



Marine
Management
Organisation

Marine Licensing
Lancaster House
Hampshire Court
Newcastle upon Tyne
NE4 7YH

T +44 (0)300 123 1032
F +44 (0)191 376 2681
www.gov.uk/mmo

Mr Richard Allen
Rampion 2 Lead Panel Member
Rampion 2 Offshore Wind Farm Case
Team
Planning Inspectorate
Rampion2@planninginspectorate.gov.uk
(Email only)

MMO Reference: DCO/2019/00005

Planning Inspectorate Reference: EN010117

Identification Number: 20045232

1 August 2024

Dear Richard Allen,

**Planning Act 2008, E.On Climate and Renewables UK Ltd, Proposed Rampion 2
Offshore Wind Farm Order**

Deadline 6 submission

On 20 September 2023 the Marine Management Organisation (“the MMO”) received notice under section 56 of the Planning Act 2008 (the PA 2008) that the Planning Inspectorate (“PINS”) had accepted an application made by E.On Climate and Renewables UK Ltd (the Applicant) for determination of a development consent order (“DCO”) for the construction, maintenance and operation of the proposed Rampion 2 Offshore Wind Farm (the DCO Application) (MMO ref: DCO/2019/00005; PINS ref: EN00117). The DCO also includes a Deemed Marine Licence (“DML”).

The Applicant seeks authorisation for the construction, operation and maintenance of DCO Application, comprising of up to 90 wind turbine generators together with associated onshore and offshore infrastructure and all associated development (the Project). The associated development includes an offshore generating station with an electrical export capacity of in excess of 100 megawatts (MW) comprising up to 90 turbines, and array cables, in an area approximately 196 square kilometres (km²), located approximately 13 kilometres (km) south of the Sussex coast located to the west of the existing Rampion Offshore Wind farm.



This written representation is submitted without prejudice to any future representation the MMO may make about the DCO Application throughout the examination process. This representation is also submitted without prejudice to any decision the MMO may make on any associated application for consent, permission, approval or any other type of authorisation submitted to the MMO either for the works in the marine area or for any other authorisation relevant to the proposed development.

Yours faithfully



Ethan Lakeman

Marine Licensing Case Officer

E  marinemanagement.org.uk

P +44 



Table of Contents

1.Closing statement	5
2.Additional requests/updates.....	6
3.Remaining DCO/DML comments not agreed with applicant	10
4.DCO Comments	10
5.Comments on Applicant’s amended Application Documents submitted at Deadline 5 ..	11
6.MMO Comments on Applicant’s Submissions received at Deadline 5.....	30
7.MMO Comments on Applicant’s post Issue Specific Hearing 2 Documents	32
8.MMO Comments on Applicant’s response to Examining Authority (ExA) WQ’s	34
9.MMO Comments on Applicant's Comments on the MMO Deadline 4 Written Submissions	44
References	55
Annex 1.....	56
Annex 2.....	61
Annex 3.....	62
Annex 4.....	65



1. Closing statement

- 1.1 The MMO would like to highlight to the Examining Authority (ExA) and Secretary of State (SoS) that requests for information from the applicant were made during the pre-application process. The MMO is disappointed that the information was provided at later deadlines (deadlines 4 & 5) within the Examination especially relating to fisheries and under water noise. This delay in providing the information means that we have not been able to engage in detailed discussions within the time scales of the examination period and the MMO still has major concerns as some high priority issues are still not agreed at the final deadline.
- 1.2 The MMO understands that disagreements are reviewed, and recommendations are made to the SoS by the ExA, so the SoS can make a decision. However, the MMO would highlight that with the Applicant leaving some of the major issues for examination it has increased resource requirements during this process and some high priority issues remain unresolved, undermining the development consent order process. In addition to this, major decisions that should be a matter for the SoS are being included as conditions to resolve at the post consent stage. This causes additional work for all parties, increases/duplicates resources and occasionally can put the MMO in a difficult position. For example; if we require more information (at a cost to the Applicant), such as surveys which impacts the Applicants timeline and funding.
- 1.3 A summary of the remaining concerns can be found in Section 3 of this document along with our Principal Areas of Disagreement which will be submitted alongside this document.



2. Additional requests/updates

2.1 Disposal Sites

- 2.1.1 The MMO has requested amendments to the DML in relation Disposal Sites. One Disposal Site (reference WI118) has been created for both the export cable corridor and the array area and this should be included within the DML. If this is not included in the DML the Applicant does have consent to dispose within the proposed area if the SoS was minded to approve the DCO.
- 2.1.2 The MMO also requested confirmation that drill arisings volumes have been included in the 2,568,500 cubic metres figure in Schedule 11 Part 2(3) and the Applicant has confirmed this.
- 2.1.3 The MMO requests that the disposal site reference WI118 is added to both Schedule 11 Part 1 2(b) & Part 2 9(3) and 12, Part 1 2(b) & (c) and Part 2 9(3).
- 2.1.4 The MMO suggested the wording below in blue to the Applicant.

Schedule 11

Part 1

2. (b) *the disposal of up to 2,568,500 cubic metres of inert material of natural origin and/or dredged material produced during construction drilling or seabed preparation for foundation works comprising Work No. 1, other seabed and preparation and array cable installation works comprising Work No. 2 and the maintenance of such works within the part of the offshore Order limits comprising the array area **at disposal site reference WI118 and provided that such quantity of material permitted to be disposed must take account of and include material disposed of in the array area during the carrying out and maintenance of Work No. 3 as permitted pursuant to licence 2 (transmission);***

Part 2

- 9 (3) *The undertaker must ensure that only inert material of natural origin, drilling mud and dredged material, produced during the drilling installation of or seabed preparation for foundations, and sandwave clearance works is disposed of within **disposal site reference WI118 within the extent of the Order limits seaward of MHWS. Any material of anthropogenic origin will be screened out and disposed of at an appropriate waste facility onshore.***

Schedule 12

Part 1

- 2(b) *the disposal at sea of up to 2,568,500 cubic metres of inert material of natural origin and/or dredged material produced during construction drilling or seabed preparation for foundation works and sandwave and other seabed preparation and cable circuit installation works comprising Work Nos. 3 and 4 and the maintenance of such works within that part of the offshore Order limits comprising the array area **disposal site reference WI118 within the extent of the Order limits seaward of MHWS and***



provided that such quantity of material permitted to be disposed of in the array area must take account of and include material disposed of in the array area during the carrying out and maintenance of Work Nos. 1 and 2 as permitted pursuant to licence 1 (generation);

2(c) *the disposal at sea of up to 340,720 cubic metres of inert material of natural origin and/or dredged material within **disposal site reference WI118 within the extent of the Order limits seaward of MHWS** and produced during construction drilling or seabed preparation for cable circuit installation works comprising Work Nos. 4 and 5 or by construction of exit pits in connection with horizontal directional drilling comprising Work No. 5 in the export cable corridor provided that such material may subsequently be used to the extent required for reinstatement of the exit pits comprising Work No. 5;*

Part 2

9(3) *The undertaker must ensure that only inert material of natural origin, drilling mud and dredged material, produced during the drilling installation of or seabed preparation for foundations, and sandwave clearance works is disposed of within **disposal site reference WI118 within the extent of the Order limits seaward of MHWS**. Any material of anthropogenic origin will be screened out and disposed of at an appropriate waste facility onshore.*^{2.5} In addition to the above the MMO requested the addition of the following condition in both Schedule 11 & 12 in Part 2 Section 9 Chemicals, drilling and debris:

(x) The undertaker must inform the MMO of the location and quantities of material disposed of each month under this licence. This information must be submitted to the MMO by 15 February each year for the months August to January inclusive, and by 15 August each year for the months February to July inclusive. In the event that no activity has taken place during the reporting period the undertaker must provide a null (0) return to the MMO.

2.1.5 This is a requirement of the use of a disposal site as part of the Oslo and Paris Conventions (OSPAR) reporting requirements and must be included if the sites are to be opened/used.

2.1.6 The MMO and the Applicant had a meeting on 31 July 2024 to discuss this issue and the Applicant highlighted they would like two disposal sites. Due to the stage of the Examination and the time it would take to update this, the MMO and the Applicant has agreed with the below updates in blue to condition 9(3). This allows the MMO the ability to ensure that disposal only takes place within the sites requested and the MMO will confirm this with the Applicant should the SoS be minded to approve, this includes the requirement to report the disposal.

*9(3) The undertaker must ensure that only inert material of natural origin, drilling mud and dredged material, produced during the drilling installation of or seabed preparation for foundations, and sandwave clearance works is disposed of within the extent of the offshore Order limits. Any material of anthropogenic origin will be screened out and disposed of at an appropriate waste facility onshore. **The***



undertaker must inform the MMO of the location and quantities of material disposed of each month under the Order by reference to the disposal site identifier agreed with the MMO, by submission of a disposal return by 15 February each year for the months August to January inclusive, and by 15 August each year for the months February to July inclusive.

2.2 Chemicals

2.2.1 The MMO set out in our Relevant Representation (RR-219) that condition 9 (1) was being reviewed as a wider project. Although the condition used by the Applicant has been used previously. This is a fundamental change to this process due to the ability to access the offshore chemical regulations 2002(a). The Chemicals on this list have been modelled using oil and gas structures and the use of these chemicals in offshore wind is different and require further review. This drafted condition will be the condition used by the MMO for future OWF projects and should be updated accordingly.

2.2.2 The MMO sent a new condition following the page turn meeting on 4 July 2024 for inclusion in the DCO which the Applicant is now considering. This condition included an eight week submission date.

The MMO did not receive confirmation or an update from the Applicant during examination and is unsure if this has been taken into account in the final DCO submitted by the Applicant at DL6.

2.2.3 An amendment to ten weeks, with the proposed agreement with the MMO has been updated since this meeting. This was not shared with the Applicant in time to be included in their Deadline 6 response. The reason for these changes is because eight weeks is the time Cefas require to review and provide comments, the additional two weeks are to ensure the internal consultation process can be followed. We encourage the applicant to engage early with the MMO when seeking to discharge this condition and the MMO will endeavour to do this request quicker where possible.

The condition is as follows:

Schedule 11 & 12, Part 2, Condition 9 (1):

Unless otherwise agreed in writing by the MMO, all chemicals and substances, including paints and coatings, used below MHWS for the undertaking of the licensed activities must be approved in writing by the MMO prior to use. Submission for approval to the MMO must take place no later than ten weeks prior to use, unless otherwise agreed by the MMO in writing.

2.3 Marine Noise Registry (MNR)

2.3.1 The MMO highlighted to the Applicant that the MNR condition is not fit for purpose. Although the MMO provided suggested wording at Relevant Representation (RR-219) and the Applicant has included a condition, due to the seasonal restrictions or construction piling this may not be suitable in relation to the close out reports. Reports are required for OSPAR and JNCC require this information by the 25 March to collate



the data for the previous year January – December. For example, with the current wording if the Applicant starts piling November and continues until 31 January all the data for November and December would not be included in the reports as the Applicant would not be required to submit the report until April which would skew the JNCC reporting figures.

2.3.2 Due to the stage of examination the MMO proposed the following wording in blue to the Applicant:

Reporting of impact pile driving

25.—

(1) Only when driven or part-driven pile foundations are proposed to be used as part of the foundation installation the undertaker must provide the following information to the Marine Noise Registry—

(a) prior to the commencement of each part of construction of the authorised scheme, information on the expected location and expected start and end dates of impact pile driving to satisfy the Marine Noise Registry’s Forward Look requirements; and

(b) within 12 weeks of completion of impact pile driving for the relevant part of the authorised scheme or by 25 March for works which take pace in the preceding year January to December (whichever is earlier), information on the locations and dates of impact pile driving to satisfy the Marine Noise Registry’s Close Out requirements.

(2) The undertaker must notify the MMO in writing of the successful submission of Forward Look or Close Out data pursuant to paragraph (1) above within seven days of the submission.

(3) For the purpose of this condition, “Forward Look” and “Close Out” mean the requirements as set out in the UK Marine Noise Registry Information Document Version 1 (July 2015) as amended, updated or superseded from time to time.

2.3.3 The MMO received confirmation that this wording would be included in the final DCO submitted at Deadline 6 and welcomes this.

2.4 Schedule 11, Part 1, Paragraph 2 Removal of static fishing equipment

2.4.1 Article 2(f) states the following:

Details of licensed marine activities

2. Subject to the licence conditions, this licence authorises the undertaker (and any agent or contractor acting on their behalf) to carry out the following licensable marine activities under section 66(1) (licensable marine activities) of the 2009 Act—...

(f) site clearance and preparation works including debris removal, levelling, boulder clearance works either by displacement ploughing or subsea grab technique or any other equivalent method and removal of static fishing equipment”

2.4.2 The MMO understands that this inclusion is to make clear what licensable activities can be undertaken within the DML.



2.4.3 In relation to Licensing 'Removal of static fishing equipment' activity by virtue of the DML does not give the undertaker an absolute legal authority to remove the gear, it simply means that any removal does not commit an offence under The Marine and Coastal Access Act 2009 (MCAA 2009). The undertaker may also require other consents to lawfully carry out any activity that we have licenced, and that principle applies in this case.

2.4.4 The MMO reminds the Applicant that only impacts assessed within the Habitat Regulation Assessment and/or Environmental Statement (forming the Environmental Impact Assessment) can be carried out.



3. Remaining DCO/DML comments not agreed with applicant

3.1 Summary of Position

3.1.1 The MMO and the Applicant are not in agreement with the following topics:

- Article 5 Benefit of the Order
- We do not agree with the wording within this section. Please see our final comments in Section 4.
- Chemicals
- Please see the condition requested in Section 2.2.
- Noise Modelling & Mitigation
- Please see the MMO final position within Section 5 and 8.
- Seasonal Restriction
- Please see the MMO final position within Section 5 and 8.
- Operational monitoring
- Please see the MMO final position within Section 5.

4. DCO Comments

4.1 MMO Response to Applicant's Comments on the Examining Authority's Schedule of Changes to the DCO (REP5-121)

Table 2-1

Sections 3-6: Article 5 DCO Benefit of the Order

- 4.1.1 The MMO provided full comments on the Examining Authority's Schedule of recommendation submitted at Deadline 4, in our Deadline 5 Response (Response to DCO 2.1 in Table 2: REP5-146)
- 4.1.2 Without prejudice to that position, the MMO set out in correspondence with the Applicant on 12 June 2024 an alternative Article 5 dDCO. Having received no response from the Applicant to this alternative draft, the MMO provides it to the Examining Authority for consideration alongside our previous response on this issue. A copy of the MMO draft Article 5 can be found in Annex 1 of this Deadline Response.
- 4.1.3 The MMO maintains its position as set out and supports the ExA's position that the word "grant" should be removed.

Section 20 Part 1 Para 9

- 4.1.4 The MMO agrees with the ExA's recommendation.

Section 21 Part 2 Condition 3(2)

- 4.1.5 The MMO welcomes the update to the DML condition.

Section 22 Part 2 Condition 3(5)

- 4.1.6 The MMO agrees with the ExA's recommendation.

Section 23 Part 2 Condition 11(1)(a)



4.1.7 The MMO supports Natural England's position on this wording.

Section 24 Part 2 Condition 11(2)

4.1.8 The MMO welcomes the update to the DML condition.

Section 25 Part 2 Condition 11(2)(c)

4.1.9 The MMO supports Historic England's position on this wording.

Section 26 Part 2 Condition 16(2)(b)

4.1.10 The MMO agrees with the ExA's recommendation.

4.2 MMO Response to Applicant's Comments on Draft Development Consent Order (clean) (REP5-005), as provided in Applicant's Comments on Deadline 4 Submissions (REP5-122)

4.2.1 The MMO maintains its principle objection to the power to transfer the DMLs and considers that the existing statutory process should be retained for the reasons set out in [REP4 088].

Applicant's response, Table 2-12

Paragraph 2.12.1

4.2.2 The Applicant has set out its position at paragraph 2.12.1 and refers back to this paragraph in response to the majority however it has failed to specifically particularise its position in respect of each of the individual points raised by the MMO.

4.2.3 It is accepted by the MMO that Transfer of Benefit articles are common to all made DCOs, however it does not accept that the terms of the provision as sought by the Applicant are common to all DCOs, as previously identified.

4.2.4 The MMO does not agree with the Applicants assertion that the process they have provided is '*not more administratively burdensome*' and directs the Examining Authority to its previous deadline submissions.

4.2.5 The Applicant has specifically quoted from Advice Note 15 para 28.3, in relation to the position it has adopted. The MMO acknowledges the paragraph quoted but would draw the Examining Authority's specific attention to the last sentence in the quoted paragraph:

*"it is therefore considered that there is no legal reason to prevent a DCO from allowing part of a Deemed Marine Licence to be transferred, **although there may be operation difficulties with such an approach including monitoring compliance and taking enforcement action.**"*

These are issues which the MMO has previously highlighted to the ExA.

Condition 10(1) Schedule

4.2.6 Notably the Applicant at reference 2.12.51 concerning Condition 10(1) directs the MMO to reference 2.12.1 in response to the issues raised, however reference 2.12.1 is silent on Condition 10(1) and no clarification of the relationship between the clause



and section 86 of the 2009 Act has been provided. Further direction to reference 2.12.1 on this issue is made at reference 2.12.54 Table 1.

