Rampion 2 Wind Farm

Category 7: Other documents

Offshore In Principle Monitoring Plan (tracked changes)

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A	04/08/2023	Final for DCO Application	GoBe	RED	RED
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Executive Summary

This Offshore In Principle Monitoring Plan (IPMP) (Document Reference: 7.18) has been produced following consultation with the Marine Management Organisation (MMO) and other relevant statutory consultees. It sets out the basis for delivering offshore monitoring measures for Rampion 2 as expected to be required under the Deemed Marine Licences (dMLs – comprising Schedules 11 and 12 of the draft Development Consent Order (DCO)).

The IPMP provides a framework for further discussions post consent with the Marine Management Organisation (MMO) and the relevant authorities to agree the exact detail (timings, methodologies etc.) of the monitoring that is required. Due to the Rochdale envelope approach being used for the Rampion 2 DCO Application (**Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4)), the final detail of methods statements are developed and provided after consent being granted. However, agreeing guiding principles from the outset will allow ongoing refinements to be made to ensure final plans are based on the best available knowledge and technology at that time. Final detailed plans will be produced prior to the commencement of monitoring work and in line with the Conditions set out in the dMLs.

This plan puts forward proposal for monitoring for the following relevant topics:

- Coastal processes:
- Offshore and intertidal ornithology;
- Benthic subtidal and intertidal ecology
- Fish and shellfish ecology;
- Marine mammals;
- Commercial fisheries;
- Shipping and navigation; and
- Marine archaeology.

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1. Description of the Project

1.1 Key Components of the Proposed Development

1.1.1 Rampion Extension Development Limited (hereafter referred to as 'RED') (the Applicant) is developing the Rampion 2 Offshore Wind Farm Project (Rampion 2) located adjacent to the existing Rampion Offshore Wind Farm Project ('Rampion 1') in the English Channel.

1.1.2 Rampion 2 will be located between 13km and 26km from the Sussex Coast in the English Channel and the offshore array area will occupy an area of approximately 160km^2.

1.1.3 The key offshore elements of the Proposed Development will be as follows:

- up to 90 offshore wind turbine generators (WTGs) and associated foundations;
- blade tip of the WTGs will be up to 325m above Lowest Astronomical Tide (LAT) and will have a 22m minimum air gap above Mean High Water Springs (MHWS);
- inter-array cables connecting the WTGs to up to three offshore substations;
- up to two offshore interconnector export cables between the offshore substations;
- up to four offshore export cables each in its own trench, will be buried under the seabed within the final cable corridor; and
- the export cable circuits will be High Voltage Alternating Current (HVAC), with a voltage of up to 275kV.

1.1.4 The key onshore elements of the Proposed Development will be as follows:

- a single landfall site near Climping, Arun District, connecting offshore and onshore cables using Horizontal Directional Drilling (HDD) installation techniques;
- buried onshore cables in a single corridor for the maximum route length of up to 38.8km using:
  - trenching and backfilling installation techniques; and
  - trenchless and open cut crossings.
- a new onshore substation, proposed near Cowfold, Horsham District, which will connect to an extension to the existing National Grid Bolney substation, Mid Sussex, via buried onshore cables; and
- extension to and additional infrastructure at the existing National Grid Bolney substation, Mid Sussex District to connect Rampion 2 to the national grid electrical network.

1.1.5 A full description of the Proposed Development is provided in **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4).

1.1.6 The key characteristics of the proposed Development Consent Order (DCO) Order Limits are summarised in **Table 1-1**.

