EWG.</p> <p>Jl: Stated that you need to be mindful of regional sediment transport budgets being affected cumulatively with other projects.</p> <p>NS: Noted</p> <p>NS continued refinements and commitments:</p> <p><u>Cable protection</u></p> <ul style="list-style-type: none"> • No cable protection required in Constable Bank. Within the Menai Strait and Conwy Bay SAC, cable protection will reduce water depth no more than 5% without approval from the Licensing Authority and the Marine Coastguard Agency and restricted to 10% of the cabling within the SAC. • The foundation scour protection measures will be subject to engineering design to ensure they are fit for purpose and to minimise the occurrence of primary and secondary scour. Secondary scour will become negligible through detailed site specific design. • Therefore there will be minimal changes to wave climate, tide, and sediment transport regimes in areas where cable protection is required. Occurrence of scour and secondary scour will be minimised. <p>Jl: Tend to disagree with scoping out secondary scour. What are the implications of scour (particularly along the corridor) on benthic habitats and have these been cross-linked in the document. You can't scope out secondary scour without the evidence at this stage. Would there be mitigation measures in place if secondary scour became an issue during the monitoring?</p> <p>NS: Secondary scour is discussed and looked at in the context of the assessment. There are commitments specifically looking into it (including the CSIP). At this stage, it is difficult to quantify the magnitude and extent of any secondary scour that may occur at this stage (due to engineering uncertainties). From an engineering process, reducing/avoiding secondary scour is advantageous.</p> <p>Jl: Reiterated that secondary scour has to be considered. Otherwise happy to see that the cable protection has been reduced and the approach presented to this.</p> <p>MP: We'll take an action to revisit our draft assessments and ensure we have included all the studies and modelling used.</p>	<p>Applicant to revisit the draft assessments to review how secondary scour has been considered.</p>	<p>For the Environmental Statement</p>
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	<p>NS moved on to refinements and commitments for Morgan Generation and stated that the comments from above on Mona will also be applied to Morgan Generation. The commitments and refinements above will be carried forward to Morgan Generation too.</p> <p><u>Modelling assessment and strategy</u></p> <p>Trenchless technology will reduce event driven sediment dispersion. With the changes, updates, and commitments, it is not as necessary to undertake specific modelling for event driven sediment dispersion although it is still considered within the assessment.</p> <p>The physical processes team has done additional sensitivity testing in terms of the different foundation types that could potentially be used.</p> <p><u>Material harvesting for gravity based foundations</u></p> <p>It is proposed that up to 7,000 m³ of seabed preparation material may be harvested from each gravity base. Due to the fact there is a large proportion of coarse sand across the array, this will not cause changes to the seabed sediment characteristics and associated sediment transport rates. The volume of the gravel base placed under the slab is greater than the potential sediment to be used as a ballast, hence there will not be a void to interrupt sediment transport pathways. Any sediment used in the ballast from offsite would be clean material which had passed any relevant quality and contaminants checks and all ballast would be decommissioned by offsite disposal.</p> <p>Jl: Will gravel be left behind at decommissioning?</p> <p>NS: No, the material that will be used to fill the ballast will be taken off site. The gravel underneath the structure will remain <i>in situ</i>.</p> <p>Jl: We need to know size and quantity of gravel remaining <i>in situ</i>. Have you assessed material removal in combination with Morgan Generation as it could be significant. Will go back and discuss this further with JNCC and refrain from making any more comments until we have discussed.</p> <p>KC: Will gravity bases be used for all turbines across the array?</p> <p>NS: Assessment has been undertaken for up to 70 locations within each of Mona and Morgan as the maximum design scenario.</p> <p>KC: Are you looking at the different biotopes at these locations, as some will be more receptive to material removal than others?</p> <p>██████ We don't have a layout on where these 70 locations modelled will be, so cannot provide the level of granularity that you're asking for at this stage of the project. The biotopes are widespread across the array and wider Irish Sea.</p> <p>MP: The assessment is at a worst case, so we have assessed all the habitats and species within the array.</p> <p>ST: Please do feedback to us if you have any more queries.</p>	<p>Applicant to include gravel remaining in situ in the physical processes assessment</p>	<p>With the Environmental Statement</p>
<p>3.</p>	<p><u>Benthic Ecology assessments – presented by ██████</u></p>		

P presented the sampling in 2022 of the Morgan Array Area and Zone of Influence (Zoi). ██████ stated that we are combining the 2021 and 2022 survey data for the final application for consent.

Morgan Generation

Particle Size Analysis (PSA) shows that sediments ranged from muddy sandy gravel to gravelly muddy sand with most as gravelly sand and gravelly muddy sand. Typically coarser in the west and with a higher composition of sands and muds in the east of the array. Detailed the results of the sediment chemistry analysis, which showed that contamination was low overall and, with the exception of arsenic, below the relevant Cefas Action Levels (ALs) and Canadian Threshold Effects Level (TEL).

Biotopes are dominated by the Polychaete-rich deep Venus community in offshore mixed sediments (SS.SMx.Omx.PoVen) biotope with the *Lagis koreni* and *Phaxas pellucidus* in circalittoral sandy mud (SS.Smu.CsaMu.LkorPpel) biotope in the east. Brittlestar bed recorded at one station in the west of the Zoi. Annex I low resemblance stony reefs was identified at two stations in the south of the Morgan Array Areas Zoi (as per the 2021 survey), but this habitat was not found to be present within the array. No evidence of stony reef was recorded in the Morgan Gen Zoi in 2022 survey. An assessment of the 'sea pen and burrowing megafauna communities' habitat was undertaken at two stations in the Zoi but burrows at both stations had a SACFOR result of rare meaning they were not considered to resemble this habitat. No 'Fragile Sponge and Anthozoan Communities on Subtidal Rocky Habitats' was recorded.

██████ gave a quick recap of the list of impacts in the Morgan Generation assessment, which have not changed from those presented in the PEIR.

Presented updates that have been made to the benthic subtidal ecology technical report in response to S42 comments:

- Minor inconsistencies regarding sediment chemistry have been reviewed and corrected which confirms the original conclusion that levels of contamination, on the whole, are low across the Morgan Array Area
- Includes biotope analysis of site specific survey data for the Morgan Zoi in combination with the Morgan and Mona 2021 data
- Includes description of bedform features from the site-specific geophysical surveys
- Habitat Assessment (for both the 2021 and 2022 surveys) has been revisited (with the full image analysis provided by Gardline). This has led to a decision to include, on a precautionary basis, a new seapens and burrowing megafauna IEF. This has been taken forward for full assessment in the benthic ES chapter
- Fragile sponge and anthozoan communities on subtidal rocky habitats assessed has been revisited which has confirmed that this habitat is not present

The low resemblance stony reef recorded in the Zoi has been classified as an Annex I stony reef IEF (albeit outside an SAC) in line with the