- 4.2.7 The MMO maintains the position as previously set out in our Deadline 4 Response (REP4-088) in respect of this issue, which was also reiterated at Deadline 5 (REP5 - 146)



5. Comments on Applicant's amended Application Documents submitted at Deadline 5

5.1 The MMO in consultation with the Centre for Environment, Fisheries and Aquaculture Science (Cefas) have reviewed the following amended documents submitted at Deadline 5:

- Commitments Register Rev E (REP5-087)
- Statement of Commonality for Statements of Common Ground Rev D (REP5-107)
- In Principle Sensitive Features Mitigation Plan Rev E (REP5-083)
- Offshore In Principle Monitoring Plan Rev D (REP5-085)
- Outline Offshore Operations and Maintenance Plan Rev C (REP5-081)
- Environmental Statement Volume 2 - Chapter 8 Fish and shellfish ecology Rev B (REP5-028)
- Environmental Statement Volume 2 - Chapter 9 Benthic, subtidal and intertidal ecology Rev C (REP-030)
- Environmental Statement Volume 2 - Chapter 11 Marine mammals Rev D (REP5-033)
- Environmental Statement Volume 4 - Appendix 6.3 Coastal processes technical report Impact assessment Rev B (REP5-045)
- Outline Scour Protection and Cable Protection Plan Rev C (REP5-075)
- Draft Unexploded Ordnance Clearance Marine Mammal Mitigation Protocol Rev B (REP5-079)
- Environmental Statement Volume 2 - Chapter 11 Marine mammals Rev D (REP5-033)
- Appendix 11.3 Underwater noise assessment technical report (REP5-046)
- Environmental Statement Volume 2 - Chapter 8 Fish and shellfish ecology Rev B (REP5-028)
- Environmental Statement Volume 2 - Chapter 9 Benthic, subtidal and intertidal ecology Rev C (REP4-019)

Commitments Register Rev E (REP5-087)

5.2 General comments

- 5.2.1 The MMO acknowledges the updates made to the Executive Summary to explain that the details on how specific Commitments contained within the Commitments Register will be delivered will be presented in the specific document relevant to those Commitments or that stage of the Project.
- 5.2.2 The MMO notes the amendment to Section 1.2.3 which now states that "*In the event that there is an inconsistency in the commitments in this register and the detail provided in the related Application Documents referenced herein, the least environmentally damaging scenario shall prevail*", the MMO supports this statement.



5.2.3 The MMO acknowledges that several Commitments pertaining to the Offshore environment have been made and new Commitments added. The MMO has provided any comments on these updates in our review of the relevant documents below.

Statement of Commonality for Statements of Common Ground Rev D (REP5-107)

5.3 General comments

- 5.3.1 The MMO and the Applicant attended a Statement of Commonality for Statements of Common Ground (SoCG) page turn meeting on 04 July 2024 to discuss the status of outstanding issues. The SoCG was signed by the MMO and the Applicant on 09 July 2024 and was submitted to the Examining Authority (ExA) at Deadline 5. There are several outstanding matters within the SoCG that the MMO are not able to sign off as a result of conversations around resolution beginning so late in the examination process. The MMO refers to Sections 2.4.4 – 2.4.6. of our Deadline 5 response (REP5-146) for details of the issues discussed at this meeting.
- 5.3.2 The MMO has reviewed the updated Statement of Commonality for Statements of Common Ground (SoCG) and have the following comments to make. The MMO acknowledges that following the page turn on 04 July 2024 the Applicant has amended the status of several matters under the jurisdiction of the MMO.
- 5.3.3 The MMO acknowledges that our position on both Coastal Processes and Benthic/Subtidal/Intertidal Ecology have been changed from light green 'Some matters agreed / some matters under discussion' to purple 'Some matters agreed, some matters not agreed, some matters under discussion'. The MMO considers this change appropriate and believes it correctly represents our position on these matters given that at the time of submission the MMO was still yet to review submissions provided by the Applicant at Deadline 5.
- 5.3.4 The MMO acknowledges that our position on Marine mammals has been changed from light green 'Some matters agreed / some matters under discussion' to brown 'Some matters agreed, some matters not agreed'. As detailed most recently in Section 5.12 of our Deadline 4 response (REP4-088) and discussed at the SoCG page turn there remains disagreement between the MMO and the Applicant on the sensitivity of marine mammals to permanent threshold shift (PTS). The MMO acknowledges that while this remains unresolved, the classification of sensitivity has limited bearing on the overall assessment of impacts to these species and we are content that this issue will remain a non-material disagreement. The MMO therefore, considers the status of this matter appropriate.
- 5.3.5 The MMO acknowledges that our position on Principle of Development has been changed from yellow 'All matters under discussion' to red 'All matters not agreed'. The MMO concludes that while we do not object in principle to the Proposed Development, we have concerns that harm to the marine environment may result from its construction, operations and maintenance, and decommissioning. As such, this remains an area of disagreement.



- 5.3.6 The MMO have detailed in previous Deadline responses that there remain several significant disagreements relating to Fish/Shellfish Ecology, specifically underwater noise impacts, including the determination of a suitable disturbance threshold for black sea bream and the Applicant's position that the month of July should not be included in the defined mitigation period for the zoning plan. These matters were discussed at the SoCG page turn meeting and defined as 'Not agreed-material impact', The MMO would therefore, consider our position on this matter as brown 'Some matters agreed, some matters not agreed' and do not agree the status of this matter should be represented as purple.
- 5.3.7 The MMO has detailed our current position on the draft DCO and the inclusion of Article 5, verbally at the Issue Specific Hearing 2 on 15 May 2024, and in our written representations. There remains significant disagreement between the MMO and the Applicant on the current draft DCO Rev F (REP5-006) as detailed in Section 1 of this Deadline response. As these issues remain unresolved, the MMO considers that our position be changed to brown 'Some matters agreed, some matters not agreed' and do not agree that the status of this matter should be represented as light green.
- 5.3.8 Some sections of the SoCG will remain not agreed by the of the Examination period and will be taken forward in the MMO Principle Areas of Disagreement (PADS) document. These are as follows:
- Matters relating to the Draft DCO which is considered to be 'Not Agreed – Material Impact' due to issues which persist around Article 5 and Schedules 11 & 12.
 - Matters relating to the Offshore In Principle Monitoring Plan are considered 'Not Agreed – Material Impact' due to ongoing disagreements over the suitability of the Applicant's proposed monitoring.
 - Matters relating to Fish Ecology, 'Not Agreed – Material Impact'
 - In Principle Sensitive Features Mitigation Plan, 'Not Agreed – Material Impact'
 - Efficacy of noise mitigation, 'Not Agreed – Material Impact'
 - Benthic Ecology chalk features, 'Not Agreed – No Material Impact'

In Principle Sensitive Features Mitigation Plan Rev E (REP5-083)

5.4 Benthic comments

- 5.4.1 The MMO acknowledges that the proposed mitigation for benthic ecology receptors presented in this latest Deadline 5 submission, has not appreciably changed from that presented in the In Principle Sensitive Features Mitigation Plan Rev D (REP4-054) submitted at Deadline 4. The MMO therefore maintains our position that the Commitments listed in Section 6.1.1 to design the cable route to avoid, where possible, any areas of subtidal chalk, reef features, and peat and clay exposures and to target areas where the potential for cable burial is maximised is appropriate. The MMO direct the Applicant to Section 2.5 of our Deadline 5 response (REP5-146) for additional comments on the suitability of the proposed mitigation.
- 5.4.2 In their response to Question BP2.5 of the Applicant's Responses to the Examining Authority's Second Written Questions (ExQ2) Rev A (REP5-119) the Applicant states



that “*adaptive management will be developed and discussed if monitoring shows impacts greater than anticipated*”. The MMO welcomes this commitment but notes that it does not appear to be reflected in Sections 6 and 7 of the In Principle Sensitive Features Mitigation Plan Rev E (REP5-083). The MMO advise that this mitigation plan (REP5-083) is updated to reflect this commitment by the Applicant and ensure consistency across documents.

5.5 Coastal Processes comments

- 5.5.1 The MMO notes that Commitment C-269, commits to developing a cable routing design to “*identify the shortest feasible path avoiding subtidal chalk and reef features*”, however, the newly added Commitment C-305 states “*Excavated chalk will be used to infill cable trenches produced by mechanical cutters, where practicable.*”
- 5.5.2 The MMO is conscious that this new Commitment should not over-ride the former, and that avoidance should still be the primary aim where possible. In addition, any chalk infill that is nevertheless generated should only be placed within chalk areas. This is not explicitly stated in the Commitment and this Commitment should be reworded to ensure that excavated chalk is only used to infill trenches in areas of seabed defined as being chalky.

5.6 Underwater Noise comments

- 5.6.1 A new paragraph (5.3.24) has been added which includes further information on the underwater noise monitoring campaign undertaken in 2023. The MMO reviewed both the 2022 and 2023 monitoring campaigns and provided comments accordingly. No further action regarding this monitoring campaign is required, and the MMO is satisfied that the queries and comments originally raised on this matter have largely been addressed by the Applicant.
- 5.6.2 The other main change is on Page 77 of the Plan relating to Commitment C-273 which has been updated to “*A seasonal restriction will be put in place to ensure Offshore Export Cable Corridor activities (including: construction and installation, preparatory works during cable installation, UXO clearance, preventive or scheduled maintenance, inspections and decommissioning) are undertaken outside the black seabream breeding period (1st March- 31st July inclusive) to avoid any effects from installation works on black seabream nesting within or outside of the Kingmere MCZ. This does not apply to emergency work required to maintain the operation, safety and integrity of the infrastructure*”.
- 5.6.3 In addition to Commitment C-273, the Applicant has committed to a number of mitigation measures during the piling of foundations. These include:
- **C-265:** Double Big Bubble Curtains (DBBC) will be deployed as the minimum single offshore piling noise mitigation technology to deliver underwater noise attenuation for all foundation installations throughout the construction of the Proposed Development where percussive hammers are used in order to reduce predicted impacts to:



- Sensitive receptors at relevant Marine Conservation Zone (MCZ) sites to reduce the risk of significant residual effects on the designated features of these sites;
 - spawning herring; and
 - marine mammals
- **C-280** Commitment that no piling will occur in the piling exclusion zones during the seabream breeding period (March-July) which will be defined by the modelling in the Final Sensitive Features Mitigation Plan.
- **C-281** Commitment to no piling within the western part of the Rampion 2 offshore array closest to the Kingmere MCZ during the majority of the black seabream breeding period (March-June); and sequenced piling in the western part of the Offshore Array Area during July in accordance with the zoning plan to be set out in the Final Sensitive Features Mitigation Plan, to reduce the risk of significant effects from installation works on breeding black seabream within or outside of the Kingmere MCZ.
- **C-274** Commitment to commence piling at locations furthest from the Kingmere MCZ during the black seabream breeding period (March-July), to reduce effects from installation works on breeding black seabream within or outside of the Kingmere MCZ.

5.6.4 The MMO welcomes and supports the Applicant confirming DBBCs will be deployed as the minimum single offshore piling noise mitigation technology to deliver underwater noise attenuation for all foundation installations throughout the construction of the Proposed Development where percussive hammers are used (Commitment C-265).

5.6.5 The MMO considers the Applicant's proposals (in terms of mitigation) to be fair and reasonable and will help to reduce the risk of potential impact on sensitive receptors, acknowledging that there are a number of uncertainties that remain. However, the MMO still requests a full seasonal piling restriction during sensitive periods, as this is the most effective measure to reduce the risk of impact.

5.6.6 The noise modelling presented define areas within which mitigated piling using DBBC noise abatement techniques, or a combination of DBBC and another noise abatement measure, serves to reduce received noise levels at the relevant MCZs below a disturbance threshold of 141 dB re 1 μ Pa_{2s} (single strike Sound Exposure Level) (SEL_{ss}). The modelling has assumed a 15 dB reduction in source level for a DBBC, and a 20 dB reduction in source level for a DBBC plus another noise abatement measure. The Applicant has also presented modelled outputs based on the 135 dB SEL_{ss} threshold and the assumption of a DBBC relative to Beachy Head East and West MCZs and the Selsey Bill and the Hounds MCZ. Some very slight overlap of Selsey Bill and the Hounds MCZ and Beachy Head West MCZ is shown for both disturbance thresholds (see Figures 5.14, 5.15, 5.16. and 5.17). This is welcomed.

5.7 Fisheries comments

The MMO still considers there to be uncertainties relating to several topics (noise abatement black sea bream and herring) and these concerns have been summarised below.



Uncertainty in the noise abatement reductions achievable and the Applicant's commitments

- 5.7.1. The Applicant has now confirmed that approximately 30% of their turbine locations will be in water depths of over 40meters (m) (with some locations in depths between 50-55m).
- 5.7.2 A report to support the efficacy of noise mitigation at the Rampion 2 site was provided at Deadline 4 (*ITAP - Information to support efficacy of noise mitigation abatement techniques with respect to site conditions at Rampion 2 Offshore Windfarm Rev A (REP4-067)*) and stated that the achievable overall noise reduction of the proposed double big bubble curtain (DBBC) noise abatement systems might be slightly decreased by 1-2 dB in water depths > 40m.
- 5.7.3 The MMO still does not know where in the array the water depth is > 40m so there is also some uncertainty as to where a 13- or 14- dB noise reduction should be expected relative to sensitive receptors.
- 5.7.4 The MMO has also not seen Underwater Noise (UWN) modelling showing how the mitigated UWN contours for a 13 dB, 14 dB and 15 dB noise abatement reduction compared to each other. It is likely that a 13 dB noise abatement reduction may show a larger overlap with sensitive receptors than a 15 dB reduction but without seeing this modelling it is impossible to say whether this slight reduction is acceptable
- 5.7.5 **Unfortunately, the MMO cannot be fully confident that the overlap of UWN contours mitigated with a potential 13 dB reduction in deeper parts of the array will still be acceptable relative to sensitive receptors without further modelling. The MMO would welcome this modelling as early as possible to ensure this can be resolved.**

Black seabream

- 5.7.6 There is uncertainty regarding whether a 15 dB or 20 dB reduction in noise through abatement measures is being applied. Commitment C-265 is for the use of DBBC as a minimum mitigation technology, which is expected to provide a 15 dB noise reduction. However, the most recent modelling has been based on 20 dB, yet there is no actual commitment to a 20 dB noise reduction and whether this can be achieved in water depths >40m is also unknown.
- 5.7.7 There is a lack of noise modelling showing contours for 20 dB reduction to support zoning plan.
- 5.7.8 The MMO disagrees on the timing of the black seabream breeding season in relation to mitigation measures.
- 5.7.9 Whilst the MMO can see the rationale and the value to the Applicant in their proposed zoning and sequencing scheme, there remain a number of issues highlighted throughout this advice which reduce the confidence in the applicability of this approach.



5.7.10 There is low confidence in whether the zoning plan would afford adequate mitigation. Given these uncertainties, we maintain our request for a complete piling restriction from 1st March to 31st July inclusive. The condition is set out below:

Black sea bream spawning

(1) The undertaker must not undertake pile driving during the black sea bream spawning and nesting period.

(2) The “black sea bream spawning and nesting period” means a period between 1 March – 31 July inclusive.

5.7.11 The MMO will continue to discuss mitigation including the zoning plan but this should be to reduce the impact further and not replace the requirement for a piling restriction due to the uncertainties. The MMO would request further evidence to be provided as part of this discussion during the decision process to ensure the matter has been fully taken into account within the examination process.

Herring

5.7.12 There remains a lack of confidence as to the location of spawning beds where herring are actively spawning.

5.7.13 The Applicant has incorrectly maintained that the Coull et al., (1998) spawning map alone represents the best source of evidence on spawning grounds. The Applicant has also incorrectly stated that the effect of larval drift means the Coull et al., (1998) spawning map alone is a more accurate indicator of active herring spawning beds than International Herring Larva Survey (IHLS) data, which directly measures the position and abundance of herring larvae (See Sections 8.3.1-8.3.6 below of this Deadline Response for further comments).

5.7.14 Clarifications are also still needed on the data used to form the Applicant’s potential herring spawning habitat ‘heat’ map (see points 20ii) which at present is not fully accurate. This means that IHLS herring larval abundance data and sediment particle size analysis (PSA) data must be relied upon to indicate the presence of spawning beds in lieu of an adequate potential spawning habitat heatmap (See Sections 8.3.2-8.3.4 below of this Deadline Response for further comments).

5.7.15 There also remain several factors which affect our confidence in the UWN modelling for herring.

- The first is that without an accurate ‘heat’ map of potential herring spawning habitat, it is not possible to confidently determine how much of the herring spawning ground would be overlapped by mitigated UWN contours for temporary threshold shift (TTS) and behavioural effects. This makes it somewhat difficult to confidently conclude whether the areas of the herring spawning ground overlapped by UWN are of high or medium potential for herring spawning, and whether the degree of overlap is acceptable.
- The second is that the MMO has not seen UWN modelling contours which compare the mitigated UWN contours for a 15 dB noise abatement reduction with



those of 13 dB noise abatement reduction (which accounts for the effect of water depth on the efficacy of DBBCs, as per (See Section 8.3.10 below of this Deadline Response for further comments). UWN contours with a noise reduction of 13 dB are likely to overlap a larger portion of the herring spawning ground than the current modelling (based on a 15 dB reduction) shows. This further affects our confidence as to whether the degree of overlap of UWN noise with the herring spawning ground is acceptable.