Table 1-1 Proposed DCO Order Limits characteristics

Characteristic	Measurement
Wind farm array area for Rampion 2	196km^2
Export cable corridor	59km^2
Closest distance to shore of wind farm array area	13km
Water depth range in wind farm array area	15m to 65m below Lowest Astronomical Tide (LAT)
Onshore cable corridor length	Approximately 38.8km
Typical onshore cable corridor width	40m

1.1.7 As is common for all offshore wind farms, the final choice of WTG and therefore the final capacity of the Proposed Development will be subject to a procurement exercise carried out post-consent. This assessment therefore considers two WTG typologies based on the characteristics of turbine models which are expected to be available at that future stage. These are described throughout this ES as a "smaller WTG type" and "larger WTG type", and the assessment considers two design scenarios based on up to 90 smaller WTG type turbines or 65 larger WTG type turbines. This is fewer than the 116 WTGs utilised for Rampion 1. The maximum rotor diameter and blade tip height quoted in **Table 1-2** for the larger WTG type will not be exceeded, regardless of the choice of WTG in the final Proposed Development.

Table 1-2 WTG maximum design assessment assumptions

Assessment assumption	Smaller WTG Type	Larger WTG Type
	(Parameters presented in **bold** text)	
Maximum number of WTG	**90**	65
Rotor diameter	250m	**295m**
Minimum air gap above Mean High Water Springs (HAT)	**22m**	**22m**
Maximum blade tip height above LAT	285m	**325m**
Maximum Chord (blade width)	9m	11m
Maximum RPM	7.6 RPM	5.9 RPM
Minimum to Maximum Blade pitch	-4 to 90 degrees	-4 to 90 degrees
Minimum turbine spacing	950m [(1)]	1,130m

[1] Minimum turbine spacing at 950m represents the minimum spacing for this scenario, however for the purposes of the EIA, and specified within the DCO, a minimum of **830m** has been used to provide for the possibility of smaller WTGs being employed; note, other relevant assessment parameters of such a scenario would not exceed those presented here, importantly including the maximum of 90 WTGs.

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2. General guiding principles for the proposed monitoring

2.1.1 The Environmental Statement (ES) and supporting documentation detail the steps the Applicant has taken to avoid or reduce significant impacts either through the iterative process of project design ('embedded mitigation' e.g., the location of project boundaries) or by 'additional' mitigation measures which will be applied during the construction, operation or decommissioning phases of the Project.

2.1.2 The guiding principles for monitoring and which apply in general to the in-principle monitoring outlined in this document are as follows:

- All consent conditions, which would include those for monitoring, should be "necessary, relevant to planning and to the development to be permitted, enforceable, precise and reasonable in all other respects" as set out in Paragraph 56 of the National Planning Policy Framework and referred to as the 'six tests' (Ministry of Housing, Communities and Local Government (MHCLG) 2021).
- In line with good practice, monitoring must have a clear purpose in order to provide answers to specific questions where significant environmental impacts have been identified. As such, monitoring proposals should have an identified aim, end date and confirmed outputs, which provide, as far as possible, statistically robust data sets, as applicable to the hypothesis being tested.
- Monitoring should be targeted towards significant evidence gaps or uncertainties, which are relevant to the project and can be realistically delivered by project level monitoring, as well as those receptors considered to be the most sensitive to project specific impacts including those of conservation, ecological and/or economic importance. The presence of a significant impact should not, on its own, necessarily lead to a requirement for monitoring.
- Proposals for monitoring should be based, where relevant, on best practice and the latest environmental data associated with post-consent monitoring of offshore wind farms.
- The scope and design of all monitoring work should be finalised and agreed following review of the results of any preceding survey and/or monitoring work (i.e., an adaptive approach), including those surveys conducted in support of the environmental impact assessment (EIA). This includes the potential for future survey requirements to be adapted based on the results of the monitoring outlined in this document. Where it has been agreed that there are no significant impacts, monitoring need not be conditioned through the dMLs or detailed in this document.

2.1.3 Where appropriate, the results of post-consent monitoring, data and reports will be made publicly available and provided to the relevant data repositories.

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3. Rampion 2 residual effects

3.1.1 The EIA predicts the residual effect to a species or features taking into account:

- Linkages using the source > pathway > receptor model;
- Embedded/additional mitigation;
- Sensitivity to the effect;
- Magnitude of the effect; and
- Ecological/economic importance.