	<p>guidance in Golding et al. (2020) and is assessed accordingly in the chapter. Changes to the chapter:</p> <ul style="list-style-type: none"> • Morgan Array Area has reduced in size • Reductions in the maximum design scenario (MDS) due to the changes to project parameters (e.g. reductions in sandwave clearance parameters) • The Mooir Vannin offshore wind farm has been included as Tier 2 in the CEA • Queries registered with Isle of Man Government regarding whether some cumulative projects are active and will update accordingly • Chapter includes seapens and burrowing megafauna IEF (as a precaution). <p>No comments from the EWG on the benthic ecology section presented by [REDACTED].</p>		
4.	<p><u>Fish and Shellfish Ecology – presented by LS</u></p> <p>Provided a summary of key feedback received and proposed actions surrounding underwater sound assessment for herring and cod.</p> <p>Provided updates on the revised underwater sound assessment for Mona and Morgan Generation. These involved removal of monopiles of the design envelope, reduced maximum hammer energy, and reduced hammer energies associated with concurrent piling scenarios. The sensitivities of herring and cod have been updated to ‘high’ at the suggestion of the EWG through the response to the PEIR.</p> <p>LS provided an overview of the outputs from updated underwater sound modelling for Mona and Morgan Generation, showing contour plots for SPL_{pk} and SEL_{ss} alongside herring spawning grounds, and SPL_{pk} alongside cod spawning grounds. Contour plots were shown for both the 4,400 kJ and 3,300 kJ hammer energy scenarios, along with plots for concurrent piling (SEL_{cum}).</p> <p>IN: Why are you modelling single strike instead of cumulative SEL?</p> <p>LS: The ranges for SEL_{cum} will also be presented in the chapter, but in terms of the threshold proposed for herring single strike has been presented here (135 dB SEL_{ss}; use of this metric was requested by Cefas). All thresholds and metrics will be fully discussed in the chapter.</p> <p>JW: It’s confusing for the 5 dB increments to be provided on the figure, could you confirm why this was done?</p> <p>LS: These were included in the figures to illustrate the 135 dB but we will plot the relevant TTS thresholds from Popper <i>et al.</i> (2014) up without the increments within the Fish and Shellfish Ecology Chapter of the Environmental Statement.</p> <p>KL: Note that these will need to be two different figures given the different units in the Popper <i>et al</i> (2014) thresholds in comparison to the 135 dB (SEL_{ss}).</p> <p>LS: Noted</p> <p>LS continued presenting the sound contours for herring at Mona highlighting that whilst the 135 dB SEL_{ss} sound contour shows some overlap with the mapped herring spawning ground at Douglas Bank,</p>	<p>Applicant to plot the relevant TTS thresholds in the Environmental Statement</p>	<p>With the Environmental Statement</p>

this threshold is highly precautionary (based on the author's own statement that it should not be applied as a threshold). Piling will also be intermittent, and it is unlikely for continuous piling to occur for the full 3-4 weeks of the spawning period. Further, the hammer energies modelled are the maximums, and in practice, it is unlikely that the maximum energy level will be reached all foundation locations. These results should only be considered in the context of the spawning periods for herring and cod, and outside of these timeframes the spatial concerns are limited, as herring are not constrained to specific substrates outside of spawning, and impacts to cod communications are not anticipated to affect spawning success outside of their spawning period. The concurrent piling modelling shows minimal difference between that modelled for single piling (noting that there is a slight difference in metric between SEL_{ss} and SEL_{cum}). This is due to sound levels not being mathematically additive, with only a small increase (c. 3 dB) when combining two sound sources of the same level. The maximum concurrent scenario will also be presented within the Fish and Shellfish Ecology Chapter of the Environmental Statement.

GE: You mentioned a 160 dB SPL_{pk}, we have made a few comments regarding how sound levels were converted before on the Morgan and Morecambe Offshore Windfarms: Transmission Assets. Have you checked your equations on this for Mona?

LS: We will come back to you on this after looking at the equations again (as I haven't seen the comments regarding this).

KL: The reason we have used the 160 dB SPL_{pk} as a basis for assessing impacts of behavioural effects is that it is based on various reports on piling and seismic (such as McCauley *et al.*, 2000, Mueller-Blenkle *et al.*, 2010) and in the absence of any agreed, published thresholds for behavioural effects. We've used higher sound level references on other projects (such as 168 dB to 173 dB SPL_{pk} used on Atlantic Array and Hornsea One), however we wanted to be precautionary on this project. *Post meeting note: many projects use the less precautionary Popper et al. (2014) thresholds for TTS as a proxy for behavioural responses; while more profound behavioural effects are likely to occur within this TTS range, we feel that using 160 dB SPL_{pk} is a better guide for assessing risk of behavioural effects on fish, and it is appropriately precautionary, whilst not being too conservative.*

GE: Was the Atlantic Array example for herring?

KL: It was for herring and shad. For some species (such as lamprey and flatfish) the 160 dB SPL_{pk} behavioural effects range will be massive over estimations of the impact, but it's appropriate to capture sensitivities of all fish species. We note that 135 dB SEL_{ss} discussed earlier is highly conservative but are still presenting it as requested by Cefas.

GE: Appreciate that you have presented these. No further comments.

LS continued to present Mona sound contours for cod, based on 160 dB SPL_{pk} at the northernmost location. There is a wide extent of high and low spawning grounds in the entire Irish Sea, and as previously discussed for herring, piling will be of short duration and intermittent. It is not expected to span throughout the entire cod spawning season (not least due to the likely weather conditions in winter) and the

	<p>maximum hammer energies modelled are not likely to occur in practice at all foundation locations.</p> <p>LS continued to present very similar findings for cod and herring at Morgan. Overlaps between sound contours (both 135 dB SEL_{5s} and 160 dB SPL_{pk}) and the mapped Douglas Bank herring spawning ground are increased, due to the closer proximity of Morgan Generation to this ground. The same justifications provided previously for Mona apply for Morgan Generation, in terms of the short-term nature of the piling phase, and the high degree of intermittency, along with the modelling being undertaken based upon the maximum potential hammer energies, which is not likely to be required in practice. The recoverability of cod and herring should also be considered, and the application of these spatial concerns during the spawning periods for these species.</p> <p>PD: Have you had additional advice on the larval phases of herring post spawning and how these will be impacted by sound?</p> <p>LS: Our assessment includes fish eggs and larvae (static) mortality ranges, which are outlined both in a table and fully in text in the chapter. They don't specifically relate to herring eggs and larvae, but are considered applicable.</p> <p>KL: Generally, adults are more sensitive so you wouldn't expect an effect on eggs and larvae at the distances shown on these contour maps.</p> <p>LS: We have used larval kernel density on the maps to show where peak aggregations of larvae are likely to be immediately post-hatching.</p> <p>PD: The spawning grounds are not necessarily as close to the Isle of Man, more so that currents transfer the larvae up to these hotspots. I can send you the most recent larval survey maps?</p> <p>LS: For the larval data, the approach broadly taken is to present data on larvae of a particular size (<10mm; i.e. those which have recently hatched and have not been subject to extensive transport by currents within the water column). This is then a good indication of where they have hatched from, and therefore where the eggs were deposited and spawning occurred. The larvae presented here is of this particular size range, as these will not likely have been carried away by the current yet.</p> <p>KL: The larvae heatmap is based on ten years of data, so is comprehensive. The data presented in the maps was provided by the Agri-food and Bioscience Institute (AFBI).</p> <p>PD: Have the AFBI looked at the assumptions in the modelling and accepted them?</p> <p>KL: Agreed to take this query away and requested that PD sends over the most recent maps and data that he mentioned.</p> <p>GE: Potentially aggregate or PSA data around the Isle of Man could help combining the larval density hotspots as herring spawning grounds. Is there a potential scenario for concurrent piling at Mona and Morgan Generation at the same time?</p>	<p>IoM Gov to send over the most recent PSA data</p>	<p>Complete</p>
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	<p>LS: Outside of the Irish Sea Offshore wind round 4 cluster there will be potential differences in the way that modelling has been done for other projects (such as at Awel y Mor, and this information is not available for the Moir Vannin Offshore Windfarm). This makes it difficult to create a concurrent piling scenario for all these projects.</p> <p>KL: For a quick answer, yes, it is possible that Morgan Generation and Mona could pile at the same time, which will be included in the CEA.</p> <p>GE: Yes, I appreciate this, and there is a low likelihood that two piles are hit at the exact same time (and how this will make modelling difficult).</p> <p>MP: There should be no overlap in piling with the Moir Vannin wind farm, based on its scoping documents.</p> <p>GV: We plan to complete construction by 2030, and Moir Vannin shouldn't be piling until after then.</p> <p>IN: Even if the ensonified areas aren't larger as a result of cumulative piling, you will still have multiple patches of ensonified areas.</p> <p>LS: This has been considered qualitatively in the CEA in terms of increased coverage by ensonified areas from multiple projects.</p>		
5.	<p><u>Underwater Sound Management Strategy (UWSMS) – presented by ST</u></p> <p>Site Integrity Plans have historically been applied to projects in the Southern North Sea (SNS), in particular those within or close to the Southern North Sea SAC, which is designated for Harbour Porpoise. In these SIP's there are defined thresholds for cumulative effects of piling – 10% in a particular season, or 20% on a particular day. Mona and Morgan Generation are not predicted to reach the 10% area threshold for the nearest harbour porpoise SAC (i.e. North of Anglesey Marine SAC), either alone or in-combination with other projects. As such, a SIP, similar to those used in the Southern North Sea SAC, is not considered appropriate to manage underwater sound impacts.</p> <p>At PEIR, outstanding concerns were raised with respect to:</p> <ul style="list-style-type: none"> • Bottlenose dolphin populations, including those associated with Welsh SACs; • Cumulative concerns about impacts of piling on cod spawning; • Concerns about piling impacts on herring spawning. <p>The Applicant is looking to agree a mechanism (similar to SIPs) that allow us to agree an approach to managing of underwater sound impacts post consent, when more details of the project construction for the individual projects, and more detail on cumulative projects in the region is known. We are producing an Underwater Sound Management Strategy (UWSMS) to do this.</p> <p>The UWSMS would allow the projects to focus on underwater sound for multiple receptors (fish and marine mammals). The project will submit an outline of the UWSMS with the applications so the stakeholders and Secretary of State can have confidence that this will be effective and agreed post consent.</p>	<p>Stakeholders to confirm whether the UWSMS is an acceptable approach to manage underwater sound impacts</p>	Complete