5.7.16 There remains uncertainty regarding the extent of spatial overlap of noise at the herring spawning ground and thus whether mitigation in the form of a seasonal piling restriction is / is not required.

5.7.17 Considering all of the outstanding sources of uncertainty relating to herring listed above, the MMO maintains our request for a seasonal piling restriction in order to limit disturbance to adult spawning herring during the spawning period (1st November to 31st January, inclusive). The condition is set out below:

Herring spawning

(XX) — (1) The undertaker must not undertake pile driving during the herring spawning period.

(2) The “herring spawning period” means a period within 1 November and 31 January, inclusive.

5.7.18 This request is made with the view that, as the necessary information becomes available should the SoS be minded to approve the consent for Rampion 2, this full seasonal restriction can be refined or removed as a variation to the DML providing that the Applicant provides the additional UWN modelling, monitoring data / reports to the MMO in a timely manner, and that these data validate predictions that the measured noise levels are not exceeding the modelled predictions. Without this condition being stipulated on the DML, the consent risks being too permissive with regard to protecting a commercially and ecologically important species. It will also likely be disagreeable for all parties if a restriction has to be strengthened post-consent, rather than refined.

5.7.19 The MMO understands with both seasonal restrictions there is pressure on the construction programme. However, these issues have been raised from early discussions in the pre-application stage or the development consent order process and the Applicant was not forthcoming with further modelling or evidence and did not discuss mitigation until Examination. The MMO strongly believes that there would be an impact without mitigation and that not enough evidence has been provided to satisfy the MMO that the mitigation would be successful.

5.7.20 In light of this and using the precautionary principle the MMO believes a seasonal restriction should be included.

5.7.21 The MMO believes these are issues for the SoS to decide, however noting the Applicant’s concerns. If the SoS is minded to approve with seasonal restrictions,



without further evidence at this time, the MMO suggests the wording above could be amended further to include '*unless otherwise agreed in writing by the MMO*'. This could allow further discussions to take place and enable flexibility within the condition.

5.7.22 Even though the MMO has suggested this – a full seasonal restriction is our preferred choice as the evidence requested from the Applicant has not been forthcoming to date, therefore the MMO would be cautious in this approach.

Offshore In Principle Monitoring Plan Rev D (REP5-085)

5.8 Benthic comments

5.8.1 The MMO acknowledges that there have not been any reductions to the monitoring proposals for benthic ecology receptors in this latest Deadline 5 submission, compared to those presented in the Offshore In Principle Monitoring Plan Rev C (REP4-056) submitted at Deadline 4. The MMO therefore, maintains our position that the monitoring proposed for benthic features presented in this document are appropriate. The MMO directs the Applicant to Section 2.8 of our Deadline 5 response (REP5-146) for additional comments on the suitability of the proposed modelling.

5.8.2 In the Applicant's response to reference point 2.12.107 of the Applicant's Comments on Deadline 4 Submissions Rev A (REP5-122) the Applicant "*confirms that both side scan sonar and Multi-beam Echo Sounder methods will be used together to collect more information, including backscatter, to support the use of drop-down video to confirm the presence of these features*" (chalk reef, stony reef and Sabellaria spinulosa reef). The MMO welcomes this clarification but notes however, that Table 4-3 of the Offshore In Principle Monitoring Plan Rev D (REP5-085) does not specify that both these methods will be used and does not refer to backscatter. The MMO advises that this monitoring plan (REP5-085) is updated to reflect this commitment by the Applicant and ensure consistency across documents.

5.8.3 In their response to Question BP2.5 of Applicant's Responses to Examining Authority's Second Written Questions (ExQ2) Rev A (REP5-119) the Applicant states that "*adaptive management will be developed and discussed if monitoring shows impacts greater than anticipated*". The MMO welcomes this commitment but notes that it does not appear to be reflected in Table 4-3 of the Offshore In Principle Monitoring Plan Rev D (REP5-085). The MMO advises that this monitoring plan (REP5-085) is updated to reflect this commitment by the Applicant and ensure consistency across documents.



5.9 Underwater Noise comments

- 5.9.1 The Plan identifies that construction noise monitoring should include measurements of noise generated by the installation of the first four piled foundations of each piled foundation type to be installed. This is in keeping with the standard requirements for offshore wind farm construction to date. It is also appropriate that noise measurements shall be made in line with the Good Practice Guide No.133: Underwater Noise Measurement (National Physical Laboratory, 2014). The MMO understands full specifications will be provided in the final monitoring plan.
- 5.9.2 The MMO acknowledges that the proposed monitoring of noise generated by the installation of the first four piled foundations of each piled foundation type to be installed is in keeping with the standard requirements for offshore wind farm developments. However, we request that in this instance, an enhanced monitoring programme be put in place for Rampion 2, which could, for example, include obtaining measurements of the first eight piles (or eight of the first 12 piles), of each foundation type, to be installed. We appreciate that this is more than is typically required.
- 5.9.3 The reason we are requesting this enhanced monitoring is to compensate for the uncertainties regarding the effectiveness of a DBBC in waters greater than 50 m depth (see comments set out in; REP4-088 - Paragraph 5.4.1 and REP5-146 – Section 2.9).
- 5.9.4 However, as there is some uncertainty around this, and the need for monitoring data at these depths, the MMO believes that this enhanced monitoring requirement is justified. The monitoring data / reports would need to be submitted to the MMO in a timely manner (as set out in Section 2.10.5 of REP5-146), to ensure that the measured noise levels are not exceeding the modelled predictions. The data gathered would provide valuable evidence on how effective Noise Abatement Systems (NAS) (such as a DBBC) are in deeper waters, particularly for depths greater than 40-45 m, providing a more extensive corroboration of the developer's noise reduction predictions and reducing uncertainty in future consents.
- 5.9.5 The MMO reiterates that bubble curtains are a well-tested technology (certainly in Europe), and the contractors will be familiar with deploying them. The enhanced monitoring programme that is requested, such as monitoring 8 of the first 12 piles to be installed, for example, should be able to demonstrate / determine whether there are any issues. This should give time for the MMO to halt piling if the systems are not working as planned and the predictions are exceeded. Although the MMO understands the cost to halting piling but the Applicant, this could be required if the mitigation is demonstrating a higher impact than predicted.

Outline Offshore Operations and Maintenance Plan Rev C (REP5-081)

- 5.10.1 The MMO acknowledges the amendments made to Section 1.2.3 of the Outline Offshore Operations and Maintenance Plan (OOMP) in response to previous comments submitted in our Deadline 4 response (REP4-088). Section 1.2.3 now



states that “A Final OOMP will be provided to the MMO, at least three four months prior to the completion of construction of the authorised scheme, in accordance with Condition 3 of the DML, Schedules 11 and 12 of the draft DCO Rev C”.

- 5.10.2 The MMO thanks the Applicant for clarifying that the final OOMP will be submitted “prior to the completion of construction of the authorised scheme” rather than following completion, and for accepting our recommendation of a four-month review period prior to operation, as opposed to the previous timeline of “three months following the completion of the authorised scheme”. The MMO is content with the updated wording of this Section.
- 5.10.3 The MMO notes that as stated in previous Deadline responses, most recently in Section 5.8.12 of our Deadline 4 response (REP4-088), regarding the status of operations and maintenance activities which may require additional consultation with the MMO, that these have not been addressed.
- 5.10.4 Due to the need to ensure that the MMO meets the OSPAR guidelines with regard to notification of chemicals, those activities that involve the need for additional or amendments of chemicals should have their “*Consultation Required with the MMO and relevant SNCB*” status changed to yes, such as, Generator replacement, scheduled general maintenance, Painting and cleaning and Grout and corrosion works.
- 5.10.5 The MMO notes that as raised most recently in Section 5.8.13 of our Deadline 4 Response (REP4-088), advice relating to Table B-1 has not been addressed. Table B-1 sets out the maximum assessment assumptions for operational and maintenance activities. Along with the maximum footprint of seabed disturbance, the total volume anticipated for disposal as a result of drilled arisings, trenching burying and ground clearance should also be included in this table.

Environmental Statement Volume 4 - Appendix 6.3 Coastal processes technical report Impact assessment Rev B (REP5-045)

5.11 Coastal Processes comments

- 5.11.1 This document identifies residual effects on coastal processes as being of minor or lesser significance. Therefore, no specific pre- or post-construction monitoring of coastal processes is proposed other than for engineering needs. The MMO considers this approach reasonable, since these necessary surveys will assess pre- and post-construction seabed condition, including scour, and so will afford coastal process monitoring in any case.
- 5.11.2 The MMO notes that it would be of value for the reporting of these surveys to include a coastal process assessment/interpretation and requests that this is done by the Applicant, as this will add to the evidence base for Offshore Wind Farm (OWF) construction and impacts.
- 5.11.3 Section 2.4.3 states that there is limited evidence for expected suspended sediment concentrations (SSC) associated with monopile or pin-pile drilling operations. Despite



this, a minor impact is assessed, and no proposal is made to monitor or obtain the evidence to confirm this assessment.

- 5.11.4 From a solely coastal processes perspective the MMO considers the assessment of the impact of dispersal and deposition of fines over a period of days and the conclusion of minor impact reasonable. However, this cannot be treated as a conclusion for ecological effect of the period of turbidity and deposition on environmental receptors. The same is true for the SSC increases due to disposal of dredge spoil, cable burial and landfall 'punch-out'. The assessment of impact to coastal process is reasonable, but this is separate to the ecological impacts.
- 5.11.5 The assessment of cumulative and in-combination effects has confined itself to the typical assumption that only spatially and temporally overlapping impacts need be assessed. In some locations it may be of value to understand the spatial and temporal extent of adjacent coastal process impacts i.e., to quantify the net increase in 'high-turbidity events' that will be generated by the combined developments over a typical annual cycle and within a given area, to assess the potential for an increase in pressures on adjacent ecosystems over the period.
- 5.11.6 With regards to 'punch-out' sites, while they are generally considered to be too small to affect coastal process significantly, MMO advice with respect to coastal process impact would be to minimise interference in active sediment systems as far as possible. The MMO also advises that these sites be located below the closure depth for beach profile changes, to minimise any possibility of affecting the shoreline morphology, with minimised footprints for any structures or scour protection, and avoiding any obvious cross-shore or longshore sediment transport features such as bars.
- 5.11.7 With regards to Horizontal Directional Drilling (HDD) there should be a principal requirement that the drilling fluid used is benign and non-toxic. All chemicals to be used for the HDD and on the wind farm including, paints and coatings that have a pathway to the marine environment should be notified to the MMO as part of the chemical risk assessment. An assessment of the risk from drilling fluid loss, hydraulic fracture or inadvertent drilling return, should also be provided to ensure a worst-case scenario is assessed.
- 5.11.8 Commitment C-227 indicates that HDD will use bentonite clay mix for HDD, and the drilling fluid assessment also indicates a benign water-bentonite mixture with little or no risk to the marine environment. As drilling fluids may also contain other chemicals (e.g., polymers that have varying degrees of degradability) all chemicals to be used that have a pathway to the marine environment, not used on vessels, and not covered by other regulations (i.e., chemicals covered by wastewater regulations such as sewage on ship or grey water, covered by IMO MARPOL Annex IV) must be notified for approval by the MMO. This requirement is covered by the new wording proposed by the MMO for Condition 9(1) stated in our comments on the Applicant's draft DCO provided in Section 2 of this Deadline response.



Outline Scour Protection and Cable Protection Plan Rev C (REP5-075)

5.12 Coastal Processed comments

- 5.12.1 The MMO notes that the Applicant has added the additional Commitment C-300 which states that *“Cable protection will be used that minimises the environmental impacts as far as practicable”*. It should be recognised that cable protection options are limited, and all introduce non-native materials to the seabed surface, with slightly different potential impacts. As such, minimising impact may require value judgments as to which of the incongruent costs and benefits of the options best represent a ‘minimum’.
- 5.12.2 This plan does not yet commit to any of the specific cable protection options available, so it is not possible to comment yet on how and whether Commitment C-300 will be met.

Draft Unexploded Ordnance (UXO) Clearance Marine Mammal Mitigation Protocol Rev B (REP5-079)

- 5.13.1 The MMO provided comments in our Relevant Representation – Section 5.5 and the amendments requested have not been updated within this document.
- 5.13.2 There is a mistake in Table 3-1 and the predicted SPL_{peak} (Peak sound pressure level) Permanent Threshold Shift (PTS) range for Very High Frequency (VHF) cetaceans and a charge weight of 525 kg should be ~13 km (and not 2.5 km as per the table). This comment has not been addressed and is still outstanding.
- 5.13.3 The MMO believes it would be beneficial for the Applicant to change *“underwear noise”* to *“underwater noise”* in Table 4-1 under C-275.
- 5.13.4 The MMO fully supports the use of low order methods to dispose of UXOs using the deflagration method, and welcome that, where other less impactful methods exist at the point of applying for a Marine Licence, those alternative methods may be proposed instead, where evidence support their efficacy. The MMO notes that the table has been updated/revised to state that, *“The use of low order detonations using the ‘deflagration method’ will be the prioritised method of disposal for Offshore UXOs and will be implemented, where practicable”*.
- 5.13.5 Overall, the MMMP refers to the standard measures typically employed for UXO clearance operations including a mitigation zone, marine mammal observers, passive acoustic monitoring, acoustic deterrent devices and soft start procedures. It is appropriate that bubble curtains are proposed for high-order detonations, should high order not be avoidable.



Environmental Statement Chapter 11 Marine Mammals (REP5-033).

5.14.1 The MMO notes there is an outstanding comment which was previously raised in our Relevant Representation (REP1-056) and has not been addressed.

5.14.2 In paragraph 11.9.42, the results of the underwater noise modelling have been misinterpreted, and it is incorrect to state that *“to be at risk of auditory injury, an animal would have to stay within the immediate vicinity of the noise source for 24 hours. This is considered unrealistic and therefore, the risk of auditory injury to marine mammals from these activities is considered to be de minimis”*. The underwater noise assessment (presented in Appendix 11.3) concludes that for non-impulsive (or continuous) noise sources, any marine mammal would have to be less than 100 m from the continuous noise source at the start of the activity, in most cases, to acquire the necessary exposure to induce PTS as per Southall et al. (2019). This is because the noise assessment assumed a fleeing animal receptor. Furthermore, the noise assessment assumed that non-continuous sources were operating for a worst-case of 12 hours in any given 24-hour periods apart from vessel noise (which was assumed to be present for 24 hours). Thus, the MMO requested Chapter 11 to be corrected accordingly or a further addendum to rectify as this is a certified document.

5.14.3 However, the MMO does not believe the incorrect statement significantly alters the conclusions of Chapter 11. The MMO wanted this to be noted if the statement is ever referred to if the Secretary of State is minded approve the DCO.

Appendix 11.3 Underwater noise assessment technical report (REP5-046)

5.15.1 Version A was previously reviewed, and comments were provided in our Relevant Representation (RR-219). The MMO raised several queries relating to the underwater noise modelling assessment presented.

5.15.2 The Applicant has addressed some of our comments and has updated the report with the necessary changes. A few comments, however, had not been fully addressed and these are noted below in Table 1.

Table 1 - Original comments on the underwater noise modelling (middle column) and comments on whether concerns have been addressed (final column).