3.1.2 The significance of the residual effect should not in its own right necessarily lead to a requirement for monitoring. Monitoring should be targeted to significant evidence gaps or uncertainty, which are relevant to the project and can be realistically addressed.

3.1.3 For each receptor the residual effects and major areas of uncertainty as predicted within the DCO Order Limits are detailed. Only where moderate or major adverse effects are predicted for the topics listed in the Executive summary (**Chapter 31: Summary, Volume 2** of the ES (Document Reference: 6.2.31) provides a summary of predicted environmental residual effects), or significant uncertainty remains in the assessment has monitoring been deemed necessary and required as part of the dML.

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4. In Principle proposals for monitoring

4.1.1 The following sections set out the in-principle proposals for monitoring in relation to those topics and/or receptor groups outlined in the Executive summary. These are cross referenced against the relevant conditions within the respective dMLs.

4.1.2 While accepting that this IPMP represents the proposed approach to monitoring at the time of writing, it is recognised that the outcomes of future survey work could influence future monitoring requirements, methodologies, focus and effort for Rampion 2, as knowledge and understanding develops. For example, where appropriate, and in consultation with the MMO and its advisors, including the relevant SNCB, these scopes may be refined to consider other relevant studies. This is a key principle for an adaptive approach to monitoring and will be the subject of ongoing consultation between RED, the MMO and its advisors. It is recognised that the MMO has the ability to vary the dML conditions in this regard. This document will be used as a basis for further discussions, in relation to monitoring, post consent.

4.2 Engineering and design related monitoring

4.2.1 In addition to the environmental survey and monitoring required under the dMLs, additional activities will be undertaken for engineering and design purposes. Some of these will overlap with dML monitoring and wherever possible RED will look to combine surveys for monitoring purposes with those already being carried out for engineering purposes. The offshore activities proposed for engineering or design purposes are:

- Geophysical surveys (C-58) - to provide further detail and to clarify the presence of boulders, unexploded ordnance (UXO) and other obstructions on the seabed;
- Geotechnical survey (C-59), **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference: 6.2.16);
- pre-lay grapnel/ plough run;
- UXO survey and clearance (C-58) **Chapter 8: Fish and shellfish ecology, Volume 2** (Document reference: 6.2.8) and **Chapter 11: Marine mammals, Volume 2** (Document Reference: 6.2.11) of the ES;
- ROV survey; and
- Cable burial survey (C-45) **Chapter 8: Fish and shellfish ecology, Volume 2** (Document reference 6.2.8) and **Chapter 9: Benthic, subtidal and intertidal ecology, Volume 2** (Document reference 6.2.9) of the ES.

Table 4-1 Embedded environmental measures referenced in this document

ID	Environmental measure proposed
C-45	Where possible, subsea cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification and Installation Plan.
C-52	A piling Marine Mammal Mitigation Protocol (MMMP) will be implemented during construction and will be developed in accordance with Joint Nature Conservation Committee (JNCC, 2010) guidance and with the latest relevant guidance and information and in consultation with stakeholders. The piling MMMP will include details of soft starts to be used during piling operations with lower hammer energies used at the beginning of the piling sequence before increasing energies to higher levels. A **Draft Piling Marine Mammal Mitigation Protocol** (Document Reference 7.14) has been submitted with this application.
C-53	An Outline Marine Pollution Contingency Plan (MPCP) has been submitted with this Application as Appendix A of the **Outline Project Environmental Management Plan** (Application Document Reference 7.11). This Outline MPCP provides details of procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to Rampion 2. The Final MPCP will include relevant key emergency contact details.
C-56	RED will apply for Safety Zones post consent. Safety Zones of up to 500m will be sought during construction, maintenance and decommissioning phases. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards.
C-57	Marine Written Schemes of Investigation (WSI) will be developed in accordance with the **Outline Marine Written Scheme of Investigation** (WSI) (Application Document Reference 7.13). The Marine WSI will outline the archaeological exclusion zones (AEZ), the implementation of a Protocol for Archaeological Discoveries in accordance with 'Protocol for Archaeological Discoveries: Offshore Renewables Projects' (The Crown Estate, 2014) and future monitoring and assessment requirements.
C-59	Offshore geotechnical surveys prior to construction will be undertaken following early discussions with Historic England. Areas with geoarchaeological potential will be targeted during the geotechnical sampling campaigns and the results of the geoarchaeological assessment will be presented in staged geoarchaeological reports inclusive of publication. The