	<p>The UWSMS would set out the detailed project design pre-construction (e.g. the number of foundations that will need piling may be reduced, hammer energies may be revised etc.) as the application collects more information on the ground conditions.</p> <p>The version developed post-consent will contain any further environmental information e.g. cod and herring stock or spawning grounds if necessary. These have previously been used post-consent in discussion on underwater sound impacts.</p> <p>The impact assessments within offshore wind applications assume all the piling is occurring at the same time and therefore you end up with a large, conservative assessment. In reality, all cumulative projects may not be piling at the same time therefore the cumulative impacts will likely be reduced from what has been assumed in the final applications. This has been the experience for SIPs where impacts have been reduced due to phasing of projects. The UWSMS will set out potential mitigation options which could be employed if there are residual concerns about the cumulative impacts of underwater noise following refined project design. These are often agreed in principle at the application stage with final agreement achieved post consent with the final project design.</p> <p>Presented a working table of content for the UWSMS. This is may still subject to change. An outline of the UWSMS will be submitted with the application for consent along side the MMMP.</p> <p>The main advice the applicant is looking for is whether this approach would be acceptable. This approach was presented at the steering group and the project general received positive feedback. We are trying to put forward a process where the projects can continue towards consent and the detail can be discussed post-consent when further information is available.</p> <p>IN: Will timing restrictions be included in mitigation?</p> <p>KL: The spatial restrictions presented will be relevant to timing. The Applicant will want to have the option to undertake piling operations throughout the year, although there may be the need for spatial restrictions at certain times of year, depending on project design refinements that happen between now and construction; this will be part of the focus of the UWSMS.</p> <p>IN: Great.</p> <p>There were no further comments on the UWSMS presented by ST.</p>		
6.	<p><u>HRA Updates for Mona – presented by</u> [REDACTED]</p> <p>[REDACTED] discussed some key updates for the Mona Offshore Wind Project. Regarding the Menai Strait and Conwy Bay SAC, up to 8.1 km of export cable will be installed within it. Up to 10% of this cable may require protection (this is a reduction in values presented in the PEIR: 800 m reduced from 2.8 km). No cable protection higher than 70 cm. No Annex I habitat features occur within the Mona Offshore Cable Corridor (nearest is 2.4 km away).</p>		

<p>Reiterated that NRW were happy to screen out temporary and long term habitat loss and contaminated sediments based on no LSE for this SAC.</p> <p>The following impact pathways have been screened in for LSE and are assessed in the ISAA for Annex I reefs and Annex I sandbanks:</p> <ul style="list-style-type: none"> • Increases in SSC and associated deposition • Changes in physical processes • Increased risk of introduction and spread of INNS • Accidental pollution. <p>█████ summarised the assessment of increases in SSC and associated deposition. Modelling of export cable installation was undertaken with tidal forcing. Average SSC of <300 mg/l are predicted along the cable path, with the level dropping to background levels on the slack tide. Sedimentation level is small typically <0.5 mm and the greatest levels of deposition occur along the trenching route as coarser material settles. In nearshore regions the tidal flows are oriented parallel to the coastline and the plume is not predicted to encroach on the shoreline and the Menai Strait and Conwy Bay SAC features.</p> <p>J1: Have you considered including wind generated sediment transport, particularly in the nearshore area? For example, if you had a northerly wind blowing towards the coast and normal wave condition in shallow waters, this could result in potential transport of the sediment plume towards the coast?</p> <p>NS: There are only certain conditions that you could undertake these cable installation activities. The wind would need to be coming from the north or north east, and, in terms of the SAC, the tide would also need to be an ebb tide. There are a lot of factors at play. However, as the majority of work is at the seabed, most of the sediment falls back into the trench (due to the nature of the works undertaken and the coarse nature of the sediment). Softer sediments, yes, could get dispersed further albeit at lower suspended sediment concentrations. If you have wind influencing the seafloor, you also have normal sediment transport as a result.</p> <p>J1: So the tidal ellipse moves in line with the trench?</p> <p>NS: Yes, correct. Within the technical report we have the ebb and flood tidal currents and vectors. We could generate some figures showing the ellipses at multiple places along the export cable corridor.</p> <p>█████ continued to summarise that there would be no risk of an adverse effect on the integrity of the Menai Strait and Conwy Bay SAC due to increased SSCs and deposition, based on the physical processes modelling outputs presented on the slide.</p> <p>█████ summarised the assessment of changes in physical processes. Any cable protection within the SAC will be minimised and will not exceed 0.7 m. Peak tidal flows may be redirected, however this will not be detectable beyond the immediate vicinity.</p> <p>J1: Can I confirm that the cable protection will be removed?</p> <p>GV: We aren't able to fully state what will happen on this in 35 years. Where removal is the worst case this has been assessed. Where cable</p>	<p>Applicant to add figure of tidal ellipsis into the Environmental Assessment</p>	<p>With the Environmental Statement</p>
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	<p>protection remaining in situ is the worst case scenario is the worst case, this has been assessed.</p> <p>██████: We will ensure this is worded correctly in the HRA with regards to the MDS for this impact (removal or leaving cable protection <i>in situ</i>). It can be concluded that there is no risk effect on the integrity of the Menai Strait and Conwy Bay SAC due to changes in physical processes.</p>		
7.	<p><u>Agreement Logs – presented by ST</u></p> <p>Progress is being made towards submission (Q1 and Q2 2024).</p> <p>As discussed in previous EWG meetings we have made good progress on methodologies, and these have been logged in the agreement logs. The next aim is to map out progress towards conclusions and mitigation agreements as we move to application submission. The projects are looking to agree topics now based on the PEIR and project update and information provided in this presentation, and other EWG discussions. The projects are aware that there will be some items under discussion and so agreements will be made once these discussions take place and as the projects progress the advice received from the PEIR and EWGs.</p> <p>The agreement log includes a request for agreement that for the project alone there will not be any adverse effects on integrity of designated sites. This is based on the PEIR and updates shown today that there is no greater magnitude of impact than was presented at PEIR. The applicant understands the EWG will wish to see the full cumulative assessment ahead of providing agreements on impact levels, but we wanted to highlight that we are not in a position of significant/adverse effects or impacts for Mona or Mogan Gen.</p> <p>Some additional items in the agreement log and others have been flagged as under discussion, and some have been flagged as agreed. We would like to map a pathway to agreement and where we want to progress to, up to application. These logs will form framework for statements of common ground.</p> <p>Minutes will be circulated within two weeks of today.</p>	<p>Stakeholders to review and update the agreement log</p>	<p>Ongoing</p>

B.7.2 Response from Cefas regarding the meeting minutes

From: [REDACTED]
Subject: RE: Morgan Mona BE, FSF, PP EWG meeting 6
Date: 08 January 2024 16:21:20
Attachments: [image001.png](#)
[image002.png](#)

[REDACTED]

Please see below comments from the underwater noise team:

Please note that no one from our noise team attended this meeting on the 7th December. Therefore, I defer to Cefas fisheries advisors who were present to confirm whether they are content with the meeting minutes.