Section / Table	Original comment	Final position
Table 2-10 <i>Levels for a 50 % response was observed in fish from</i>	Please note that the Hawkins et al. (2014) paper does not refer to unweighted peak sound pressure levels, so it is not clear where the thresholds of 173 dB re 1 µPa and 168 dB re 1 µPa unweighted peak have been derived from.	This comment was responded to by the Applicant at Deadline 1 Section MMO Table 3 of REP1-017:



<p><i>Hawkins et al. (2014)</i></p>	<p>MMO recommends that these thresholds are removed from Table 2-10 to avoid confusion.</p>	<p><i>The MMO is correct that these figures are not derived from Hawkins et al. (2014), and are in fact derived from McCauley et al. (2000), and the Applicant is grateful for identification of this error, this has been added to the Errata submitted at Deadline 1. The Applicant confirmed that this has not been used in any determination of impact distances or ranges.</i></p> <p>This has not been updated as set out by the Applicant.</p> <p>However, this is only a minor editorial comment and has no bearing on the report conclusions. We recommend for future reports that the reference to Hawkins et al. (2014) is removed, to avoid confusion.</p>
<p>Modelling confidence (section 3.1)</p>	<p>Figure 3-1 presents a comparison between example measured impact piling data and modelled data using INSPIRE version 5.1. Importantly, this comparison is lacking context.</p> <p>i. Firstly, MMO notes that the pile sizes used in this comparison are much smaller (i.e., 1.8 m, 9.5 m, 6.1 m and 6.0 m) than the proposed (up</p>	<p>This comment was responded to by the Applicant at Deadline 1 Section MMO Table 3 of REP1-017:</p> <p><i>i. INSPIRE bases its calculation of</i></p>

	<p>to) 13.5 m diameter monopiles for Rampion 2. It is not clear how INSPIRE scales up the smaller piles. Additionally, have other factors, such as the penetration depth and the water depth, been considered in the modelling of the source levels?</p>	<p><i>apparent source noise levels on extensive data available from the installation of, currently, up to 9.5 m piles offshore. It is recognised that the proposed piles may be larger, and an extrapolation is used to predict these. INSPIRE has used this extrapolation technique to produce confident results that have been verified by subsequent measurements on installed OWFs over approximately the last 10 years. The water depth is included in this calculation. The penetration depth is relevant for subsea driven piles, where the pile does not extend for the entire water depth and is included where that could occur.</i></p> <p>We thank the Applicant for this response and confirm that we are content this comment has now been addressed.</p>
<p>Section 5.1 Noise making activities</p>	<p>Minor comment (action): <i>“The calculation of underwater noise transmission loss for the non-impulsive sources is based on an</i></p>	<p>This comment was responded to by the Applicant at Deadline 1</p>



	<p><i>empirical analysis of the noise measurements taken on transects around these sources by Subacoustech. The predictions use the following principle fitted to the measured data, where R is the range from the source, N is the transmission loss and α is the absorption loss:</i></p> <p><i>Received Level = Source level (SL) – N log₁₀ R – αR.</i></p> <p>This equation suggests that the propagation loss is of the form $N \log_{10} R + \alpha R$, which is what we would normally expect to see; however, the examples in Table 5.2 show that the alpha coefficient is negative. For example, for trenching, the approximate transmission (or propagation) loss is $13 \log_{10} R - 0.0004R$. This is somewhat unusual (although conservative); please could Subacoustech provide further clarification?</p>	<p>Section MMO Table 3 of REP1-017:</p> <p><i>The basic equation as stated here is correct and agreed. The geometric loss must be a reduction from the source level, and the absorption must also be a reduction. This will be corrected in revisions: it is confirmed that the basic concept of $RL = SL$ minus geometric spreading minus absorption function is followed.</i></p> <p>The Applicant has acknowledged the original point. No further action required although any future reports should be revised/corrected to avoid confusion.</p>
--	--	---

6. MMO Comments on Applicant's Submissions received at Deadline 5

Outline Cable Burial Risk Assessment Rev A (REP5-123)

- 6.1 The MMO has reviewed this document with our scientific advisors Cefas and direct the Applicant to our response to the Examining Authorities Written Question BP3.1 provided in Section 7 of this Deadline Response.

Outline Cable Specification and Installation Plan (REP5-126)

- 6.2 The MMO has reviewed this document with our scientific advisors Cefas and direct the Applicant to our response to the Examining Authorities Written Question BP3.1 provided in Section 7 of this Deadline Response.

Outline Guillemot and Razorbill Implementation and Monitoring Plan Rev A (REP5-127)

- 6.3.3 The MMO acknowledges the submission of Outline Guillemot and Razorbill Implementation and Monitoring Plan Rev A (REP5-127). The MMO is aware there is ongoing discussions between Natural England and the Applicant with regards to the In Combination Assessments for impacts to Guillemot and Razorbill within Flamborough and Filey Coast SPA and Guillemot within the Farne Islands SPA.
- 6.3.4 The MMO note in Natural England's Deadline 5 submission (REP5-137) that they have reviewed the Applicant's documents *Applicant's Post Hearing Submission – Issue Specific Hearing 1 Appendix 8 Further Information for Action Point 34 - Guillemot and Razorbill Rev B* (REP4-066) and *Habitats Regulations Assessment (Without Prejudice) Derogation Case Rev B* (REP4-015) submitted at Deadline 4. Natural England have stated that they do not agree with the Applicant's conclusion that adverse effect on site integrity can be ruled out for all of the features considered "*and consider that Rampion 2 will make a contribution to in- combination adverse effects to the three sites under consideration*".
- 6.3.5 In response to the Applicant's proposed compensatory measures for kittiwake, guillemot and razorbill, Natural England have also stated that "*We broadly consider the proposed approaches to be appropriate and proportionate, although we note that significant monitoring efforts will be required at each colony considered for guillemot and razorbill compensation to establish whether recreational disturbance is currently having a significant impact on the success of those colonies, and what methods may be effective in addressing it*". The MMO defers to Natural England on matters relating to ornithology and their opinion on the suitability of the Applicant's proposed modelling but will maintain a watching brief on responses and can provide comments if any DML conditions are required.



Applicant's Response to Action Point 22 - Bottlenose Dolphin Population Modelling (REP5-128)

- 6.4.1 The MMO notes that this document was produced in response to Action Point 22 and concerns interim Population Consequences of Disturbance (iPCoD) modelling for bottlenose dolphin as suggested by Natural England at Deadline 5. The MMO defers to the advice of Natural England on the suitability of this document and whether it adequately satisfies their suggestion.



7. MMO Comments on Applicant’s post Issue Specific Hearing 2 Documents

The MMO has provided answers to the ExA published request (Rule 17) for additional information following the receipt of the written submissions at Deadline 5 (17 July 2024) in the table below.

Reference	Question	MMO Response
BP	Benthic, Coastal and Offshore Processes	
BP 3.1 <i>Outline Cable Burial Risk Assessment and an Outline Cable Specification and Installation Plan</i>	<p>Natural England / Marine Management Organisation</p> <p>At Deadline 5 the Applicant submitted an Outline Cable Burial Risk Assessment [REP5-123] and an Outline Cable Specification and Installation Plan [REP5-126]. Provide comments on these documents and confirm which previous concerns expressed have been addressed by the submission of these documents.</p>	<p>The MMO welcomes the commitments provided by the Applicant in the Outline Cable Specification and Installation Plan [REP5-126] (C-283, C-288, C-289, C-297 & C-300) but maintains that more information is required to fully assess the potential environmental impacts of cable protection methods.</p> <p>As previously stated in Section 5.3.5 of our Deadline 4 response (REP4-088) with Commitment C-289 the Applicant they will use “<i>secondary protection material, where practicable, that has the greatest potential for removal on decommissioning of the Proposed Development</i>” but does not explain further what this material could be.</p> <p>C-283 states that “<i>Gravel bags laid on the seabed to protect the cable barge during construction of Rampion 2, will be removed prior to the completion of construction, where practicable</i>” but does not provide any assessment of the potential environmental impacts or proposed mitigation in the event that recovery is not possible.</p> <p>While the MMO agrees with the sentiment of the new Commitment C-300 that “<i>Cable protection will be used that minimises the environmental impacts as far as practicable</i>” it should be noted that all cable protection methods have environmental impacts and have the potential to introduce non-native materials to the seabed surface. As such, minimising impact may require value judgments as to which of the incongruent costs and benefits of the options best represent a ‘minimum’. In addition, these documents do not yet commit to any of the specific cable protection options</p>

[Type here]

		<p>available, so it is not possible to comment yet on how and whether Commitment C-300 will be met.</p> <p>The MMO along with Coastal Process specialists have reviewed the Outline Cable Specification and Installation Plan, and have no comments to make.</p>
--	--	--

[Type here]

8. MMO Comments on Applicant's response to Examining Authority (ExA) WQ's

Applicant's Response to ExAs First Written Questions - Fish and Shellfish - Appendix H Rev B (REP5-110)

- 8.1.1 Within this document the Applicant has 'revised' their zoning plan to adjust their argument so that piling during the black seabream breeding season would still be possible even when modelled using the 135 dB behavioural response threshold, as per Hawkins *et al.*, (2014). The Applicant asserts that this will be possible because a noise abatement reduction of 20 dB will be achieved using a DBBC combined with the PULSE or MNRU hammer mitigation. However, many of the issues highlighted by the MMO when originally reviewing this document, still remain.
- 8.1.2 The Applicant's revised zoning exercise presents the areas of the Rampion 2 array in which it will not be possible to pile during the black seabream spawning and nesting season (March to July, inclusive), based on modelling of 135 dB SELss threshold. It should be noted that the figures provided in Appendix H still do not fully represent the situation, as the UWN modelling carried out to determine the exclusion zones (i.e., the UWN contours depicting the full extent of the impact ranges for the various piling locations modelled in each of the scenarios), has not been provided. This is significant because the exclusion zones have been derived according to where these contours show an overlap with the Kingmere MCZ only and so the Applicant's revised zoning exercise does not show the full extent of the noise disturbance caused by their proposed piling activities during the sensitive black sea bream spawning and nesting season (which would be indicated by the UWN contours). This remains a serious limitation of Figures H-1 – H-4 in Appendix H (included in Annex 4 of this response) as they do not show how much of the surrounding area will also be affected by UWN associated with each scenario.
- 8.1.3 Further, a fundamental element of the Applicant's zoning plan is that the month of July is still treated separately from March-June, despite both the MMO and specialists at Natural England advising and maintaining that the black seabream breeding season is from 1st March to 31st July inclusive. Black seabream are at their most sensitive when undertaking spawning and nest guarding, and as a result, the conservation objectives of the Kingmere MCZ are of heightened importance during the spawning and nesting period. There is clear evidence that black seabream will continue to spawn and maintain their nests into and during July, and therefore July must be considered as an equally important part of the spawning and nesting period, and not less important than the March-June period. This was made clear to the Applicant pre-application in April 2023 following the review of a technical note on piling noise relevant to black seabream and an expert topic group (ETG) meeting on the same subject. The continual proposal that the month of July be treated separately from March-June within the Applicant's proposed zoning plan for piling during the spawning and nesting season is therefore not acceptable. This is also discussed relative to the Applicant's most recent comments on their zoning plan regarding the



In-Principle Sensitive Features Mitigation Plan, which can be found in section 5 of this response.

- 8.1.4 Another consideration is the Applicant's use of a 20 dB noise abatement reduction in the scenarios presented in Appendix H, despite most of their modelling being based on a 15 dB reduction. For the reasons outlined in Section 5 above, there remains significant uncertainty as to whether the full 15 dB reduction can be achieved in deeper areas of the array. This inevitably creates uncertainty as to whether the proposed 20 dB reduction is achievable and whether the modelling presented by the Applicant in Appendix H (noting that full modelling of the UWN contours has again not been provided) is representative of the situation.
- 8.1.5 Given that this has been provided at Deadline 5 with one remaining deadline within the current Examination Period and noting the outstanding uncertainties in the UWN modelling presented in Appendix H and outstanding question as to the achievability of the noise reductions proposed, the MMO does not believe that this document strengthens the Applicant's case that piling can be carried out during the black seabream breeding season.
- 8.1.6 As within Section 5 the MMO requests a piling restriction condition to be included within the DML.

Applicant's Responses to Examining Authority's Second Written Questions (ExQ2) Rev A (REP5-119)

8.2 Benthic comments

- 8.2.1 Question BP2.5: The MMO welcomes the Applicant's response and their statement that "*adaptive management will be developed and discussed if monitoring shows impacts greater than anticipated*". The MMO directs the Applicant to Section 5.4.2 and Section 5.8.3 for comments on why this commitment should also be reflected in the In Principle Sensitive Features Mitigation Plan Rev E (REP5-083) and the Outline Offshore Operations and Maintenance Plan Rev C (REP5-081) respectively.
- 8.2.2 The MMO welcomes this commitment but notes that it does not appear to be reflected in Sections 6 and 7 of the In Principle Sensitive Features Mitigation Plan Rev E (REP5-083). The MMO advise that this mitigation plan (REP5-083) is updated to reflect this commitment by the Applicant and to ensure consistency across documents.

8.3 Fisheries

- 8.3.1 Points FS 2.4 – 2.6 are inherently linked to one another and so our comments below address these points together. To answer the question posed in FS 2.4, at present, the MMO does not consider it possible to be confident that there will be no adverse effects to adult herring engaged in spawning as a result of UWN generated by piling activities within the Rampion Extension array, due to a number of outstanding issues and uncertainties within the Applicant's assessment.



8.3.2 Firstly, there continues to be disagreement as to where the herring spawning grounds are and which data are appropriate for use in identifying the spawning grounds (FS 2.5). The disagreement primarily relates to the use of Coull *et al.* (1998) and its use in mapping historic spawning grounds of fish, and the use of a ‘heat’ map of potential herring spawning habitat. The MMO has provided comments below in points i and ii.

- (i) Concerning the Applicant’s inaccurate statement that the Coull *et al.* (1998) historic spawning grounds represent the active herring spawning grounds, the MMO has outlined in previous advice why the Coull *et al.* (1998) shapefile is useful for providing an indication of the location of historic spawning grounds only, but should not be relied upon in isolation to accurately represent the presence of active herring spawning grounds.

To reiterate, this is because, although the Coull *et al.* (1998) fisheries sensitivity maps were formed from data collected by fisheries research organisations, the data used to inform the Coull *et al.* shapefiles have not been updated since their production, meaning that environmental changes in the distribution of spawning sediments and interannual variability in spawning activity is not reflected in the shapefile.

Further to this, spawning areas are not rigidly fixed, and fish will not adhere to spawning within the explicit boundaries defined in the shapefile. The shapefile is also unable to quantify the nuance of how spawning activity varies spatially, for example, over prime spawning ground where sediments are suitable spawning intensity will be higher, whereas spawning intensity may be lower around the fringes of the spawning ground. Therefore, the Coull *et al.* (1998) data can provide an indication of the location of historic spawning grounds only.

- ii) A more robust means of identifying areas of seabed with high potential to support herring spawning would be to produce a ‘heat’ map following the methodologies described by Reach *et al.*, (2013) and MarineSpace (2013), (noting that an updated methodology has also been published, as per Kyle-Henney *et al.*, (2023)). This approach uses a suite of current and relevant data, including IHLS data, broadscale seabed sediment data, particle size analysis (PSA) data as well as fishing fleet data and other data sources, which are methodically layered and scored to generate a single ‘heatmap’ output.

Areas of higher ‘heat’ are representative of areas with higher potential herring spawning habitat. It is important to note that the IHLS data used in the heatmap provides a direct measurement of the presence and abundance of herring larvae over multiple years, from a survey that is conducted annually.

In addition, the PSA data used in the heatmap provide a direct measurement of the seabed sediment composition (and therefore suitability to provide spawning habitat for herring). PSA data collected by the Applicant during benthic surveys is typically supplemented with publicly available PSA data to



improve area coverage, with both sources of data generally being acquired in recent years (i.e., more recent than when Coull et al., 1998 was published).

Following our review of the Environmental Statement (ES) in September 2023, we requested that the Applicant provide an appropriately formulated 'heat' map of potential herring spawning habitat in order to support their conclusions that the herring spawning ground would not be significantly overlapped by UWN from piling. The Applicant provided an updated 'heatmap' of potential herring spawning habitat at Deadline 1 which was not consistent with the methodologies of Reach *et al.*, (2013) and MarineSpace (2013).

An amended 'heat' map was then provided at Deadline 4, however there were also a number of issues and inaccuracies with this 'heat' map and clarifications are still pending on the data which has been incorporated. The Applicant has not been able to provide the clarifications on the data used in their 'heat' map, (which was also requested following Deadline 4), within this consultation.

Further to this, the MMO acknowledges that there have been ongoing technical issues with the ICES portal through which IHLS data is downloaded. This means that it may be some time before the Applicant is able to fully address the outstanding issues and uncertainties with their herring potential spawning habitat 'heat' maps.

- 8.3.3 The most appropriate data from which the location of the active herring spawning grounds (in lieu of an adequate potential spawning habitat heatmap) should be determined are IHLS data (amalgamated over an appropriately long 10-year timeseries), in conjunction with broadscale sediment data and site-specific PSA data. These data represent direct measures of herring larval presence and abundance, as well as the presence of suitable spawning sediments, respectively. This was outlined in our Deadline 5 response (REP5 -146). IHLS data are collected every year across the Eastern Channel and North Sea herring spawning grounds. The equipment used is a Gulf VII plankton sampler which is towed through the water and samples to a depth of approximately 5m above the seabed.

It is important to note that it does not touch the seabed so does not sample eggs, but 'newly hatched larvae' which are defined by ICES as those <11 millimetres (mm) in length for Southern North Sea (Downs herring) stocks. Newly hatched larvae remain on or close to seabed until their yolk-sacs are absorbed and only when the yolk-sacs have been absorbed and the larvae reach a size of approximately 11mm, will they begin drift away from the spawning grounds. IHLS data is therefore the only data which captures the presence, location and abundance of newly hatched larvae whilst they are still in their early developmental stages and still closely associated with their spawning grounds.

The Applicant's statement that "The presence of high densities of herring larvae (as informed by IHLS data) are not indicative of locations of spawning grounds and actively spawning adult herring" is therefore incorrect. Furthermore, broadscale seabed sediment data and site-specific PSA data, when presented alongside IHLS data, are a valuable means of identifying areas of suitable seabed that consist of the



gravel and coarse sediments on which herring lay their eggs. As described by Reach *et al.*, (2013), the environmental conditions in which herring choose to spawn are highly specific and can be identified through particle size analysis. PSA data therefore represents, with high confidence, the location of areas of seabed where the sediment composition is either 'preferred' by herring as a spawning substrate, or 'marginal' where conditions may be slightly less suitable but are still more than adequate to provide suitable herring spawning habitat.