ID	Environmental measure proposed
	published results will aim to enhance the palaeogeographic knowledge and understanding the area.
C-277	A post-construction monitoring plan as per Marine Written Schemes of Archaeological Investigation (WSI) will be produced. The post-construction monitoring plan will recommend areas or sites of high archaeological significance and outline how post-construction monitoring campaigns will collect, assess and report on changes to marine heritage receptors that may have occurred during the construction phase.
C-298	Where appropriate, the results of post-consent monitoring, data and reports will be made publicly available and provided to the relevant data repositories.

4.2.2 Full details of the embedded environmental measures referenced in this document can be found in the **Commitments Register** (Document Reference: 7.22).

4.2.3 Other relevant Plans required under the dML with commitments to monitoring (linked to the items listed in paragraph 4.2.1) are:

- A scour protection management and cable protection plan (monitoring of scour and protection measures). An **Outline Scour Protection and Cable Protection Plan** (Document Reference: 7.12) has been submitted as part of this DCO Application;
- A cable specification and installation plan (cable burial monitoring), to be provided as part of the pre-construction documentation, dML Condition 11 in Schedules 11 and 12 of the DCO specifies that the cable specification and installation plan includes: *"proposals for monitoring offshore cables including cable protection during the operational lifetime of the authorised project which includes a risk based approach to the management of unburied or shallow buried cables*";
- A construction method statement, to be provided as part of the pre-construction documentation; and
- An offshore operations and maintenance plan. An **Outline Offshore Operations and Maintenance Plan** (Document Reference: 7.16) has been submitted as part of this DCO Application; and
- a written scheme of marine archaeological investigation. An **Outline Marine Written Scheme of Investigation** (Document Reference: 7.13) has been submitted as part of this DCO Application.

4.3 Coastal processes

Conclusions of the Environmental Statement

4.3.1 No residual effects greater than minor are predicted within **Chapter 6: Coastal processes, Volume 2** of the ES (Document Reference: 6.2.6). RED intend to survey the area within the DCO Order Limits using appropriate high resolution bathymetric and side-scan surveys for engineering purposes. This information would also help inform the benthic monitoring campaign (see **Section 4.5**).

4.3.2 **Table 4-2** provides information on the monitoring requirements for coastal processes. The proposed monitoring will be discussed and agreed with Natural England and the MMO.

Table 4-2 In principle monitoring proposed for coastal processes

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
Changes in seabed topography, including scour processes	Physical environment and lined receptor groups e.g., marine ecology	Pre-construction	• Engineering and design purposes • Input in to benthic and other related ecological surveys and monitoring requirements as agreed with the MMO and SNCBs	A single survey within the agreed array and cable corridor survey areas using full sea floor coverage swath-bathymetric (multibeam echo sounder) and side-scan surveys of the area(s) within the DCO Order Limits in which it is proposed to carry out construction works, including a 500m buffer area around the site of each works. (The “site of each works” being the area within the DCO Order Limits which is taken forward to construction and therefore directly impacted by the works, noting that certain areas within the DCO Order Limits may not be directly impacted.)	Scope of surveys and programmes and methodologies for the purposes of monitoring shall be submitted to the MMO for written approval at least four months prior to the commencement of any survey works will be implemented, as approved.
		Post-construction	• Structural integrity / engineering (scour)	A single survey within the agreed array and cable corridor survey areas using full sea floor coverage swath-bathymetric surveys undertaken to International Hydrographic Organization (IHO) Order 1A standard and side scan sonar surveys around appropriate sub-samples of adjacent infrastructure to assess any changes in seabed topography. For this purpose, the survey contractor will, prior to the first such survey, submit a desk-based assessment (which takes account of all factors which influence scour) to identify the sample of adjacent turbines with greatest potential for scour. The survey will be used to substantiate the desk-based assessment: further surveys may be required if there are significant differences between the modelled scour and recorded scour. The number of turbine locations subject to monitoring will be confirmed following the completion of detailed design studies and in consultation with the MMO and relevant SNCBs.	