I have provided thoughts on the Underwater Sound Management Strategy (UWSMS) which was also discussed during the marine mammal ETG held on the 5th December 2023. We (Cefas) would be interested to hear Natural England's views on this, specifically the applicant's view that a Site Integrity Plan (SIP) is not considered appropriate to manage noise impacts. If an Underwater Sound Management Strategy (UWSMS) is agreed as the preferred approach, then it would be helpful to set out in advance the conditions under which noise abatement, for example, will be required, so that there is a clear set of boundaries within which the developer will be working. This approach would still allow for the construction planning to evolve, but it would also give confidence that appropriate safeguards are in place at the stage of giving consent to the project, rather than leaving it to time-pressured discussions (which is too often the case) after consent has been granted.

Many thanks

[REDACTED]

Our MMO Values: Together we are **Accountable**, **Innovative**, **Engaging** and **Inclusive**



Enabling sustainable growth in our marine area

To receive information from the MMO's Marine Conservation Team regarding marine protected areas in England, please email "Contact me" to

B.8. Benthic ecology, Fish and shellfish and Physical processes EWG agreement log

Morgan Agreement Log for the Benthic ecology, fish and shellfish ecology and physical processes Expert Working Group

Item	Meeting Date	Issue on which agreement is sought	Topic	Consultee	Progress of agreement in the EWG	Agreement?	Notes
1	17/02/2022	Agreement on the Remit and Inputs to the EWG (as set out in Section 4.2 of the Evidence Plan Template).	Benthic ecology, fish and shellfish ecology and physical processes	NRW	NRW Advisory (A) agree in principle to the remit and inputs to the EWG, although, as stated previously, NRW (A) needs to be able to carefully consider, plan and manage our resources at all times and as such we can only commit to the Evidence Plan Process on a 'best-endeavours' basis. It should also be noted, that the Evidence Plan process falls under our Discretionary Advice Service – whilst we aim to meet demand for the service, there may be times when our capacity to do so is limited. In those instances, we reserve the right to not offer the service. NRW (A) would like to clarify in Section 3.1.1.3 Natural Resources Wales Advisory within the Evidence Plan Template that JNCC remain the statutory consultee for Welsh waters beyond 12 nm, but we will endeavour to align our advice where possible.	Agreed	NRW (A) will endeavour to 'agree' the points outlined in Section 4.2 where possible, but as acknowledged within the Evidence Plan process, it may not always be possible to reach full agreement between all parties. Where agreement is not reached, NRW (A) will advise according to our remit and clearly outline our reasoning. Similarly, in the second to last bullet point in Section 4.2.1, it may not be possible to 'ensure' the effects are reduced to an acceptable level. It should be noted that any advice that we provide is advisory only and will not be binding, or in any way restrict NRW in performing its statutory functions. All advice provided by NRW will be based on the information that has been made available to us, and policies that are in place at that time. In response to the sector topics covered within this EWG, whilst NRW (A) acknowledge that input from additional receptor specialists can be overseen by the NRW Advisory Case Manager, we reiterate the need to include discussions on Water Quality and WFD where appropriate.
			Benthic ecology, fish and shellfish ecology and physical processes	JNCC	JNCC are content with the remit and inputs outlined in Section 4.2 of the Evidence Plan Template, however, we would like to take this opportunity to highlight that (with regard to Section 3.1.1.4 Joint Nature Conservation Committee) JNCC's role in relation to offshore renewables in English waters has been delegated to Natural England. Natural England is now authorised to exercise the JNCC's functions as a statutory consultee in respect of certain applications for offshore renewable energy installations in inshore and offshore waters (0-200nm) adjacent to England. Therefore, JNCC would not look to provide comment on the Morgan project unless we anticipate an impact on a jointly managed site (i.e. a site jointly managed by ourselves and Natural England). As such JNCC have not provided feedback in relation to the Morgan project within this response. We are currently holding internal discussions regarding this issue and how this can be managed in practice. We will endeavour to provide clarity as soon as is possible. We also note that Section 3.1.1.3 Natural Resources Wales Advisory states that Natural Resources Wales Advisory (NRW) will provide comment on offshore elements of the project 'within and outside of 12nm from the Welsh coast'. We would like to highlight that JNCC are the statutory consultee for offshore Welsh waters but will, throughout this process, look to liaise with NRW to provide joint advice where it is deemed appropriate.	Agreed	04/08/2023: For Information Only, JNCC will not look to provide comment on the Morgan Project. As previously stated, JNCC's role in relation to offshore renewables in English waters has been delegated to Natural England (NE). We defer to NE regarding the Morgan Project.
			Benthic ecology, fish and shellfish ecology and physical processes	TWT	TWT are happy to accept the minutes and agree to the log to date.	Agreed	None
			Benthic ecology, fish and shellfish ecology and physical processes	Natural England	Natural England provided comment on the draft Evidence Plan, via a comments log, on 4 November 2021. It was our view that the Evidence Plan set out the basic framework of the Evidence Plan. This was ahead of the 1st Evidence Plan meeting on 16 November 2021. We welcome the update of the Evidence Plan (version F02, provided 4 February 2022) which has incorporated our earlier comments. The remit of the Benthic Ecology, Fish and Shellfish Ecology and Physical Processes EWG as set out under 4.2 of the Evidence Plan (v F02) is appropriate and in line with Natural England's previous comments, we agree the remit as set out. We welcome the outlined timetable of future meetings and their focus as presented in Table 4.2.	Agreed	None
2	17/02/2022	Agreement on Ways of Working document, including timescales.	Benthic ecology, fish and shellfish ecology and physical processes	NRW	NRW (A) agree in principle to the Ways of Working document and the timescales for responding, although we reiterate that more time may be required for a response if there are large / multiple documents or due to unforeseen circumstances. Where deadlines cannot be reached, NRW (A) will notify RPS / bp / EnBW as soon as possible. As above, NRW (A) can only commit to the Ways of Working on a 'best endeavours' basis and reserve the right to not offer our Discretionary Advice Service at times when our capacity to do so is limited.	Agreed	None
			Benthic ecology, fish and shellfish ecology and physical processes	JNCC	JNCC are satisfied with the content of the Ways of Working document and feel that the proposed timings are reasonable. Where there may be an issue in achieving the timeframe set out within the Ways of Working document, JNCC will be sure to contact bp / EnBW and RPS in a timely manner to ensure minimal disruption to the progress of the agreement(s) in question.	Agreed	Any advice or assistance provided by JNCC via our Discretionary Advice Service is advisory only, and with reference to the General terms and conditions for DAS chargeable services, JNCC excludes any warranty that the advice provided by its officers represents JNCC's opinion or otherwise binds JNCC when acting as a Statutory Consultee.