- 8.3.4 Given the outstanding clarifications regarding how the Applicant formulated their 'heat' map and the data they have used and considering the time necessary for the Applicant to appropriately revise their 'heat' map and provide this to us for review, the MMO does not consider it possible for this disagreement to be resolved ahead of SoS final decision on the Rampion extension application.

As outlined in our previous written responses (REP5-146 and REP4-088) we must take seabed sediment data which has been ground-truthed using PSA data, alongside aggregated IHLS data to be the most reliable representation of the presence of active herring spawning grounds. These data (shown in Figure 3.3 Annex 2) indicate that the area to the north of the historic spawning ground (Coull *et al.*, 1998) is suitable as herring spawning habitat, with dense PSA coverage showing sediments consisting of 'prime/preferred' and sub-prime/preferred' spawning habitat. This area also coincides with the area of highest larval density where concentrations of larvae are between 48,000 – 98,500 per metre squared (m²). This has not changed since this evidence was first presented at Deadline 1. The MMO believes this is a matter for the SoS and should not be pushed to post consent to resolve as this undermines the development consent order process.

- 8.3.5 With regard to FS 2.6 which relates to the drifting of herring larvae away from their spawning ground, we addressed this point in detail in our advice at Deadline 5. The question posed is whether the influence of larval drift points to the main spawning ground being defined by Coull *et al.* (1998) and not the area closer to the array. The MMO does not agree that the Coull *et al.*, (1998) spawning ground represents the best data by which current, active herring spawning grounds should be defined.

The Coull *et al.* (1998) spawning ground shapefiles provide a broad indication of where herring spawning grounds have occurred historically but should not be relied on as the sole indicator of the presence of herring spawning grounds. Such a use of these maps misinterprets the work of the authors and risks decisions being made on the basis of inaccurate information. Coull *et al.* (1998) acknowledges that 'spawning distributions are under continual revision. It therefore follows that these maps should not be seen as rigid, unchanging descriptions of presence or absence'. Ellis *et al.* (2012) (who provided an updated revision to UK spawning and nursery ground maps in UK waters) highlighted that further ichthyoplankton surveys have been carried out since the Coull *et al.* (1998) maps were produced, and states that 'using the maps in isolation may result in misrepresentations of the data'.

As outlined above in point 8.3.2 (ii) spawning areas are not rigidly fixed, and fish will not adhere to spawning within the explicit boundaries defined in the shapefile.



Furthermore, the data used to inform the Coull *et al.*, (1998) shapefiles has not been updated since their production in 1998, meaning that environmental changes in the distribution of spawning sediments and interannual variability in spawning activity is not reflected.

- 8.3.6 With respect to the influence of herring larval drift on identifying the spawning grounds, the MMO disagrees with the statement in FS 2.6 that “spawning activities are occurring in the spawning ground as defined by Coull *et al* (1998), as opposed to areas where high densities of eggs and larvae are present (as identified by IHLS data), as eggs and larvae will be drifting away from the defined spawning ground”. This statement is not accurate.
- 8.3.7 As was outlined in our advice at Deadline 5 (REP5-156) , according to Heath & Rankine (1988), herring larvae which have absorbed their yolk sack (i.e., are past their earliest developmental phases) can drift up to 9 kilometres (km) a day, and post-larval Isaacs-Kidd Midwater Trawl (MIK) net survey data carried out during International Bottom Trawl Surveys (IBTS) show that larvae generally move in an easterly direction. In fact, virtually all stocks in western Europe drift in an easterly direction (Dickey-Collas, 2005), and the drift of larvae in the southern North Sea (of which the Downs spawning grounds in the Eastern Channel is a part) is also eastwards towards the juvenile nursery grounds between the Wadden Sea to the Skagerrak and Kattegat (Wallace, 1924; Burd, 1978).

In fact, the Applicant acknowledges that this is the case in their response to FS 2.5, and provides no argument against this being true, rather, they deflect this point by discussing how their heatmap (which is not accurately formed for the reasons outlined in our Deadline 1 and 2 response (REP1-056 and REP2-035) and our Deadline 5 (REP5-156) response indicates support for the Coull *et al.*, (1998) spawning ground.

- 8.3.8 This then raises the point that larvae drifting eastwards cannot be originating from the area of seabed indicated by the Coull *et al.*, (1998) spawning ground, as this is located to the east of where the highest larval abundances are recorded (Figure 3.3 presented in support of Action Point 38, included in Annex 2 for reference). Figure 3.3 (Annex 2), shows that there are several dense clusters of PSA data points indicating preferred and marginal herring spawning sediments located to the north and northwest of the Rampion 2 array, but importantly there is a very large cluster of PSA data points showing preferred and marginal herring spawning sediments (indicating suitable spawning beds) located between the Rampion 2 array boundary and the areas of high larval density as indicated by IHLS data. If the larvae presented in Figure 3.3 had originated from the area of seabed indicated by the Coull *et al.*, (1998) spawning ground and drifted eastwards, then we would expect to see areas of medium and high larval abundance located closer to the Dover straight, however that is not the case.
- 8.3.9 Therefore, as larvae are drifting eastwards, it follows that the larval abundances shown in Figure 3.3 (Annex 2) originated from the spawning beds where sediments have sufficient composition to support spawning, as indicated by the PSA data. It should also be noted that the IHLS data presented in Figure 3.3 presents the



abundance of larvae less than 11mm in length, which (as outlined in my point 21 above) will still have some affinity with their spawning beds (See Section 8.8.3 above of this Deadline Response for further comment). As outlined in Sections 5.7.12-5.7.16 above of this Deadline Response, sediment class data which have been ground-truthed using PSA data, taken alongside aggregated herring larval data remains a more reliable representation of the presence of herring spawning grounds than the Coull *et al.*, (1998) spawning ground taken alone.

8.3.10 With regard to point FS 2.9, the uncertainties associated with the achievable noise abatement reduction in the site-specific context of Rampion 2 affect our confidence in the modelling of the Double Big Bubble Curtain mitigation. However, this point is layered. In their response in document 8.81 (REP5-119), the Applicant confirms that approximately 30% of their turbine locations will be in water depths of over 40 m and have also stated that some of these locations will be in water depths of between 50-55m. This is significant for the following reasons:

- i. All of the mitigated UWN contours modelled in relation to the herring spawning ground and the range of behavioural effects in adult spawning herring seen in recent consultations, have been based on a 15db noise abatement reduction achieved using a DBBC. Modelling for behavioural effects from piling mitigated with a 15 dB noise abatement reduction, presented in Figures 4.5 and 4.6 (included below and discussed in Section 2.14.15 of our Deadline 5 Response (REP5-146)), shows a reduced range of impact with the mitigated noise contours overlapping with areas of slightly lower larval densities (23,000 – 48,000 per m²) than the unmitigated noise contours. Taking the area where high larval densities occur (>35,000-48,000) to represent high potential herring spawning habitat where herring are likely to be engaged in spawning activity (in lieu of an adequate potential spawning habitat heatmap and recognising the limitations of the *Coull et al.*, (1998) spawning ground shapefile9), the reduced range of impact may be acceptable.
- ii. However, this is dependent upon a 15 dB noise abatement reduction, which the Applicant has indicated that based on past case studies, the effectiveness of any BBC system could decrease by 1 - 2 dB in water depths of 50 m compared to 40 m. Knowing now that approximately 30% of turbine locations will be in water depths of over 40 m, potentially between 50-55m, there is some uncertainty as to whether the modelling scenario presented is fully reflective of the real world worst-case scenario. That is to say that we have not been advised by the Applicant exactly which turbine locations are located in waters deeper than 40m and have not been presented with modelling with compares the mitigated UWN contours for a 15 dB noise abatement reduction with those of 13 dB noise abatement reduction. This is significant because, if the deep-water turbine locations are located on the east side of the array closer to the herring spawning ground, mitigated UWN contours with a 13 dB noise abatement reduction may show a larger overlap with the herring spawning ground than is indicated in Figures 4.5 and 4.6 below. That means that the potential for significant behavioural effects in spawning adult herring may be



greater as, potentially, a larger portion of the spawning ground would be affected.

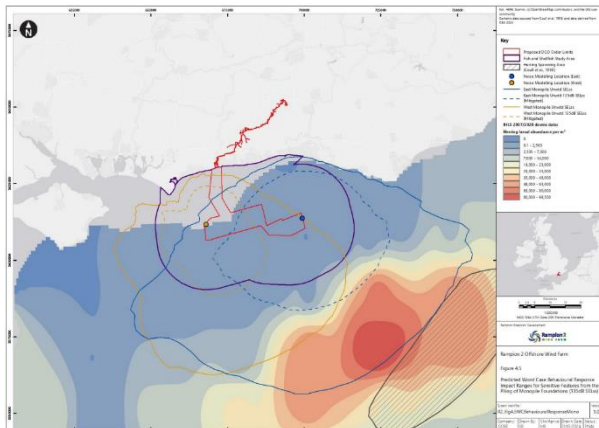


Figure 4.5 Predicted worst case behavioural response impact ranges for spawning herring from the **piling of monopile foundations** (135db SELss) for east and west modelling locations, with a 15 dB noise reduction based on DBBC.

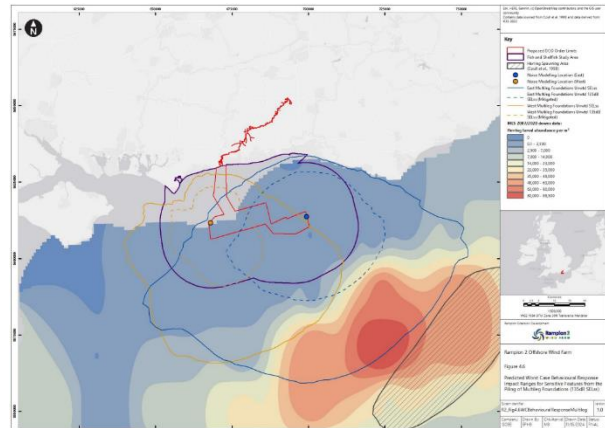


Figure 4.6 Predicted worst case behavioural response impact ranges for spawning herring from the **piling of multileg foundations** (135db SELss) for east and west modelling locations, with a 15 dB noise reduction based on DBBC.

- i. It is noted in the Applicant’s response to **FS 2.9** that they have had recent discussions with a contractor providing DBBC for an unrelated project that identified current deployments of DBBC for offshore wind piled foundations at water depths of 60m deep where the contractor *did not expect* significant issues with the performance of the DBBC. Although this is an ongoing project and monitoring information on deployed DBBC efficacy at 60m is not yet available, this information has the potential to provide the necessary reassurance that a 15 dB noise abatement reduction could be achieved in waters deeper than 40m at the Rampion array.

It is also noted that an enhanced monitoring programme has been requested (REP5-146). The data gathered would provide valuable evidence on how effective noise abatement systems (such as a DBBC) are in deeper waters, particularly for depths greater than 40-45 m, providing a more extensive corroboration of the developer’s noise reduction predictions and reducing uncertainty in future consents.

- Further clarifications on these points are essential to resolving the outstanding uncertainties surrounding the likely significance of behavioural effects in adult spawning herring from UWN as a result of piling activities. However, given that this issue remains unresolved at this late stage in the examination process, the additional modelling (point 25ii) has not currently been provided and will unlikely to be provided within the current examination period. It will not be possible for the results of the unrelated project monitoring (point 25iii), nor the results of an enhanced monitoring programme carried out by Rampion 2 to be submitted and reviewed.

8.3.11 Taking into account all of the outstanding sources of uncertainty, we must maintain our **request of a seasonal piling restriction in order to limit disturbance to adult spawning herring during the spawning period (1st November to 31st January, inclusive)**. This request is made with the view that, as the necessary information becomes available following the issuing of consent for Rampion 2, should consent be granted, this full seasonal restriction could be refined or removed as a variation to the DML, providing that the Applicant provides the additional UWN modelling, monitoring data / reports to the MMO in a timely manner, and that these data validate predictions that the measured noise levels are not exceeding the modelled predictions.

8.4 Underwater Noise

FS2.7 Effects of Piling Restrictions on Construction & FS2.9 - Noise Abatement Systems

8.4.1 The MMO welcomes the response from the Applicant confirming that, based on preliminary studies of possible layouts for the offshore wind farm, around 30% of the turbine locations are expected to be in water depths of over 40m. The majority of this 30% will be in the range of 40-50m and a few locations in the range of 50-55m. We support the use of the noise abatement measures proposed by the Applicant, and we request updates regarding the underwater noise monitoring during the construction phase (as set out in Section 2.10.5 of REP5-146) so that we can determine early on the efficacy of NAS.

8.4.2 In our Deadline 5 Response (REP5-146) the MMO raised the following point:

The MMO highlighted that the ITAP (the Institute of Technical and Applied Physics) report '*Information to support efficacy of noise mitigation / abatement techniques with respect to site conditions at Rampion 2 Offshore Windfarm*' (Document Reference: 8.40) notes that based on past experience, "*the effectiveness of any BBC (Big Bubble Curtain) system will decrease by 1 decibels (dB) (unlikely 2 dB) in 50 m water depth compared to 40m. The application of an enhanced BBC as an inner ring in combination with a normal BBC as an outer ring would be expected to compensate or minimise the effect of the increased water depth*". The MMO considers this statement unclear, as this seems to describe a double BBC, which is what the 15 dB noise reduction estimate is based on. Further clarity has not been provided.

MM2.4 Definitions of Magnitude and Sensitivity in the ES

8.4.3 It is noted by the Applicant that they have responded to these points throughout the Examination in the Relevant and Written Representations, and considers point a, c and d of question MM2.4 resolved.

Regarding **point b**, the Applicant is aware that Natural England and MMO maintain the position that the sensitivity score for cetaceans should be high, and that more



empirical data is required to conclude a different sensitivity score. The applicant agrees with the statutory nature conservation bodies (SNCBs) that more empirical data is required but based on their expert opinion, the Applicant maintains that the Permanent Threshold Shift (PTS) sensitivity score is low. This matter will not be resolved within the timescale of the examination as more data and further studies are required.

- 8.4.5 The MMO highlights to the ExA that agreement on this issue has not been reached, and we maintain our position regarding PTS sensitivity.



9. MMO Comments on Applicant's Comments on the MMO Deadline 4 Written Submissions

Applicant's Comments on Deadline 4 Submissions Rev A (REP5-122)

9.1 Benthic comments

9.1.1 In their response to MMO comments on the Applicant's proposed monitoring for benthic features at Reference point 2.12.107, the Applicant "*confirms that both side scan sonar and Multi-beam Echo Sounder methods will be used together to collect more information, including backscatter, to support the use of drop-down video to confirm the presence of these features*" (chalk reef, stony reef and Sabellaria spinulosa reef). The MMO welcomes this clarification but please refer to Section 5.8.3 of this Deadline response for comment on why this commitment should also be reflected in the Offshore In Principle Monitoring Plan Rev D (REP5-085).

9.2 Fisheries comments

9.2.1 Given the volume of points in REP5-122 that require a response, and in consideration of the amount of time available for the MMO to provide detailed comments, the MMO have highlighted key areas where agreement is yet to be reached, or where outstanding concerns have not been addressed.

Point: 2.12.59

9.2.2 The Applicant states; *'It is worth noting that the mitigated impact ranges from the implementation of DBBC, as defined using the overly precautionary 135 dB SELs threshold (the use of which the Applicant does not support), also do not overlap with herring spawning grounds, or areas of high densities of eggs and larvae.'* The 135 dB threshold is not considered 'overly' precautionary. The MMO, along with Cefas Fisheries and Underwater Noise specialists, have been consistent in our advice to the Applicant (and their consultant) that the 135 dB threshold is currently considered the best available evidence for predicting the range of effect for behavioural responses in herring. Describing this as "overly" implies that the threshold goes beyond what the evidence says and is therefore not evidence based. Conversely, the 135 dB threshold is based on the findings in Hawkins *et al.* (2014) which conducted field studies in a lough in Ireland, looking at the behavioural responses in sprat (a clupeid in the same family as herring with the same hearing capability).

The paper has reputable, and experienced co-authors, and it is regularly referred to within Environmental Impact Assessments to inform noise exposure guidelines in fish. Furthermore, the application of the 135 dB threshold has been accepted and widely used in underwater noise modelling by other OWF developers during the planning process. The MMO recognise that the developer (and their consultant) has a view on the level of risk, however the MMO do not consider this to be adequately supported by the evidence. The MMO have also stated that we are willing to consider the use of an alternative threshold for modelling behavioural responses in herring (or a similar clupeid fish), should the Applicant be able to provide one which is based on



suitable, peer-reviewed literature. However, to date, such an alternative threshold has not been provided for review.

- 9.2.3 To follow on from this, we do not agree that the mitigated impact ranges from the implementation of DBBC do not overlap the herring spawning grounds. As discussed above in Sections 8.3.2-8.3.9 of this Deadline Response, the historic spawning ground map from Coull *et al.* (1998) cannot be used in isolation to determine active herring spawning grounds, and as Sections 8.3.2-8.3.4, there are also a number of issues and inaccuracies with the Applicant's 'heat' map and clarifications are still pending on the data which has been incorporated. Until we have had sight of a revised 'heat' map, it is not possible to state with confidence what the proportion of herring spawning ground will be affected by piling noise.