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4.4 Offshore and intertidal ornithology

Conclusions of the Environmental Statement

4.4.1 **Chapter 12: Offshore and intertidal ornithology, Volume 2** of the ES (Document Reference: 6.2.12) concluded that there would be no significant effects on ornithological receptors as a result of either Rampion 2 alone or the cumulative impacts of Rampion 2 and other relevant projects. The **Report to Inform Appropriate Assessment** (Document Reference: 5.9) similarly concludes no Adverse Effect on Integrity (AEoI) is expected for any site designated with relevance to offshore and intertidal ornithology.

In principle monitoring

4.4.2 As neither any significant effects nor any AEoIs are expected, no further monitoring is required or proposed for offshore or intertidal ornithology.

4.5 Benthic subtidal and intertidal ecology

Conclusions of the Environmental Statement

4.5.1 **Chapter 9: Benthic, subtidal and intertidal ecology, Volume 2** of the ES (Document Reference: 6.2.9) concluded that there would be no residual effect greater than minor adverse for Rampion 2 alone or cumulatively, with appropriate embedded environmental measures and mitigation. Rampion 2 has no direct impact on any designated sites and therefore no Habitats Directive Annex I habitat features will be impacted.

4.5.2 In line with Natural England advice, RED has committed to undertake a monitoring of habitats/species "of principal importance pursuant to section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Embedded environmental measures will be applied to avoid direct disturbance to sensitive habitats/species "of principal importance pursuant to section 41 of the NERC Act 2006, where practicable and a full appraisal will be provided at the pre-construction stage of development.

In principle monitoring

4.5.3 The following table provides information on the monitoring requirements for benthic subtidal and intertidal ecology, to inform final offshore export cable routing. The proposed monitoring will be discussed and agreed with Natural England and the MMO. Where it is possible synergies with engineering and design related monitoring made in **Section 4.2** would be explored in interpreting geophysical data.

4.5.4 Consideration has been given to habitats/species *"of principal importance pursuant to section 41 of the NERC Act 2006".* The specific habitats of relevance identified within the project area are the focus for monitoring outlined within **Table 4-3** below. These shall be referred to specifically as surveys for two main features

of concern: *Sabellaria spinulosa* reef and chalk habitat. Pre-construction geophysical surveys will be reviewed with drop down surveys to confirm presence and extent, as appropriate. The results shall then be used to constrain the offshore export cable installation methods to minimise the area of physical disturbance to chalk habitat, stony reef and *Sabellaria spinulosa* reef (if recorded) and inform final offshore export cable routing, where these habitats were identified as requiring additional mitigation. There was no such requirement within the array area, based on the baseline characterisation data and conclusions from the **ES** (Document Reference: 6.2). A detailed final project design will be presented within the construction method statement.