			Benthic ecology, fish and shellfish ecology and physical processes	TWT	TWT are happy to accept the minutes and agree to the log to date.	Agreed	None
			Benthic ecology, fish and shellfish ecology and physical processes	Natural England	We welcome the Evidence Plan Ways of working document (version F01, provided 4 February 2022) as a clear reference document. Natural England agrees with the Ways of Working document which aligns with previous comments in terms of timescales for review and comment provided as part of our comments on the draft Evidence Plan (4 November 2022). As noted in the document, it may be necessary for timescales to be amended to ensure sufficient time to review and comment (e.g. large documents or multiple documents), in which case we will communicate and agree an alternative deadline.	Agreed	None
3	17/02/2022	Agreement on broad approach to future surveys – that previous feedback has been taken into account in future scope. Detailed scope of survey to follow spring 2022.	Benthic ecology	NRW	NRW Advisory agree with the broad approach taken for future surveys and that previous feedback to date has been taken into account in future scope.	Agreed	None
			Benthic ecology	JNCC	JNCC are content with the surveys that have been undertaken as well as those scheduled for the array's Zone of Influence and the cable route. With regard to the upcoming surveys, we would like to refer bp / EnBW and RPS to previous advice provided by JNCC (Ref OIA-08126, 11 June 2021) regarding benthic survey scopes which may prove useful. We appreciate that the benthic survey scopes will be prepared and discussed with the EWG through the Evidence Plan process.	Agreed	None
			Benthic ecology	TWT	TWT are happy to accept the minutes and agree to the log to date.	Agreed	None
			Benthic ecology	Natural England	n/a	Agreed	Natural England have set up a SharePoint Online (SPOL) site to share Natural England's advice on the environmental considerations and use of data and evidence to support offshore wind and cable projects in English waters. These should be considered when developing the baseline characterisation and designing future surveys. Advice provided on this site includes Natural England and Joint Nature Conservation Committee (JNCC)'s shared advice on 'Nature conservation considerations and environmental best practice for subsea cables in English inshore and UK offshore waters.'
4	17/02/2022	Agreement on broad approach to baseline characterisation for Benthic Ecology.	Benthic ecology	NRW	NRW Advisory agree on the broad approach to characterisation for Benthic Ecology in particular now that the Zone of Influence will be sampled.	Agreed	NRW (A) would welcome the opportunity to review the assessment / data associated with the Sea-pen and Burrowing Megafauna Communities in due course.
			Benthic ecology	JNCC	JNCC note the presence and initial analysis of sea-pen and burrowing megafauna communities within the array area and welcome the opportunity to review the assessment of this feature. JNCC provide the following information as it may prove useful in further analysis. The definition of the OSPAR T&D feature 'Seapens and burrowing megafauna communities' is the subject of on-going discussions between Contracting Parties as scientific knowledge improves, particularly for deep sea areas. OSPAR (2008) defines the 'Seapen and burrowing megafauna communities' feature as 'Plains of fine mud, at water depths ranging from 15-200m or more, which are heavily bioturbated by burrowing megafauna with burrows and mounds typically forming a prominent feature of the sediment surface. The habitat may include conspicuous populations of seapens, typically Virgulina mirabilis and Pennatula phosphorea.' The narrative then notes that - "...the tall seapen Funiculina quadrangularis may also be present." The OSPAR (2010) Background Document for Seapen and Burrowing megafauna communities instead notes that "... burrows and mounds may form a prominent feature of the sediment surface with conspicuous populations of seapens ..." At a meeting of the OSPAR Contracting Parties in Bergen in November 2011, a key recommendation was that the presence of burrowing megafauna is the essential defining characteristic of the feature; the presence or absence of seapens does not in itself define the feature. Seapens may form a prominent feature of the seabed surface, but do not have to be present to define the OSPAR T&D habitat (SS.SMu.CFIMu.SpnMeg and/or SS.SMu.CFIMu.MegMax). This assumption is equally true of the Scottish 'burrowed mud' PMF, with the exception of the seapen Funiculina quadrangularis, which is designated as part of this PMF. JNCC believe that this is the most up-to-date position on the composition of this habitat. JNCC have published the following report on the UK interpretation of the feature: JNCC clarifications on the habitat definitions of two habitat Features of Conservation Importance: Mud habitats in deep water, and; Seapen and burrowing megafauna communities In recent advice to Defra (concerning data from the Nephrops fisheries stock assessments) the threshold considered to demonstrate the presence of the OSPAR habitat Seapen and burrowing megafauna communities is a burrow density of >0.2/m2. For further information on classifying Seapen and burrowing megafauna communities from Nephrops stock surveys see Section 5.1 of the JNCC's 2014 advice on possible offshore Marine Conservation Zones considered for consultation in 2015, available at: http://data.jncc.gov.uk/data/91e7f60a-5693-4b8c-8901-11f16e663a12/2-pre-consultation-T2mcz-advice-140627-V5.0.pdf JNCC also notes the presence of habitat which is being categorised as "low" resemblance to rocky reef habitat and would like to provide the following guidance: When assessing potential stony reef habitat, the use of Irving (2009) guidelines is correct, however, we would like to make bp / EnBW and RPS aware that JNCC and the Statutory Nature Conservation Bodies have also produced further guidance helping to refine the characterisation of 'low resemblance' reef. JNCC Report 656 published in September 2020 provides some overarching principles for the application of the Annex I stony reef guidance, specifically in relation to 'low resemblance' reef and the potential for reefs to have 'medium' or 'high' resemblance classification even when one or more of the criteria are 'low'. We request that the recent surveys be reviewed against this report to ensure that there are no other areas of 'medium' or 'high' resemblance reef present which may require further mitigation planning. http://data.jncc.gov.uk/data/4b60f435-727b-4a91-aa85-9c0f99b2c596/JNCC-Report-656-FINAL-WEB.pdf	n/a	For information Only, JNCC will not look to provide comment on the Morgan Project. As previously stated, JNCC's role in relation to offshore renewables in English waters has been delegated to Natural England (NE). We defer to NE regarding the Morgan Project.
			Benthic ecology	NE	N/A - agreed via email on 5th April 2024.	Agreed	None

Morgan Agreement Log for the Benthic ecology, fish and shellfish ecology and physical processes Expert Working Group