Point 2.12.60

- 9.2.4 The Applicant notes that up to 20dB noise reduction can be achieved through the use of a combination of measures, comprising the DBBC as the principal measure, together with an additional noise abatement measure. However, they acknowledge that performance of the noise abatement is achieved within depths of $\leq 40\text{m}$, current speeds of 0.48 to 0.76 m/s. They go on to state that the In-Principle Sensitive Features Mitigation Plan (REP5-083) has been updated to reflect a 20 dB noise reduction from the use of DBBC and another noise abatement measure during the black bream nesting season, amongst other mitigation measures (including zoning, and piling sequencing). The MMO have reviewed this document and note that Figures 5.10 and 5.11 (see Annex 4) present the Applicant's proposed piling exclusion zones for the piling of monopiles and multileg foundations (respectively) with DBBC and another noise abatement measure, i.e. a 20 dB reduction. (30)
- 9.2.5 The modelling used to produce Figures 5.10 and 5.11 is based on a 141 dB threshold which the MMO and Cefas fisheries advisors do not support (please see Annex 3 for an explanatory note on why the 141 dB SELss is not supported by the MMO and Cefas). The Applicant has then used the outcomes of this modelling to support their zoning and sequencing plan for piling during the black seabream breeding period. Regardless of whether a 20 dB noise reduction is achievable, the key issue is that the modelling should have been based on a 135 dB threshold, not a 141 dB threshold. The Applicant has presented some modelling using the 135 dB threshold in Figures 5.16 and 5.17 (Annex 4) which show the predicted worst case and mitigated behavioural response impact ranges for Sensitive Features from the piling of monopile and multileg foundations. However, this modelling (in Figures 5.16 and 5.17) is based on the use of DBBC so only offers 15 dB noise reduction, not 20 dB.
- 9.2.6 Aside from the zoning and sequencing plans being based on an unsupported threshold, it is important to note that the modelling presented in Figures 5.16 and 5.17 shows that there would still be an overlap of noise disturbance with Kingmere Marine Conservation Zone (MCZ) when mono-piling at the western modelled location, and a slight overlap of noise disturbance with Kingmere MCZ when mono-piling at the eastern modelled location. A similar result is shown in Figure 5.17 for multileg foundation piling, with an overlap of noise disturbance with the Kingmere MCZ when



piling at the western modelled location. However, at the eastern modelled location there is no direct overlap of noise disturbance with Kingmere MCZ, however, the mapped noise contour suggests that noise disturbance effects would still be received <1 km from the Kingmere MCZ boundary. If the modelling in Figures 5.16 and 5.17 had been based on a 20 dB noise reduction, then we would be in a stronger position to comment, but as it hasn't, significant uncertainty remains.

- 9.2.7 More uncertainty arises from the locations used in the modelling, which are based on locations at the eastern and western boundaries of the array. The MMO anticipate that any modelling for piling at locations situated inwards of these points (i.e. closer to Kingmere MCZ) would likely show an even greater overlap of noise contours with Kingmere MCZ, i.e. the extent of noise will likely cover a larger portion of Kingmere MCZ potentially leading to increased risk of disturbance to breeding black sea bream. Whilst we recognise that UWN modelling usually selects its modelled locations to predict the greatest spatial extent of noise, in the context of predicting effects on a designated or protected feature/zone, it is prudent that modelling should also include locations near the feature/zone. For this reason, we have previously questioned if the positions of the modelled locations were moved further east/west, i.e. towards the middle of the array, how this would affect the outcomes of the modelling, i.e. whether the spatial overlap of noise with Kingmere MCZ would increase.
- 9.2.8 Figures 5.16 and 5.17 (REP5-083) demonstrate how much of the surrounding area will be affected by UWN caused by piling activities during the black seabream breeding season. As has been highlighted throughout our previous advice, UWN from piling activities has the potential to not only disturb black seabream whilst nesting, but also disrupt the migration of black seabream potentially preventing them from reaching their spawning and nesting sites, as well as potentially causing physical/physiological responses in fish close to the sound source (such as TTS) or injury) which may in turn affect their reproductive success. It should also be noted that there are black sea bream nesting sites present within the Rampion 2 export cable corridor (as recognised by the Applicant in the ES), and in the surrounding area outside of the Kingmere MCZ, which would be as affected by piling noise as black seabream located within the MCZ.

Point 2.12.61

- 9.2.9 The MMO note the inclusion of Figures 2-1 and 2-3 (REP5-109) which present the proposed piling exclusion zones for the mono-piling and for piling of multileg foundations (respectively) with a 20 dB reduction, based on the 135dB SELss threshold. Although the MMO appreciates that modelling using the appropriate threshold has been provided, and that this is based on the proposed reduction in noise by 20 dB, the modelled noise contours have not been presented for review to support the proposed zoning plan, so the modelled pile locations are not known (See Section 9.2.7 above of this Deadline Response) and the full spatial extent of the noise is not known (See Sections 9.2.5-9.2.7 above of this Deadline Response). We request that the modelled noise contours are presented for review in order to validate the proposed zoning plan. A similar request was raised when the MMO first reviewed Appendix H11(REP4 -088).



Point 2.12.61

9.2.10 The MMO will also highlight that the Applicant's zoning plan in Figure 2-5 (Appendix H) and Figure 5.12 (REP5-083) proposes a piling exclusion zone from 1st March to 30th June, although the MMO have consistently advised that the black seabream breeding season is from 1st March to 31st July inclusive. Further, the Applicant has set out a zoning plan for piling during July in Figure 5.13 (In-Principle Sensitive Features Mitigation Plan) and Figure 2-6 (Appendix H). For the reasons outlined in Sections 9.2.5 above and 9.2.12-9.2.13 below of this Deadline Response, the MMO do not currently support the proposed zoning and sequencing plan, but even if such a plan was to be accepted, it must be based on the period 1st March to 31st July inclusive.

Points 2.12.62 - 2.12.63

9.2.11 The Applicant maintains that it is feasible to undertake piling activities within parts of the Offshore Array Area with the proposed zoning and sequencing plan in place for both multileg foundations using pin-piles and monopile foundation structures on the basis of a 141 dB SELss threshold. As outlined throughout this advice and previous advice, the MMO do not support the 141 dB threshold and have again set out the reasons for this threshold not being supported in Annex 2.

Point 2.12.64

9.2.12 The Applicant directs the MMO to Figures 5.16 and 5.17 of the revised In Principle Sensitive Features Mitigation Plan (REP5-083) and highlights that no unmitigated piling will be undertaken during the piling campaign. As per points 31 – 33, Figures 5.16 and 5.17 demonstrate that piling noise from mono- and multileg foundation piling will overlap Kingmere MCZ with or without noise abatement of -15 dB, rather than the 20 dB that is now proposed by the Applicant. The Applicant's response also highlights the proposed implementation of a seasonal piling restriction in the western portion of the array from March to June, and multiple measures during the month of July.

Point 2.12.65

9.2.13 The Applicant notes that black seabream are anticipated to migrate in the Spring to their spawning areas from the offshore western channel and have used this information to support their proposal that from March to June, there will be no piling in the western part of the array area, i.e. away from the direction of inward travel during the black seabream migratory period. Whilst the MMO see the rationale behind this approach, Figures 5.16 and 5.17 (REP5-083) show that even with noise abatement reduction of 15 dB, there is still a large area to the south-west of the array that is overlapped by piling noise from the eastern modelled location. This further adds to concerns of the MMO and Cefas that piling during the black sea bream breeding season may prevent them from reaching their spawning and nesting sites. In addition, whilst the Applicant is correct that black seabream is not a species of conservation importance in UK waters, there is potential that the ability of black seabream to aggregate, nest, or lay, fertilise or guard eggs during the breeding



season in Kingmere MCZ may be hindered, if they are prevented from reaching Kingmere MCZ.

Points 2.12.68 – 2.12.69

9.2.14 The MMO notes that the Applicant considers the black seabream breeding period as 1st March to 31st July for the purpose of mitigation for construction activities in the Offshore Export Cable Corridor (Commitment C-273, In- Principle Sensitive Features Mitigation Plan) but goes on to state that July is of lower importance to black seabream in the context of piling mitigation. Whilst the MMO acknowledge that the pressures arising from piling are different from ECC construction activities, this conflicts with their piling exclusion zone proposal which excludes July. This could be argued to be a selective interpretation, rather than being evidence-based.

9.2.15 The Applicant maintains their position that a full piling restriction from 1 March to 31 July is disproportionate to the risk of an impact arising and refers to results of the aggregates' industry monitoring surveys in and around Kingmere MCZ to support their argument that July is of lower importance (compared to the months of March to June) for black sea bream reproduction. They state that 'due to the substantially reduced spawning/nesting activity apparent during the month of July, when compared to March-June in the same year (as evidenced in the 2020 aggregates survey). It is also considered that spawning activity in July represents repeat spawning events (Doggett, 2018)'.

9.2.16 Care should be taken when interpreting the findings of the aggregates industry surveys. Monitoring of black seabream nesting sites has been ongoing in and around Kingmere MCZ for a number of years. However, surveys to monitor active nest sites in and around Kingmere MCZ began in 2017 and there have been inconsistencies in the timing of these surveys. Of the five years (2018, 2019, 2020, 2021 and 2022) where monitoring of black seabream nesting sites was conducted during July, active / tended nests of eggs were found in three consecutive years. There is a lack of evidence to suggest that these occurrences were or were not a result of secondary spawning. The time series of survey data for July is too brief to make statistically robust conclusions, especially as it known that the density and distribution of black sea bream nest sites is known to vary between years, so for these reasons the data should be interpreted with caution. Use of these data without acknowledging or controlling for these limitations is not appropriate. Given the time constraints associated with the volume of documents to review under this consultation, the MMO have provided a very brief summary of the aggregate industry survey findings relating to July:

- 2017: No monitoring to identify active/tended bream nests was carried out in July.
- 2018: No evidence of nest construction, spawning, guarding of eggs or maintaining of nests was found in or around Kingmere MCZ at the time of the drop-down camera surveys on 6th or 25th July.



- 2019: Spawned egg batches on nests were found on multiple nests during the surveys of 9th July 2019 (six transects).
- 2020: Spawned egg batches on nests were found on multiple nests during the survey of 10th July 2020 (one transect) providing evidence that reproductive activity was ongoing in July on those years. Additionally, the presence of a single nest on the 30th of July clearly suggests that some spawning activity had continued a little later in 2020.
- 2021: Survey on 9th – 13th July, images and video footage confirmed that nesting activity was on-going. During the survey on 20th July, 2.6 – 3.7% of the observed nests were tended or potentially tended by a male bream.
- 2022: No active nests observed on 7th July survey. The survey scheduled for 27th July was cancelled due to poor weather conditions, A survey was carried out on 11th August 2022 in lieu of the cancelled one.

Point 2.12.70 – 2.12.71: Zoning and Sequencing in March to June

9.2.17 The Applicant's proposed zoning approach means that no piling will be carried out in the western part of the array area between the 1st March and 30th June (inclusive), but piling will be carried out in the eastern portion of the array during this same period, using a combination of mitigation/abatement techniques (illustrated here as of a low noise hammer technology and DBBC (see Figure 2-5 in Annex 4 for a map of zoning plan restriction areas which delineates the western and eastern portions of the array). Within the eastern portion of the array, during between 1st March to 31st June, the Applicant has proposed the implementation of a zoning approach, with piling commencing in the southeast corner (furthest away from the Kingmere MCZ) (band A buffer, as illustrated in Figure 2-6 in Annex 4), and progressing across the array as piling operations continue (into band B, then C etc.).

9.2.18 The Applicant states that their proposed mitigation can be applied if they are defined using the 135dB SELss threshold, with a 20 dB reduction through noise abatement. However, they note that the piling exclusion area resulting from the implementation of the 135dB SELss threshold (as opposed to the proposed 141dB threshold) increases the exclusion zone across a relatively small part of the eastern array area (which is to be expected) and gives rise to significant issues on the piling programme for the project.

Zoning and Sequencing in July

9.2.19 Piling in the western part of the array will be conducted using the combination of a low noise hammer technology and DBBC. Piling in the western part of the array will be subject to a sequencing plan, with piling starting at locations furthest from the Kingmere MCZ. Piling will commence from the pile locations in the furthest south-west corner of the western part of the Array (commencing in the band C buffer shown on Figure 2-6 Annex 4).

9.2.18 Whilst the MMO see the rationale and the value to the Applicant of their proposed zoning and sequencing scheme, there remain a number of issues highlighted



throughout this advice which reduce the confidence in the applicability of this approach. The MMO have summarised these issues below:

- Modelled noise contours have been presented based on mono and multileg foundation piling scenarios, using the 135 dB SELss threshold with a noise abatement reduction of 15 dB (see points 31 - 33). Yet the zoning plan is based on a 20 dB noise abatement reduction. We have not seen any modelling in the form of mapped noise contours using the appropriate 135 dB threshold and 20 dB noise abatement reduction to inform a zoning and sequencing plan.
- The modelling is only based on two modelled locations at the western and eastern boundaries (see point 33) modelling at other locations has not been provided, which gives rise to doubt about whether the zoning plan is reliable when piling is carried out in more central locations in the array.
- The zoning plan does not appear to have changed since the ES. I would have expected the zones to have altered somewhat given the remodelling using the lower threshold of 135 dB selSS and the introduction of a 20 dB noise reduction. Hence, there is doubt about whether the zoning and sequencing plan is an accurate reflection of the latest modelling.
- As per points 36 and 41 - 43, the black seabream breeding season is 1st March to 31st July (inclusive) so we don't agree that piling during the month of July should be permitted, unless suitable evidence can be provided to demonstrate that black seabream will not be exposed to noise disturbance at Kingmere MCZ.
- Uncertainties regarding the efficacy of noise abatement measures in deeper water and hence whether the modelling accurately reflects this. See points 25 and 30.

Point 2.12.72 – 2.12.82

9.2.19 See Annex 3 for explanatory note on why we do not support the use of a 141 dB SELss threshold for black seabream.

9.3 Underwater Noise comments

Point 2.12.59

9.3.1 MMO welcomes the agreement that the main objective of the proposed mitigation is to achieve the appropriate and sufficient noise reduction levels rather than specify precise equipment at this stage.

Point 2.12.60

9.3.2 The MMO have no further comments to note on this point but direct the Applicant to section 3 of our Deadline 5 Response (REP5-146).

2.12.91 & 2.12.100



9.3.3 Please see comments in section 9.2 of this response.

2.12.100 & 2.12.113

9.3.4 The MMO welcomes this response and Commitment C-265 in relation to DBBC.

2.12.112

9.3.5 No action required as such at this stage, but we hope the Applicant takes on board this comment/recommendation in the final design.

2.12.127

9.3.6 The MMO acknowledges this comment, noting the final agreement on the proposed mitigation still needs to be agreed between all parties.