Table 4-3 In principle monitoring proposed for benthic subtidal and intertidal ecology

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
Effects on *Sabellaria spinulosa* reef, chalk habitat and stony reef.	Chalk habitat, stony reef and potential *Sabellaria spinulosa* reef	Pre-construction	Determine the location and extent of any chalk habitat, stony reef, peat and clay exposures, and potential *S. spinulosa* reef within areas of the offshore proposed DCO Order Limits in which it is proposed to carry out construction works to inform the appropriate mitigation.	A single survey geophysical (sidescan or Multi-Beam Echo Sounder) survey of those areas within which it is proposed that seabed works will be carried out at a resolution sufficient to identify chalk habitat, stony reef, and potential *S. spinulosa* reef; and In areas where chalk reef, stony reef, peat and clay exposures and potential *S. spinulosa* reef is identified from the review of the geophysical data, drop down video and/or stills will be deployed to confirm presence and extent.	Survey programmes and methodologies for the purposes of monitoring shall be submitted to the MMO for written approval at least four months prior to the commencement of any survey works.
		Post-construction	The requirement for post-construction monitoring will be dependent on the findings of the pre-construction surveys.	Where chalk habitat, stony reef, peat and clay exposures and *S. spinulosa* reef is identified during the baseline survey, a single post-construction survey, specifically targeting those habitats and reefs identified in the baseline survey, will be undertaken as a check on their condition using the same methodology set out for pre-construction monitoring. Where no stony reef, peat or clay exposures, and/or *S. spinulosa* reef is identified by the pre-construction survey, no post-construction surveys will be undertaken.	If required, survey programmes and methodologies for the purposes of monitoring shall be submitted to the MMO for written approval at least four months prior to the commencement of any survey works and conducted within the first-year post commissioning of the proposed wind farm. If significant impacts are observed the potential requirement for further surveys will be agreed with the MMO following review of the post-construction survey data.

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4.6 Fish and shellfish ecology (including underwater noise)

Conclusions of the Environmental Statement

4.6.1 **Chapter 8: Fish and shellfish ecology, Volume 2** of the ES (Document Reference: 6. 2.8) concluded that alone and cumulatively no moderate or major adverse residual effects are predicted for Rampion 2.

In principle monitoring

4.6.2 As no significant effects are expected following assessment, no further monitoring or independent surveys are proposed.

In-principle underwater noise monitoring

4.6.3 Construction noise monitoring is proposed to validate, within reason, the assumptions made within **Chapter 8: Fish and shellfish ecology, Volume 2** (Document Reference: 6.2.8) and **Chapter 11: Marine mammals, Volume 2** (Document Reference: 6.2.11) of the ES.

4.6.4 It is understood that Defra will be issuing a marine policy paper identifying the intention to implement standard underwater noise level limits for all marine piling works. Although the timing of the publication of the policy paper and any subsequent implementation schedule for noise criteria (or the details of such) is uncertain, it is possible that these will be relevant for the construction of Rampion 2. It should be noted, therefore, that the in-principle monitoring proposals set out in **Table 4-4** below are made in the absence of any relevant monitoring requirements being stipulated by Defra as part of its noise criteria proposals, which may supersede part or all of those within this in principle plan.

4.6.5 The overall objective for the construction noise monitoring for piled foundations will be to validate the predictions made in the Environmental Statement, as the modelling of noise propagation from the piling location, both with and without noise mitigation or abatement measures, has informed the assessment of impacts to noise sensitive receptors within the study area. The noise monitoring will be undertaken to show that the noise level predictions made are accurate and that the impacts predicted, and any mitigation zones implemented as a result of them, are valid and provide the correct level of protection to marine fauna. The key objective is therefore to characterise the sound source as a function of range (distance) from that source and compare this value with the noise level predictions.

4.6.6 Under this overarching objective, the proposed noise monitoring will provide data to meet several specific aims:

- to show that the noise level predictions made are appropriate and that the impacts predicted are valid;
- to validate the mitigation measures in terms of effectiveness;
- to validate mitigation zones implemented during piling; and

- to validate compliance with the specified noise threshold proposed for black seabream at the Kingmere Marine Conservation Zone site, should one be implemented.

4.6.7 It is proposed to take a hypothesis-led approach to meet the identified objectives. Noting that detailed methodologies will be developed once the final design parameters for the Proposed Development have been defined, the monitoring will be designed in order to test the hypotheses set out below in **Table 4-4**.