Item	Meeting Date	Issue on which agreement is sought	Topic	Consultee	Progress of agreement in the EWG	Agreement?	Notes
5	17/02/2022	Agreement on broad approach to characterisation for Fish and Shellfish Ecology.	Fish and shellfish ecology	NRW	NRW Advisory agree on the broad approach to characterisation for Fish and Shellfish Ecology.	Agreed	None
			Fish and shellfish ecology	NE	N/A - agreed via email on 5th April 2024.	Agreed	None
			Fish and shellfish ecology	JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	None
6	17/02/2022	Agreement on broad approach to characterisation for Physical Processes.	Physical processes	NRW	NRW Advisory agree on the broad approach to characterisation for Physical Processes.	Agreed	None
			Physical processes	NE	N/A - agreed via email on 5th April 2024.	Agreed	None
			Physical processes	JNCC	JNCC have no further comments at this stage in this process.	Agreed	None
7	29/11/2022	Agreement on broad approach to characterisation for Benthic Ecology.	Benthic ecology	Natural England	Natural England broadly agree with the approach characterisation for benthic ecology as presented at the expert working group meeting on 29th November 2022.	Agreed	None
			Benthic ecology	NRW	NRW Advisory agree on the broad approach to characterisation for Benthic Ecology.	Agreed	None
			Benthic ecology	JNCC	JNCC agree on the broad approach to characterisation for Benthic Ecology	Agreed	None
8	29/11/2022	Agreement to the scoping of impacts for the EIA and HRA for Benthic Subtidal and Intertidal Ecology	Benthic ecology	Natural England	Natural England broadly agree with the scoping of impacts for the EIA and HRA for Benthic Subtidal and Intertidal Ecology, as presented at the expert working group meeting on 29th November 2022.	Agreed	None
			Benthic ecology	NRW	NRW Advisory agree with the scoping of impacts for the EIA and HRA for Benthic Subtidal and Intertidal Ecology.	Agreed	None
			Benthic ecology	JNCC	With regard to the impacts presented in this EWG, JNCC agree with the scoping of impacts for the EIA and HRA for Benthic Subtidal Ecology. We would, however, like to refer RPS, EnBW and bp back to our Scoping response dated 1 June 2022 (Ref OIA-08713) where we provided the following advice; "we would ask that Habitat Alteration be scoped in. JNCC acknowledge that 'colonisation of hard structures' has been scoped in however, JNCC consider 'physical change to another sediment type' to be a pressure for the offshore wind operation phase and the introduction of hard substrate into naturally sandy or muddy seabeds has the potential to change or introduce new, alternative, biological communities. In addition, there is the potential for indirect impacts on surrounding habitats including the affects from scour and changes in hydrodynamics resulting from the introduction of hard substrate. We would also advise the inclusion of the impact to adjacent habitats from the removal and deposition of marine growth from hard substrates which may potentially impact a larger area than the infrastructure footprint."	Agreed with Caveat	Further comments reiterating these points have been included in JNCC's PEIR response.
9	29/11/2022	Agreement to the scoping of impacts for the EIA and HRA for Fish and Shellfish Ecology	Fish and shellfish ecology	Natural England	Natural England broadly agree with the scoping of impacts for the EIA and HRA for Fish and Shellfish Ecology, as presented at the expert working group meeting on 29th November 2022.	Agreed	None
			Fish and shellfish ecology	NRW	NRW Advisory agree with the scoping of impacts for the EIA and HRA for Fish and Shellfish Ecology	Agreed	None
			Fish and shellfish ecology	JNCC	Outside of our remit.	n/a	None
10		Agreement to the scoping of impacts for the EIA and HRA for physical processes	Physical processes	NRW	No objections raised with regards to scope of physical processes.	Agreed	
			Physical processes	JNCC	No objections raised with regards to scope of physical processes.	Agreed	
			Physical processes	Cefas	No objections raised with regards to scope of physical processes.	Agreed	
			Physical processes	Natural England	No objections raised with regards to scope of physical processes.	Agreed	
11	29/11/2022	Agreement on approach to noise modelling and approach to assessment following clarifications provided in EWG.	Fish and shellfish ecology	Natural England	Natural England agree to the approach to noise modelling and approach to assessment as presented at the expert working group meeting on 29th November 2022.	Agreed	None
			Fish and shellfish ecology	NRW	NRW Advisory largely agree with the approach to modelling and approach to assessment following clarifications provided in the EWG, but await further clarification on e.g. sandeel habitat / herring spawning as per comments provided within our scoping response.	Agreed	Requires further clarification
			Fish and shellfish ecology	JNCC	Outside of our remit.	n/a	None
12	11/07/2023	Agreement on physical processes modelling strategy	Physical processes	NRW	Modelling strategy with regard to PEIR to ES project changes: Advice note issued 14/08/2023 and follow up meeting 18/08/2023	Agreed	No issue with using existing PEIR study as supporting evidence for ES PDE
			Physical processes	NRW	Overarching strategy: "NRW Advisory (A) cannot rule out further modelling at this stage as there were a number of concerns raised during the PEIR phase that may potentially require more focused modelling."	Agreed	Concerns relate largely to location, extent and height of cable protection (particularly in shallow/near shore areas). No further modelling or revised assessment required provided the PEIR modelling assumptions are reflected in the PDE. ES adopted measures now include this (in concert with compliance with MCA navigation restrictions).
			Physical processes	JNCC	JNCC would not look to feedback on the Modelling Strategy and defer the NRW for comment.	n/a	
			Physical processes	NE	Comments raised about the modelling requirements in our PEIR response (e.g. Plough dredging, assessing concurrent multiple activities and potential overlapping plumes, validating model conclusions).	Under discussion	NE confirming with specialist.
			Physical processes	MMO/ Cefas	No comments from physical processes advisor. Agreement on approach from Fisheries, Fish & Shellfish and Benthic Ecology Advisors.	Agreed	
13	11/07/2023	There will be no significant effects on physical processes in EIA terms for the project alone or cumulatively with other plans and projects.	Physical processes	NRW		Defer to JNCC on this aspect	Defer to JNCC on this aspect for Morgan.
			Physical processes	Natural England	NE unable to agree on these points until we have seen the full assessment	Under discussion	
			Physical processes	JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	
			Physical processes	Cefas	No comments.		
		The approach used for determining LSE on European sites with Annex I habitats as features is appropriate and that all sites within the zone of influence of indirect effect from SSC and changes in physical processes have	Benthic ecology (HRA)	NRW	NRW Advisory agree with the approach used for determining LSE and all sites within the ZOI have been screened in. Clarifications were provided in the EWG as to why the Dee Estuary SAC was screened into the ISAA and not the PEIR. It was noted the ISAA was produced prior to the outputs of the Physical Process Modelling and as such the site was screened in on a precautionary basis. The modelling has since confirmed there site falls outside the Zoi	No comments	
			Benthic ecology (HRA)	Natural England	NE unable to agree on these points until we have seen the full assessment	Agreed	
						Under discussion	

Morgan Agreement Log for the Benthic ecology, fish and shellfish ecology and physical processes Expert Working Group