2.12.130

9.3.7 The Applicant's comment has been noted and welcomes the consideration of frequency.

2.12.131

9.3.8 The MMO has responded within one table, please refer to the detail within REP-122.



Table 2 – MMO Response to Applicant’s response to Examining Authority’s First Written Questions

Reference	MMO Response
FS 1.3 <i>Noise Abatement Measures</i> – see document Application Reference: 8.84.	The MMO has provided comments at Deadline 5 on this matter.
FS 1.4 <i>Noise Thresholds for Black Seabream</i> – see document Application Reference: 8.84.	Agreement on this issue has yet to be reached as set out above in Section 5 of this response.
FS 1.5 <i>Noise Thresholds for Black Seabream</i> – see document Application Reference: 8.84.	Agreement on this issue has yet to be reached as set out above in Section 5 of this response.
FS 1.9 <i>Piling Noise – Background Noise</i> – see document Application Reference: 8.84.	Agreement on this issue (regarding the noise behavioural threshold for black sea bream) has yet to be reached as set out above in Section 5 of this response.
FS 1.15 <i>Noise Abatement Zoning</i> – see document Application Reference: 8.84.	There are some outstanding concerns with the proposed zoning approach that will need to be agreed between all parties as set out Section 5 of this response.
FS 1.24 <i>Mitigated Noise</i> – see document Application Reference: 8.84.	We welcome the commitment to use double big bubble curtains (DBBC) throughout the piling campaign.
FS 1.25 <i>Behavioural Effects on Herring Spawning</i> – see document Application Reference: 8.84.	We welcome the commitment to use double big bubble curtains (DBBC) throughout the piling campaign. However, we still have major concerns on if 135 dB SELss (single strike sound exposure level) threshold is appropriate to assess potential behavioural effects on spawning

[Type here]

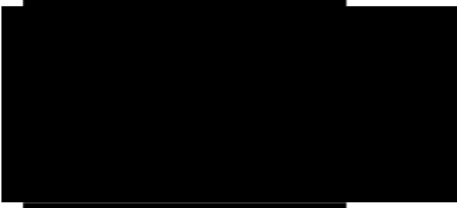
	<p>herring. We have set out reasoning and position on this in section 5 of this response. This is in keeping with our recommendations for all offshore wind farm developments.</p>
<p>MM 1.1 <i>Draft Unexploded Ordnance Clearance Marine Mammal Mitigation Protocol</i> – see document Application Reference: 8.84.</p>	<p>We thank the Applicant for their response; however, agreement has not been reached on this point, and the MMO maintain our original position. Nonetheless, we do welcome the agreement from the Applicant that Permanent Threshold Shift (PTS) is a form of injury and that it can only be permitted to occur to an EPS (European Protected Species) if an injury licence is in place. Furthermore, we welcome that the Applicant agrees the focus should be on ensuring that appropriate mitigation is put in place to reduce the risk of potential impact.</p> <p>We understand the points the Applicant is making; however, it is reasonable for the standard of evidence for such a controversial and consequential conclusion to be high, and we stand by the benchmark of publishing in the peer-reviewed literature which generally gives better assurances of independent review.</p>
<p>MM 1.2 <i>Worst-case Piling Scenario for Marine Mammals</i> – see document Application Reference: 8.84.</p>	<p>We thank the Applicant for the clarifications regarding the modelling. No further action required.</p>
<p>MM 1.3 – see document Application Reference: 8.84.</p>	<p>Please see our latest recommendations regarding the underwater noise monitoring during the construction in section</p>

2.12.132

9.2.27 The MMO has not provided formal comments to avoid duplication as these are covered elsewhere in this response.

[Type here]

Yours faithfully



Ethan Lakeman
Marine Licensing Case Officer

E  marinemanagement.org.uk

P +44 



References

- Burd, A.C. 1978.** Long term changes in North Sea herring stocks. Rapp. P.-v. Réun. Cons. Int. Explor. Mer, 172: 137-153.
- Coull, K.A., Johnstone, R. & Rogers, S.I. (1998).** Fisheries Sensitivity Maps in British Waters. Report to United Kingdom Offshore Operators Association (UKOOA), Aberdeen. 58pp.
- Dickey-Collas M. 2005.** Desk Study on the transport of larval herring in the southern North Sea (Downs herring). RIVO-Netherlands Institute for Fisheries Research.
- Doggett, M. (2018)** The Black Bream Project. [online] Available at: <http://www.mattdoggett.com/the-black-bream-project/> [Accessed 23rd July 2024].
- Hawkins, A.D., Roberts, L. and Cheesman, S., 2014.** Responses of free-living coastal pelagic fish to impulsive sounds. *The Journal of the Acoustical Society of America*, 135(5), pp.3101-3116.
- Heath, M. and Rankine, P. 1988.** Growth and advection of larval herring (*Clupea harengus* L.) in the vicinity of the Orkney Isles, Estuarine, Coastal and Shelf Science, Volume 27, Issue 5, Pages 547-565, ISSN 0272-7714, [https://doi.org/10.1016/0272-7714\(88\)90083-2](https://doi.org/10.1016/0272-7714(88)90083-2).
- Kastelein, R.A., Jennings, N., Kommeren, A., Helder-Hoek, L. and Schop, J. (2017).** Acoustic dose-behavioral response relationship in sea bass (*Dicentrarchus labrax*) exposed to playbacks of pile driving sounds. *Marine environmental research*, 130, pp.315-324.
- Kyle-Henney M., Reach I., Barr N., Warner I., Lowe S., and Lloyd Jones D., 2023.** Identifying and Mapping Atlantic Herring Potential Spawning Habitat: An Updated Method Statement.
- 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 BMAPA.
- 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.
- Wallace W. 1924.** First report on the young herring in the southern North Sea and English Channel. Part I- Distribution and growth of larval and post-larval stages. *Fish. Invest. Lond. Ser 2*, 7(4):1-73



Annex 1

MMO – Draft Article 5 Benefit of the Order

Previously submitted on a Without Prejudice basis by the MMO to the Applicant on 12 June 2024

Article 5 Benefit of the Order

- (1) Subject to this article, the provisions of this Order have effect solely for the benefit of the undertaker.
- (2) Subject to sub-paragraph (5), the undertaker may with the written consent of the Secretary of State
 - (a) transfer to another person (“the transferee”) any or all of the benefit of the provisions of this Order (excluding the deemed marine licences) and such related statutory rights as may be agreed between the undertaker and the transferee; and
 - (b) grant to another person (“the lessee”) for a period agreed between the undertaker and the lessee any or all of the benefit of the provisions of the Order (excluding the deemed marine licences) and such related statutory rights as may be so agreed,

except where sub-paragraph (16) applies, in which case no consent of the Secretary of State is required.

- (3) Subject to sub-paragraph (5), where an agreement has been made in accordance with paragraph (2)(a), the undertaker may with the written consent of the Secretary of State transfer to the transferee the whole of any of the deemed marine licences.

- (4) Where the Secretary of State grants a consent in accordance with sub-paragraph (3) or where a transfer is agreed in accordance with sub-paragraph (2)(a) which does not require consent in accordance with sub-paragraph (3) and which includes the transfer of the whole of any of the deemed marine licences:

- (a) The undertaker is to provide the MMO with [28] days notice prior to the intended date of transfer of any deemed marine licence;
- (b) That notice shall include the following details:
 - (i) the name and contact details of the person to whom the benefit of the provisions will be transferred;
 - (ii) the date on which the transfer will take effect;
 - (iii) the details of the deemed marine license to be transferred;



- (c) That notice must be treated by the MMO as an application to vary the deemed marine licence holder to the name of the transferee with effect from the date identified pursuant to sub-paragraph (4)(b)(ii) which has been granted;
- (d) The MMO shall amend the name of licence holder on the deemed marine licence identified pursuant to sub-paragraph (4)(b)(iii) to the person identified pursuant to sub-paragraph 4(b)(i) with effect from the date identified pursuant to sub-paragraph (4)(b)(ii);
- (5) The undertaker must consult the Secretary of State before making an application for consent under this article by giving notice in writing of the proposed application.
- (6) Subject to sub-paragraph (5), where an agreement has been made in accordance with sub-paragraph (2)(b), the undertaker may with the written consent of the Secretary of State grant to the lessee the whole of any of the deemed marine licences with effect from the commencement of the period agreed in accordance with sub-paragraph (2)(b).
- (7) Where the Secretary of State grants a consent in accordance with sub-paragraph (6) or where a lease is agreed in accordance with sub-paragraph (2)(b) which does not require consent in accordance with sub-paragraph (6) and which includes the granting of a lease of the whole of any of the deemed marine licences:
- (a) The undertaker is to provide the MMO with [28] days' notice prior to the intended date of the granting of the lease of the whole of any deemed marine licence;
- (b) That notice shall include the following details:
- (i) the name and contact details of the person to whom the benefit of the deemed marine licence will be granted;
- (ii) the date on which the grant of the lease will take effect;
- (iii) the date on which the grant of the lease will cease to take effect;
- (iv) the details of the deemed marine licence to be leased ("the relevant licence").
- (c) That notice must be treated by the MMO as an application to vary deemed marine licence holder to the name of the lessee with effect from the date identified pursuant to sub-paragraph (7)(b)(ii) which has been granted;
- (d) The MMO shall amend the name of deemed marine licence holder on the deemed marine licence identified pursuant to sub-paragraph (7)(b)(iii) to the person identified pursuant to sub-paragraph (7)(b)(i) with effect from the date identified pursuant to sub-paragraph (7)(b)(ii);



(e)) Not less than 28 days prior to the expiry of the period agreed in accordance with sub-paragraph (2)(b), the lessee is to provide the MMO with notice of the termination of that period;

(f) That notice shall include the following details:

(i) the name and contact details of the undertaker;

(ii) the date of the expiry of the period agreed in accordance with subparagraph (2)(b); and

(iii) the details of the deemed marine license to be transferred.

(g) That notice must be treated by the MMO as an application to vary to the name of the licence holder to the name of the undertaker with effect from the date of the expiry of the period agreed in accordance with sub-paragraph (2)(b);

(h) Pursuant to that notice, the MMO shall amend the name of licence holder on the deemed marine license to the name of the undertaker with effect from the date of the expiry of the period agreed in accordance with sub-paragraph (2)(b);

(8) The Secretary of State must consult the MMO before giving consent to the transfer to another person of the benefit of the provisions of the deemed marine licences and shall not consent to the transfer without the agreement of the MMO.

(9) Where an agreement has been made in accordance with sub-paragraph (2) references in this Order to the undertaker, except in sub-paragraphs (10) and (11), is to include references to the transferee or lessee.

(10) Where the undertaker has transferred any benefit, or for the duration of any period during which the undertaker has granted any benefit, under sub-paragraphs (2), (3) or (6)

(a) the benefit transferred or granted (“the transferred benefit”) is to include any rights that are conferred, and any obligations that are imposed, by virtue of the provisions to which the benefit relates;

(b) the transferred benefit is to reside exclusively with the transferee or, as the case may be, the lessee and the transferred benefit is not enforceable against the undertaker; and

(c) the exercise by a person of any benefits or rights conferred in accordance with any transfer or grant under sub-paragraphs (2), (3) or (6) is subject to the same restrictions, liabilities and obligations as would apply under this Order if those benefits or rights were exercised by the undertaker.



(11) Prior to any transfer or grant under sub-paragraph (2) taking effect the undertaker must give notice in writing to the Secretary of State, and if such transfer or grant relates to the exercise of powers in their area, to the MMO and/or the relevant planning authority.

(12) A notice required under sub-paragraph (11) must—

(a) state—

(i) the name and contact details of the person to whom the benefit of the provisions will be transferred or granted;

(ii) subject to sub-paragraph (13), the date on which the transfer will take effect;

(iii) the provisions to be transferred or granted;

(iv) the restrictions, liabilities and obligations that, in accordance with sub-paragraph (10)(c), will apply to the person exercising the powers transferred or granted; and

(v) where sub-paragraph (16)(c) does not apply, confirmation of the availability and adequacy of funds for compensation associated with the compulsory acquisition of the Order land;

(b) be accompanied by—

(i) where relevant, a plan showing the works or areas to which the transfer or grant relates; and

(ii) a copy of the document effecting the transfer or grant signed by the undertaker and the person to whom the benefit of the powers will be transferred or granted.

(13) The date specified under sub-paragraph (12)(a)(ii) in respect of a notice served in respect of sub-paragraph (9) must not be earlier than the expiry of 14 days from the date of the Secretary of State's receipt of the notice.

(14) The notice given under sub-paragraph (11) must be signed by the undertaker and the person to whom the benefit of the powers will be transferred or granted as specified in that notice.

(15) Section 72(7) and (8) of the 2009 Act (Variation, suspension, revocation and transfer) do not apply to a transfer or grant of the benefit of the deemed marine licences to another person by the undertaker pursuant to this article.

(16) The consent of the Secretary of State is required for the exercise of powers under sub-paragraph (2) except where—



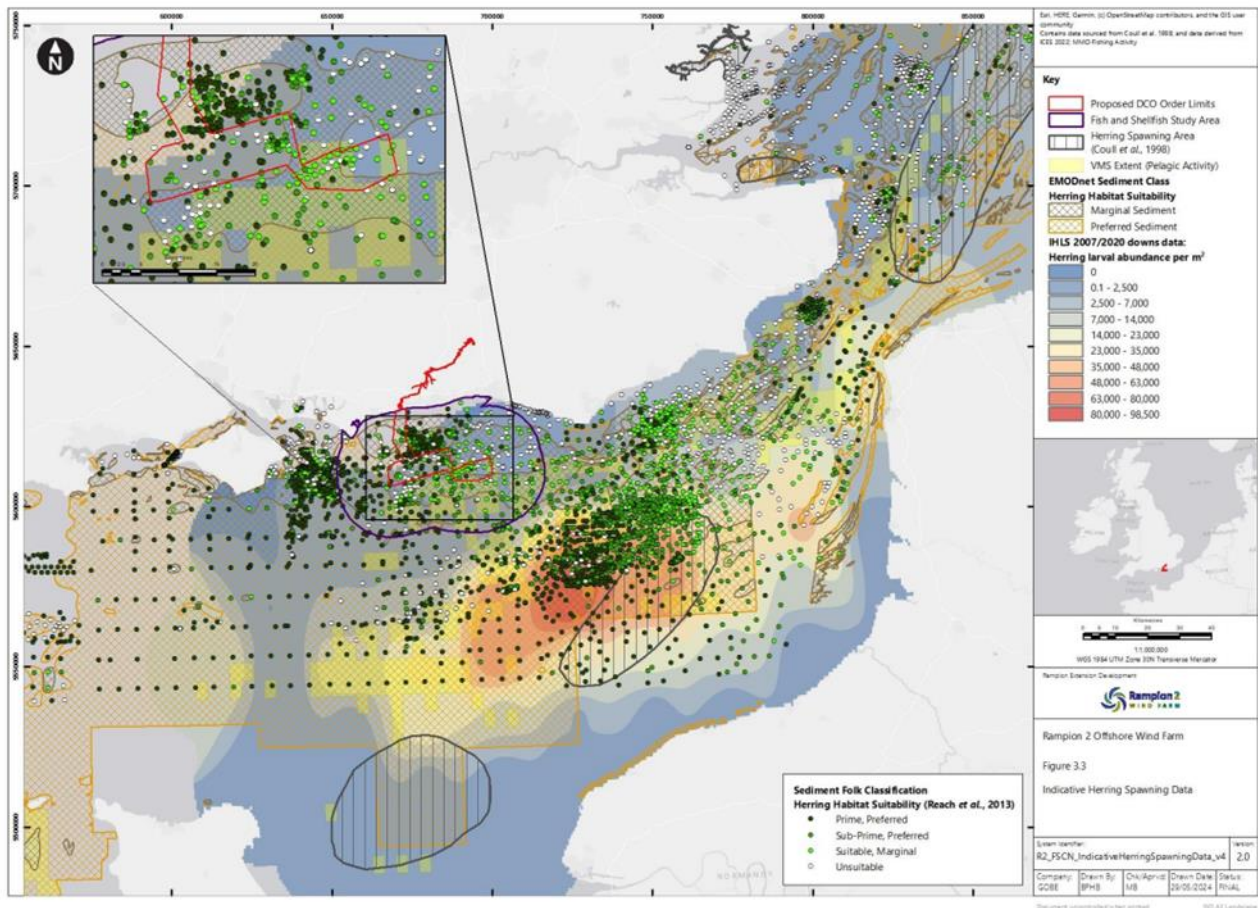
- (a) the transferee or lessee is the holder of a licence under section 6 of the 1989 Act (licences authorising supply etc.); or
- (b) the transferee or lessee is a holding company or subsidiary of the undertaker; or
- (c) the time limits for claims for compensation in respect of the acquisition of land or effects upon land under this Order have elapsed and—
 - (i) no such claims have been made,
 - (ii) any such claim has been made and has been compromised or withdrawn,
 - (iii) compensation has been paid in final settlement of any such claim,
 - (iv) payment of compensation into court has taken place in lieu of settlement of any such claim, or
 - (v) it has been determined by a tribunal or court of competent jurisdiction in respect of any such claim that no compensation is payable.



Annex 2

Figure 3.3 provided in support of Action Point 38 in Consultation 2312, which presents 'indicative herring spawning data'.

PSA data points coloured any shade of green represent the location of preferred and marginal herring spawning sediments, that is; sediments which have sufficient composition to support herring spawning. Note that the aggregated herring larval abundance contours are more closely aligned with the spawning beds indicated by PSA data, than with the historic spawning ground as indicated by Coull *et al.*, (1998).



Annex 3

A breakdown of why the 141 dB re 1 mPa² s response threshold observed in seabass in the Kastelein et al. (2017) study is not supported by Cefas Fisheries advisors.

One of the core issues relating to black seabream that is yet to be resolved is the ongoing lack of agreement on a suitable behavioural response threshold for black seabream. The Applicant proposed the use of a threshold of 141 dB SELs, based on a study by Kastelein et al. (2017) which observed an initial startle response in captive-bred adult European seabass that were exposed to piling playback under controlled laboratory conditions (in a pool exposed for 20 min). The study observed a 50% initial response threshold occurred at an SELs of 141 dB re 1 mPa² s for 44cm seabass. Smaller seabass (mean 31cm) responded to a lower SELs than the larger fish, with a 50% initial response threshold occurring at 131 dB re 1 mPa² s. The MMO have outlined many times throughout the consultation process why we do not support the use of a 141 dB SELs threshold for black seabream but will restate our position here for completeness.

- i. The first concern is that whilst European seabass may be anatomically similar to black seabream, the fish used in the study were captive bred specimens and the experiments were conducted in tanks. In fact, Popper et al., (2014) highlight this clearly, stating that “animals in tanks or even in large enclosures show very different responses to behavioural stimuli than do wild animals (e.g., Oldfield, 2011). Studies on captive animals are suitable for gaining physiological information such as hearing sensitivity, but not for understanding how a wild animal will respond behaviourally to a stimulus”. We must therefore consider whether wild black sea bream might respond differently to captive bred seabass.
- ii. The next concern is that the European seabass were not engaged in spawning or nesting guarding behaviour. In fact, they are broadcast spawners so are not reliant on particular seabed habitats for reproduction, so there is also a risk regarding how wild black sea bream might respond if they were exposed to increased noise disturbance during their breeding season. Abandonment of nests by male black sea bream will result in nests being untended, causing a build-up of sediments, algae etc and smothering of eggs in their developmental stage, as well as predation of eggs by other fish and invertebrates. Importantly, nest abandonment by black seabream will have implications for the conservation objectives of the Kingmere MCZ.
- iii. Further, to the two points raised above, the lough in which the Hawkins *et al.*, (2014) study was carried out represents a much larger body of water than the experimental tanks used by Kastelein et al. (2017). The study by Kastelein et al. (2017) placed



Schools of four individual seabass in a net enclosure (4.0 m long, 1.75 m wide and 2 m high in the water) within a larger rectangular tank (7.0 m long, 4.0 m wide; water depth 2.0 m) to be observed. The wild sprat in Hawkins *et al.*, (2014) study were not spatially confined in the same way that Kastelein's seabass were meaning they were likely more able to respond to the noise stimulus in a more authentic and natural way.