~~4.6.4~~4.6.8 Noise measurements shall be made in line with the Good Practice Guide No.133: Underwater Noise Measurement (National Physical Laboratory, 2014). Noise monitoring will be achieved using hydrophones, with full specifications provided in the final monitoring plan. Underwater data shall be recorded in a format that allows analysis using un-weighted metrics, such as peak sound pressure level, sound exposure level and peak to peak pressure level, and all conclusions and discussions should be made in relation to the un-weighted metrics. Construction noise monitoring should include measurements of noise generated by the installation of ~~the first~~ four ~~piled foundations~~ from the first 12 foundations of each piled foundation type to be installed, as set out within **Table 4-4** below.

~~4.6.5~~4.6.9 In addition, the requirements of the UK Marine Noise Registry[2] shall be adhered to as necessary. This would cover geophysical survey activities and UXO clearance as well as impact pile driving.

[2] https://mnr.jncc.gov.uk (Dates accessed: 1 August 2023)

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Table 4-4 In principle monitoring proposed for underwater noise

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
Injury / disturbance to marine ecological receptors	Marine Mammals, Fish and Shellfish Ecology	Construction	Reduce uncertainty in impact assessment, demonstrate that the noise level predictions made in the ES are appropriate and that the impacts predicted are valid, and validate mitigation zones implemented during piling.	Compare the measured data, from ~~the first~~ four ~~foundations~~ from the first 12 piled foundations installed, with predictions for received levels, source levels that were made in the ES.	The proposed hypothesis to be tested with the monitoring comprises: Hypothesis 1 • H_1 - The installation of piled foundations for Rampion 2 offshore wind farm results in under water noise levels that significantly exceed those predicted from the modelling undertaken to inform the EIA. • H_0 - The installation of piled foundations for Rampion 2 offshore wind farm results in under water noise levels that do not significantly exceed those predicted from the modelling undertaken to inform the EIA. Noting that details will be developed and set out on the basis of the final scheme design parameters, the Applicant expects that monitoring

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
					locations might be located at a range of distances, for example: • between 500 and 700 m from the piling location, in line with the Marine Mammal Mitigation Zone (MMMZ); • 750 m from the piling location to provide directly comparable data to other OWF sites (in German Waters)[3]; and • Larger distance (e.g. 4-5 km) from the piling location. Measurements at the further distances (4-5 km and potentially up to circa 12-15 km) would be undertaken if the piling duration allows. The Applicant would note that monitoring at 750 m may provide for both verification of the MMMZ and the Defra/German waters comparison distance, effectively amalgamating the first two stations noted in the list above. In this case, consideration will

[3] Measurement at 750m from source will also comply with the anticipated future implementation of noise emission criteria by Defra for the installation of piles using percussive hammers at offshore wind farm sites in UK waters, subject to confirmation of such standards.

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
					be given to establishing an additional monitoring location at an intermediate distance, e.g. 1.5 km. Monitoring will be undertaken for four piling locations for each foundation type used (i.e. monopiles and multi-leg foundations). These locations will be selected from the first 12 foundations to be installed in order to provide for sites with differing seabed conditions (particularly water depths), whilst ensuring data are collected for the earliest pile installations for verification of predicted (modelled) noise levels. The Applicant proposes to target two foundation sites of ≤40 m water depth and two sites of ≥40 m depth from the initial 12 foundation locations. Survey programmes and methodologies for the purposes of monitoring shall be submitted to the MMO for written approval in the final Plan at least ~~four~~ six months prior to the commencement of any survey

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
					works. These will be implemented as approved. Information will also be gathered and processed in accordance with UK Noise Registry requirements, if appropriate at the time of construction. Noise monitoring data will be recorded, and results will be included in final report submitted to MMO.
Injury / disturbance to marine ecological receptors	Marine Mammals, Fish and Shellfish Ecology	Construction	Collect data to validate performance of noise mitigation measures in terms of effectiveness	Compare measured data, from four from the first 12 foundations installed, with predictions for received levels, source levels that were made in the ES.	The proposed hypothesis to be tested with the monitoring comprises: Hypothesis 2 • H_1 - The deployment of noise abatement/mitigation measures during the installation of piled foundations for Rampion 2 offshore wind farm provide insufficient reductions in under water noise, resulting in noise levels that significantly exceed those predicted from the modelling undertaken to inform the EIA.