Item	Meeting Date	Issue on which agreement is sought	Topic	Consultee	Progress of agreement in the EWG	Agreement?	Notes
14	11/07/2023	been identified (noting that the Dee Estuary SAC falls outside the Zol and will be screened out of the LSE screening for the final application).		JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	
				Cefas	No comments.		
15	11/07/2023	The approach used for determining LSE on European sites with Annex I I diadromous fish as features is appropriate and that all the relevant sites have been identified.	Fish and shellfish ecology (HRA)	NRW		Agreed	
				Natural England	From Natural England's PEIR response: (NE Ref 3.15) Underwater modelling should be based solely on stationary receptor rather than a fleeing receptor for fish.	Under discussion	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	Yes the Applicant's approach is appropriate, however please refer to 'item 20' for the effects of UWN on Annex II receptors in the SAC.		
16	11/07/2023	Agreement that the fish and shellfish ecology study area that was defined in the PEIR is appropriate for the baseline characterisation	Fish and shellfish ecology	NRW	No objections raised regarding the fish and shellfish ecology study area	Agreed	
				Natural England	No objections raised regarding the fish and shellfish ecology study area	Agreed	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	No objections raised regarding the fish and shellfish ecology study area	Agreed	
17	11/07/2023	The characterisation of herring spawning potential is sufficient to inform the EIA, with the caveat that additional heat mapping of herring larval data is presented for the Environmental Statement, that PSA data is presented for the Environmental Statement to allow for data cross-checking by stakeholders and that additional PSA sample data is extracted from the Cefas OneBenthic tool for the project region to provide a wider context regarding substrate suitability.	Fish and shellfish ecology	NRW		Agreed	
				Natural England	Natural England broadly agrees with the approach for characterisation of herring spawning potential.	Agreed	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	<i>Cefas: All the comments and discussion from the meeting with the MMO and Cefas on their initial PEIR feedback regarding feedback on the MarineSpace approach to heatmapping should be considered. It was noted that the MarineSpace approach is not ideal for numbers in the Irish Sea, where abundances were much lower. The Applicant should look at adapting this approach where possible. It would be useful to look at the NIHLS larval data as a 10-year dataset and to provide contour mapping based on this, which may highlight some particular "hot spots". In addition, using additional sources to support the substrate classification such as Cefas' OneBenthic tool to extract more PSA data from the region (where available) to provide characterisation beyond the surveyed areas</i> Cefasfisheries advisors reviewed and provided some brief comments on RPS's provisional herring larval heat/contour mapping for Mona and Morgan Generation Assets in September 2023 (Cefas fisheries advice to Megan Stroudley (MMO) from Charlie Hobbs (Cefas) dated 15th September 2023). RPS's approach uses the full aggregated 10-year NINEL dataset, but with heat mapping of these as a kernel density map. We agreed that the heatmap provided looked appropriate and that the NINEL data looks to have been weighted appropriately. We were content that the data had been interpreted and presented appropriately. We made additional minor recommendations as follows: It would be helpful to see the array boundaries mapped on the figure to give an indication of their relative positions, and to have UWN contours for the UWN assessment (including the 135dB behavioural effect threshold) overlain onto the heatmap to indicate a range of effect from UWN in relation to areas of higher 'heat'. As in the PEIR, ten years of IHLS data should still be presented alongside this plot to capture the inter-annual variation appropriately in the ES.	Under discussion	
18	11/07/2023	The characterisation of sandeel potential is sufficient to inform the EIA with the caveat that PSA data is presented for the Environmental Statement to allow for data cross-checking by stakeholders and that additional PSA sample data is extracted from the Cefas OneBenthic tool for the project region to provide a wider context regarding substrate suitability.	Fish and shellfish ecology	NRW		Agreed	
				Natural England	Natural England broadly agrees with the approach for characterisation of potential sandeel habitation and spawning.	Agreed	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	Applied to both herring and sandeel substrate suitability: using additional sources to support the substrate classification such as Cefas' OneBenthic tool to extract more PSA data from the region (where available) to provide characterisation beyond the surveyed areas	Under discussion	
19	11/07/2023	The correct designated sites and appropriate fish and shellfish ecology features have been identified within the baseline characterisation and considered where appropriate in the EIA and HRA.	Fish and shellfish ecology	NRW	No objections raised regarding the designated sites presented with relevant fish features within the PEIR and prior/subsequent Expert Working Group meetings.	Agreed	
				Natural England	No objections raised regarding the designated sites presented with relevant fish features within the PEIR and prior/subsequent Expert Working Group meetings.	Agreed	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	No objections raised regarding the designated sites presented with relevant fish features within the PEIR and prior/subsequent Expert Working Group meetings.	Agreed	
20	11/07/2023	There will be no adverse effects on integrity for SACs designated for fish features for any impacts for the project alone or in combination.	Fish and shellfish ecology	NRW	In Section 42 Consultation responses: NRW (A) agree with the conclusions of no adverse effects on site integrity for qualifying Annex II diadromous fish features on the Dee Estuary and River Dee and Bala Lake SACs.	Agreed	
				NE	For Morgan Generation, Natural England agrees that there will be no adverse effects on integrity for SACs designated for fish features for any impacts for the project alone or in combination.	Agreed	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	The mapped noise contours of between 120dB and 150dB overlap the SACs in the vicinity of the project. Whilst I appreciate that these values fall below the 186dB SELcum threshold for TTS in fish, given that there is considerable uncertainty with the UWN modelling provided at this stage, SAC's with fish as designated features should not be screened out of further assessment until the necessary clarifications with the UWN modelling, and assessment have been resolved.	Under discussion	
20	11/07/2023	On the basis that there is no direct overlap with fish features of MCZ's of sound contours	Fish and shellfish ecology	NRW		Agreed	Updated 09/01/2024, NRW (A) agree there is no direct overlap with fish features of MCZs of sound contours as the only Welsh MCZ is Skomer, which does not include any fish features.
				NE	For Morgan, Natural England agrees that there will be no risk of hindering conservation objectives of any MCZs with fish features (from underwater sound or any other impacts).	Agreed	Agreement updated 09/01/2024
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	

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22		with the potential to cause injury or behavioural responses, there will be no risk of hindering conservation objectives of any MCZs with fish features (from underwater sound or any other impacts).		Cefas	The mapped noise contours of between 120dB and 150dB appear to overlap the Wyre Lune and Ribble Estuary MCZs. Whilst I appreciate that these values fall below the 186dB SELcum threshold for TTS in fish, given that there is considerable uncertainty with the UWN modelling provided at this stage, MCZs with fish as designated features should not be screened out of further assessment until the necessary clarifications with the UWN modelling, and assessment have been resolved.	Under discussion	
23	11/07/2023	For all impacts, other than underwater sound, no significant effects on fish and shellfish receptors are predicted for the project alone and cumulatively.	Fish and shellfish ecology	NRW		Agreed	Agreement updated 09/01/2024
				NE		Under discussion	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	Agreed, Other than UWN we would not expect significant impacts to fish receptors. The impacts of UWN on cod and herring should form the focus of the assessment along with designated Annex II fish species. I defer to Cefas shellfish advisors for any comments relating to shellfish receptors.	Agreed	
24	11/07/2023	Measures adopted as part of the project (as set out in Table 8.17 of the PEIR) are appropriate and agreed to ensure significant effects are avoided, other than underwater sound.	Fish and shellfish ecology	NRW		Agreed	Agreement updated 09/01/2024
				NE		Under discussion	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	Yes, the tertiary mitigation measures presented by the Applicant seem sufficient to prevent significant effects on fisheries receptors and are as follows: Development and adherence to a Cable Specification and Installation Plan to minimise the impacts of EMF to fish receptors, Cefas fisheries advisors recommend a minimum cable burial depth of 1.5m. Development of, and adherence to, an offshore Environmental Management Plan to reduce the potential impacts of any pollution events. Actions to minimise Invasive Non-Native Species (INNS), including a biosecurity plan to limit spread and introduction of INNS, Offshore Environmental Management Plan will be issued to all Project vessel operators to prevent collisions with megafauna. It should be noted that for the impacts of UWN the use of piling soft-start and ramp-up measures will likely not be sufficient to avoid all significant impacts to fish receptors.	Agreed	
25	11/07/2023	The approach to underwater sound modelling, including soft starts and ramp ups is appropriate, noting that these will not be effective for all fish and shellfish receptors.	Fish and shellfish ecology	NRW	NRW do not agree that underwater sound modelling and assessment should be based on soft starts or ramp ups.	Agreed	Update 09/01/2024 - NRW Advisory agree with the approach and note the acknowledgement that soft start is not necessarily effective (and therefore cannot be used as mitigation) for all species.
				NE	NE do not consider soft start piling as viable mitigation given the lack of evidence to support this.	Under discussion	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	Cefas agree that modelling including soft starts and ramp ups is fairly standard and agree that this approach is acceptable.	Agreed	
26	11/07/2023	The approach to underwater sound modelling based on presentation of both static receptors and those moving away from the source is appropriate.	Fish and shellfish ecology	NRW		Agree, with caveat	Update 09/01/2024 - NRW Advisory agree with this approach, but note that we will base our advice on the information provided for fish as static receptors, as NRW (A) does not agree with the use of the
				NE	Underwater modelling should be based solely on stationary receptor rather than a fleeing receptor for fish.	Under discussion	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	Cefas fisheries advisors do not support the use of a fleeing receptors. Modelling for fish should be based on a static receptor. The Applicant is welcome to model both, however only the impacts to the static receptor will be seen as relevant.	Agreed	
27	11/07/2023	Cod and herring should be considered of high sensitivity to underwater sound	Fish and shellfish ecology	NRW	NRW agree with the MMO that cod should be considered as having high sensitivity to sound.	Agreed	
				NE	NE defers to CEFAS advice on impacts to herring spawning from underwater noise.	n/a	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	Cefas maintain that cod should be classed as high sensitivity to underwater sound.	Agreed	
28	12/10/2023	For piling impacts, no significant effects are predicted on fish and shellfish receptors, other than cod and herring during the spawning period.	Fish and shellfish ecology	NRW		No comments in agreement log	
				NE		No comments in agreement log	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	No, as per the response to item 20, we would like to see additional UWN modelling in order to rule out impacts to Annex II fish species.	Under discussion	
29	12/10/2023	For piling impacts, although a significant effect (in EIA terms) is predicted on herring and cod spawning, any such effects will be managed and avoided through measures set out in the Piling Strategy, which will be agreed with stakeholders post consent.	Fish and shellfish ecology	NRW		Under discussion	Update 09/01/2024 - It is not possible for NRW (A) to agree that effects to herring and cod spawning will be managed with a Piling Strategy, without the opportunity to review this document and any
				NE		Under discussion	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	No. Mitigation for cod and herring (and any other species where applicable) from underwater noise should be agreed at the time of consent, rather than post-consent and should be agreed before any UWSMS is accepted.	Under discussion	
30	12/10/2023	The regional benthic subtidal and intertidal ecology study area that was defined in the PEIR is appropriate for the baseline characterisation.	Benthic ecology	NRW	NRW Advisory agree with the regional benthic subtidal and intertidal area defined in the PEIR	Agreed	
				NE	NE broadly agrees with the regional benthic subtidal and intertidal ecology study area being appropriate for the baseline characterisation.	Agreed	
				JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	
				Cefas	No comments.	Agreed	
	12/10/2023	Sufficient site-specific and desktop data has been collated to appropriately characterise the baseline benthic subtidal and intertidal ecology environment to inform the EIA.	Benthic ecology	NRW	NRW Advisory have reviewed the Benthic Technical report and agree sufficient site-specific and desktop data has been collated to inform the EIA	Agreed	
				NE	NE broadly agrees that sufficient site-specific and desktop data has been collated to appropriately characterise the baseline subtidal and intertidal ecology environment to inform the EIA.	Agreed	
				JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	