- iv. The Applicant has continuously neglected to take into consideration that the study by Kastelein *et al.* (2017), found a 50% initial response threshold occurred at an SELss of 131 dB re 1 mPa² s for 31 cm fish, and 141 dB re 1 mPa² s for 44 cm fish; thus, the small fish reacted to lower SELss than the large fish. Black seabream attain reproductive maturity at 30cm, so noting that the smaller seabass of 31cm showed initial responses at a threshold of SELss of 131 dB re 1 mPa² s, this (131dB) threshold is arguably more suitable. In addition, adult black seabream grow to a size of 35-40cm, i.e. smaller than the 44cm of the adult European seabass that responded at 141 dB re 1 mPa² s. In summary, the influence of the size of fish found by Kastelein *et al.* (2017) cannot be discounted by the Applicant.

- v. The Applicant has maintained that there is no evidence to support the use of 135 dB SELss other than that it is lower than 141 dB SELss. However, as previously highlighted, the 135 dB threshold is taken from a peer-reviewed paper (Hawkins *et al.*, 2014) which presents findings from a field study involving piling playback with wild sprat which are more sensitive to UWN than black seabream. For these reasons, the 135 dB can be considered precautionary, but less precautionary than if we were to use the threshold of 131 dB which was found in the study by Kastelein *et al.* (2017) for seabass that were of the same size as reproductively mature black seabream (the threshold of 131 dB was immediately discounted by the Applicant). Given the limitations of the studies outlined above but acknowledging that 131 dB is a very low threshold, in line with our previous advice, we maintain that the threshold of 135 dB SELss, as per Hawkins *et al.*, (2014), represents the best available evidence to inform a precautionary approach to modelling. Although still making inferences from a proxy species, the 135 dB threshold was based on a study of wild sprats i.e., clupeids with greater hearing capability and higher sensitivity to UWN than black seabream and seabass, and as a result this threshold is already considered sufficiently conservative for the purposes of modelling UWN. We have also previously highlighted that our recommendation for using a threshold of 135 dB represents a workable compromise between 141 dB and 131 dB, in addition to being based on a fish of similar hearing capability and ecology, which has a higher hearing sensitivity.

- vi. The Applicant has argued that as the study by Hawkins *et al.*, (2014) took place in a natural sea lough, Lough Hyne, which the authors describe as 'quiet', and therefore the conditions for the study do not reflect the ambient noise levels that typically occur around Kingmere MCZ to which black seabream will be exposed, and to some extent habituated. In their response to the ExA, the Applicant states that the location of the Hawkins *et al.*, (2014) study in a quiet natural lough means that the study is not



applicable to a much noisier area such as the English Channel. However, the Applicant has not fully acknowledged a key limitation of the Kastelein *et al.*, (2017) study, which is that their experiments on seabass were carried out in an environment which was artificially controlled to be as quiet as possible. The authors of the study state that the conditions the fish were kept in were very quiet, with the tanks and water systems having no pumps, and underwater noise levels were kept below those occurring during Sea State 0 (Knudsen *et al.*, 1948). The research pool was also made as quiet as possible, by using the filter unit with a low noise “whisper” pump and having only one researcher present whilst the experiment was running (remaining “seated quietly in the research cabin. The only actions she performed were starting a session by tapping the keypads of the laptops”). This speaks to the efforts that Kastelein *et al.*, made to ensure that background noise levels were low so as not to influence the results of the trial. This is arguably less representative of the noisy the English Channel the lough in which Hawkins *et al.*, (2014) conducted their study, which provided an environment where some level of natural ambient background noise was likely to be present.

- vii. The recordings of pile driving sounds used in the piling playback by Kastelein *et al.*, (2017) were recorded at 800 m from a 4.2 m diameter pile being driven for the Dutch offshore wind farm ‘Egmond aan Zee’ in the North Sea. However, for Rampion Extension, the Applicant intends to use monopiles of up to 13.5m (three times larger than that used for Egmond aan Zee), with a maximum hammer energy of 4,400kJ. Whether the piling playback scenario used in the study is suitable for comparison to the scenario for piling at Rampion extension has not been discussed or acknowledged as a further limitation of the study.



Annex 4

Figures relevant to the proposed zoning plan, including the Applicant's modelled piling exclusion zones for mono- and multileg piled foundations (Figures 5.10 and 5.11), behavioural response impact ranges for sensitive features for UWN (Figures 5.16 and 5.17), and the zoning plan proposed piling restriction zones and sequencing approach (Figures 2-5 and 2-6 from Appendix H).

Figure 5.10 Piling exclusion zone for the piling of monopiles with DBBC and another noise abatement measure (20dB reduction)

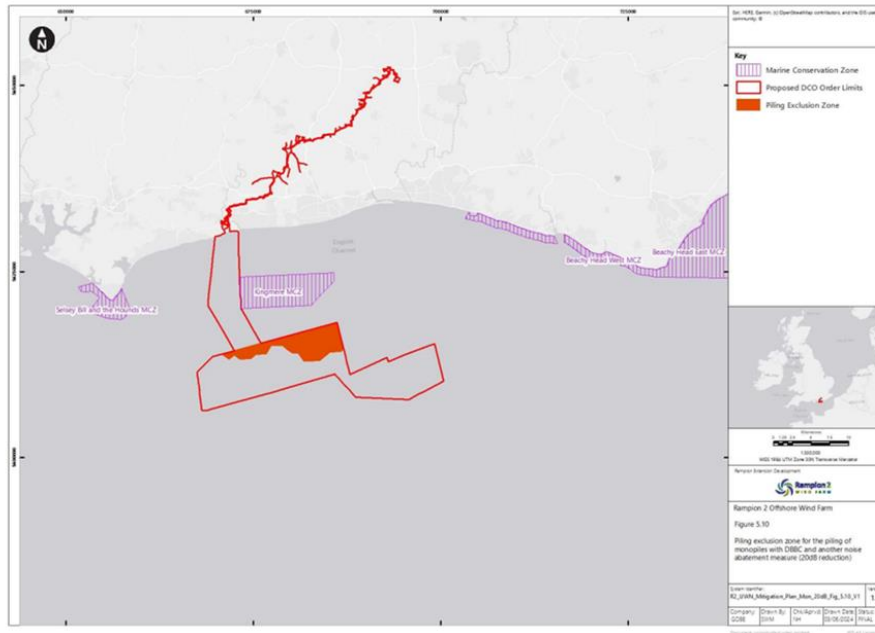
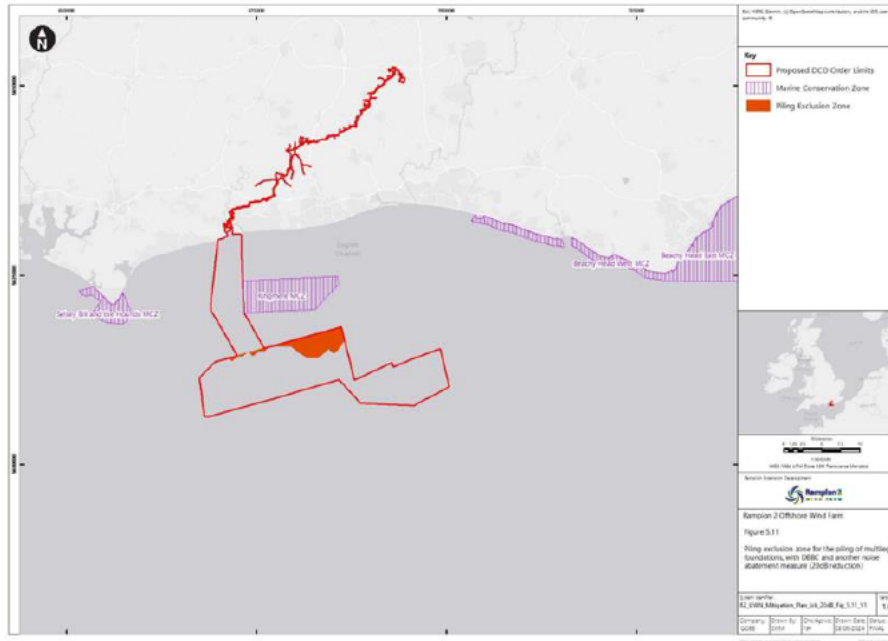


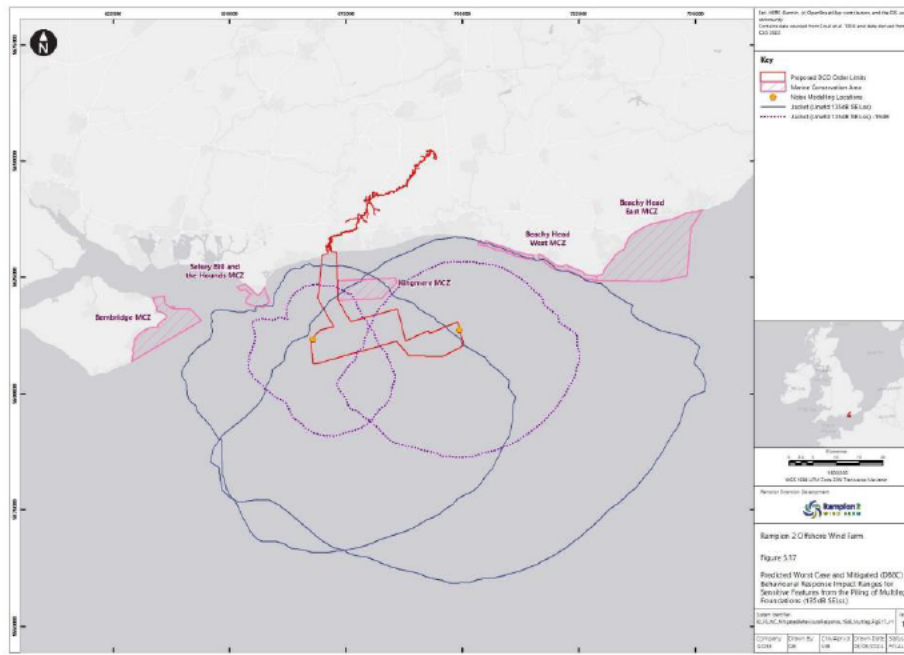
Figure 5.11 Piling exclusion zone for the piling of multileg foundations with DBBC and another noise abatement measure (20dB reduction)



Figures 5.16 and 5.17 also demonstrate the East and West modelling locations discussed in points 33. With regard to modelling the range of UWN impacts in relation to sensitive receptors, the modelling locations will unavoidably influence the degree of overlap of UWN contours with the protected site.

Figure 5.16 Predicted Worst Case and Mitigated (DBBC) Behavioural Response Impact Ranges for Sensitive Features from the Piling of Monopile Foundations (135dB SELs)

Figure 5.17 Predicted Worst Case and Mitigated (DBBC) Behavioural Response Impact Ranges for Sensitive Features from the Piling of Multileg Foundations (135dB SELs)



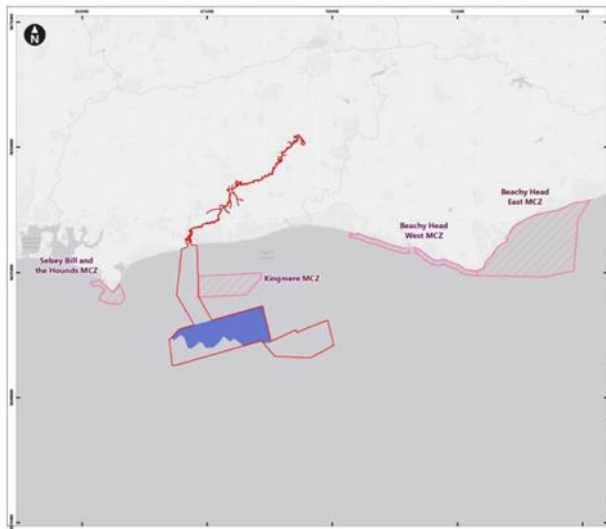


Figure H-1 Piling exclusion zone for the piling of **monopiles**, with 20dB reduction (**Unwtd 135dB SELss**)

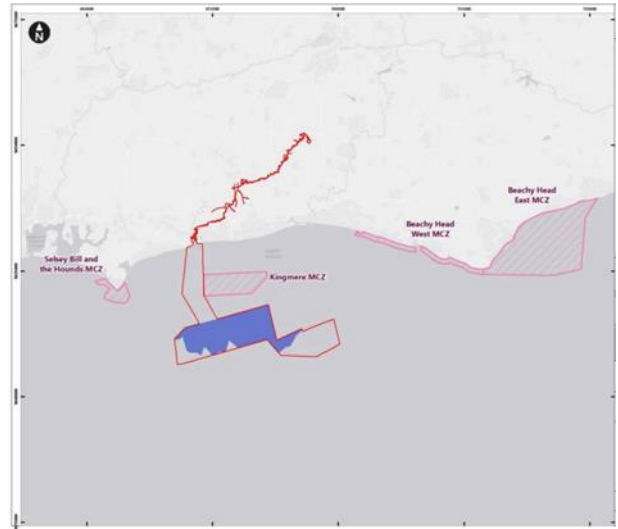


Figure H-2 Piling exclusion zone for the piling of **monopiles**, with 20dB reduction (**Unwtd, 141dB SELss**)



Figure H-3 Piling exclusion zone for the piling of **multileg foundations**, with 20dB reduction (**Unwtd, 141dB SELss**)



Figure H-4 Piling exclusion zone for the piling of **multileg foundations**, with 20dB reduction (**Unwtd, 141dB SELss**)



Figure 2-5: Zoning plan restriction areas

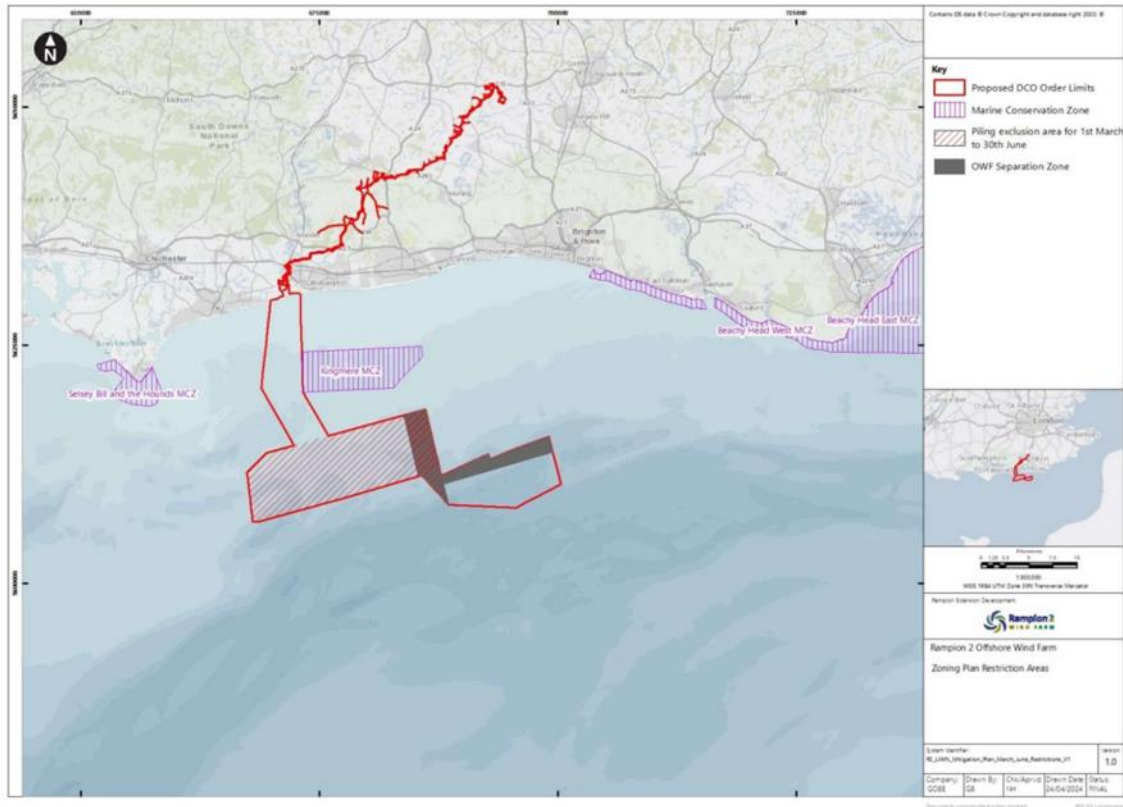


Figure 2-6: Illustrative sequencing of piling activities