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31				Cefas	No comments.		
						Agreed	
	12/10/2023	The benthic intertidal ecology baseline, including identification of IEFs, is agreed.	Benthic ecology	NRW		Agreed	
				NE	NE broadly agrees	Agreed	
				JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	
				Cefas	No comments.		
32						Agreed	
	12/10/2023	The correct designated site (i.e. the Menai Strait and Conwy Bay SAC), and appropriate benthic habitat features, have been identified and taken forward for consideration in the EIA and all other designated sites (including MCZs) with benthic features fall outside the ZOI and do not require assessment.	Benthic ecology	NRW	NRW Advisory agree the correct designated site has been identified and taken forward for consideration in the EIA. With regards to the benthic habitat features that have been screened in, it would be useful to overlap the project specific outputs of the physical processes assessment with the Annex I features of the Menai Strait and Conwy Bay SAC in order to see the spatial extent of the physical process impacts in the SAC. At present it is difficult to understand whether there is any	Under discussion	Update 09/01/2024 - It is not possible for NRW (A) to agree that all appropriate benthic habitats have been screened in without full understanding of any overlap between physical processes impacts and
				NE	NE broadly agrees	Agreed	
				JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	
				Cefas	No comments.		
33						Agreed	
	12/10/2023	In is appropriate to scope out accidental pollution from the benthic subtidal and intertidal ecology chapter (noting that effects from the release of bentonite (a chemically inert, natural clay) are assessed in the increased in SSC and sediment deposition impact pathway).	Benthic ecology	NRW	NRW Advisory agree it is appropriate to scope out Accidental Pollution from the benthic ecology EIA chapter provided standard mitigation practices are incorporated into the project design such as production and adherence to a CEMP.	Agreed	
				NE	NE broadly agrees	Agreed	
				JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	
				Cefas	No comments.		
34						Agreed	
	12/10/2023	Noting the clarification points bulleted below, the potential impacts assessed represent a comprehensive list of potential effects on benthic ecology from the Morgan Offshore Wind Project. - Habitat alteration/physical change to another sediment type is fully described and assessed in the assessment of long term habitat loss. - Secondary scour is scoped out of Volume 2, Chapter 1: Physical processes and an assessment is therefore no required in the benthic chapter	Benthic ecology	NRW	NRW Advisory agree that the proposed project design will deal with the same problem as the Menai Strait and Conwy Bay SAC. Therefore NRW (A) agree secondary scour can be scoped out and dealt with in the context of detailed design. There is now a commitment to not place any cable protection in Constable Bank and no Annex I features have been found in the section of the ECR that interacts with the Menai Strait and Conwy Bay SAC.	Agreed	
				NE			
				JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	
				Cefas	No comments.		
35						Agreed	
	12/10/2023	The list of projects screened into the CEA in the EIA and the in-combination assessment in the HRA are appropriate.	Benthic ecology	NRW	NRW Advisory understand that an updated HRA methodology note / long-list of projects screened into the CEA / in-combination assessment will be provided for review shortly. Following the list presented at PEIR, NRW A recommended inclusion of e.g. Offshore elements of the HyNet project, so it would be useful to review the final list prior to final agreement.	Under discussion	
				NE	NE broadly agrees	Agreed	
				JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	
				Cefas	No comments.		
36						Agreed	
	12/10/2023	The list of projects screened into the CEA in the EIA and the in-combination assessment in the HRA are appropriate.	Fish and shellfish ecology	NRW	NRW Advisory understand that an updated HRA methodology note / long-list of projects screened into the CEA / in-combination assessment will be provided for review shortly. Following the list presented at PEIR, NRW A recommended inclusion of e.g. Offshore elements of the HyNet project, so it would be useful to review the final list prior to final agreement.	Under discussion	
				NE	NE broadly agrees	Agreed	
				JNCC	We would like to take the opportunity to flag that Fish and Shellfish Ecology falls outside of JNCC's remit and we would not therefore look to comment further.	n/a	
				Cefas	Yes, as far as I can tell. The list of developments with potential cumulative interactions will continue to be updated, for example the Isle of Man OWF will be added when project information is available. I defer to the MMO to confirm that the list of projects in the CEA and HRA is complete.		
37						Agreed	
	12/10/2023	The list of projects screened into the CEA in the EIA and the in-combination assessment in the HRA are appropriate.	Physical processes	NRW	NRW Advisory understand that an updated HRA methodology note / long-list of projects screened into the CEA / in-combination assessment will be provided for review shortly. Following the list presented at PEIR, NRW A recommended inclusion of e.g. Offshore elements of the HyNet project, so it would be useful to review the final list prior to final agreement.	Under discussion	
				NE	NE broadly agrees	Agreed	
				JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	
				Cefas	No comments.	Agreed	
38						Under discussion	
		The impact pathways assessed for benthic subtidal ecology (intertidal detailed separately) will not result in significant effects in EIA terms given the implementation of the measures adopted as part of Morgan Offshore Wind Project	Benthic ecology	NRW	NRW Advisory are unable to agree to this until we have reviewed the assessments, following submission of the DCO application	Under discussion	
				NE	Natural England cannot confirm this until we have reviewed the full application.	Under discussion	
				JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	

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39	12/10/2023			Cefas	Agreed	Agreed	
40	12/10/2023	No cumulative effects that are significant in EIA terms are predicted	Benthic ecology	NRW	NRW Advisory are unable to agree to this until we have reviewed the assessments, following submission of the DCO application	Under discussion	
				NE	NE broadly agrees	Agreed	
				JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	
				Cefas	Agreed	Under discussion	
41	12/10/2023	The measures adopted as part of the Morgan Offshore Wind Project are sufficient and no additional measures are necessary as a result of the assessment conclusions.	Benthic ecology	NRW	NRW Advisory are unable to agree to this until we have reviewed the assessments, following submission of the DCO application	Under discussion	
				NE	Natural England cannot confirm this until we have reviewed the full application.	Under discussion	
				JNCC	Given JNCC's remit, we will not look to make further comments on the Morgan project.	n/a	
				Cefas	Agreed, trenchless techniques and confirmation that no Annex I habitats within the Mona export route.	Agreed	