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
					• H_0 - The installation of piled foundations for Rampion 2 offshore wind farm results in under water noise levels that do not significantly exceed those predicted from the modelling undertaken to inform the EIA. The same approach for monitoring, in terms of equipment and sampling strategy will be adopted in the verification of the efficacy of mitigation measures as set out for Hypothesis 1 above, with underwater noise levels being recorded for four of the first 12 piled foundations installed at the Proposed Development. This monitoring will be coincident with the monitoring undertaken for Hypothesis 1 as the Applicant has committed to the use of one noise mitigation measure (Double Big Bubble Curtains (DBBC) for all piled foundation installations for the Proposed Development.

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
					~~Additional monitoring will also be undertaken where multiple mitigation measures are employed, for example a bubble curtain and a low noise hammer or hydro-sound damper. For the first piled foundation (of each type) installed using a combination of more than one measure, additional noise monitoring will be undertaken to verify the additive performance of the measures being used in tandem.~~ Adaptive Management: The results of the underwater noise monitoring to establish the efficacy of the mitigation measure(s) will inform the design of the piling exclusion zones to be implemented during the sensitive season for the black seabream feature of the Kingmere MCZ. The noise levels recorded will be used to fine-tune the mitigation measures applied and/or refine the exclusion zones such that the noise levels modelled and set out within the **In Principle Sensitive Features Mitigation Plan [REP3-045]**

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
					(updated at Deadline 4) will not be exceeded at the MCZ. This enables an adaptive management approach to be adopted to provide for uncertainties in the predicted noise levels reaching the designated black seabream feature and ensure the level of protection afforded through the adoption of the noise mitigation measures is delivered during the construction of the Proposed Development. Survey programmes and methodologies for the purposes of monitoring shall be submitted to the MMO for written approval within the final Plan at least ~~four~~six months prior to the commencement of any survey works. These will be implemented as approved. Information will also be gathered and processed in accordance with UK Noise Registry requirements, if appropriate at the time of construction. Noise monitoring data will be recorded, and results will be

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
					included in final report submitted to MMO.
Injury / disturbance to marine ecological receptors	Black seabream (as a feature of the Kingmere MCZ)	Construction	Collect data to validate compliance with the specified noise threshold proposed for black seabream at the Kingmere Marine Conservation Zone site, should one be implemented.	Compare measured noise data at the Kingmere MCZ during piling works undertaken during the period 1 March to 31 July with predicted (modelled) received levels made in the ES.	The proposed hypothesis to be tested with the monitoring comprises: Hypothesis 3 • H_1 - The installation of piled foundations for Rampion 2 offshore wind farm results in under water noise levels that significantly exceed the specified threshold level at the Kingmere Marine Conservation Zone. • H_0 - The installation of piled foundations for Rampion 2 offshore wind farm results in under water noise levels that do not significantly exceed the specified threshold level at the Kingmere Marine Conservation Zone.

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
					The proposed monitoring will comprise a calibrated hydrophone system deployed on a fixed mooring at an appropriate location proximal to, but outside of, the Kingmere MCZ designated boundary which faces the proposed Order limits area. Monitoring of the received underwater noise levels will be undertaken during the black seabream breeding season (1st March to 31 July) if foundation installation using percussive hammers is undertaken during these months. The monitoring data will be collected to inform compliance with noise threshold values, proposed by the Applicant within the **In Principle Sensitive Features Mitigation Plan [REP3-045]** (updated at Deadline 4) as no more than 141dB, at the MCZ site. The location of the noise monitoring equipment, outside the MCZ southern boundary and therefore closer to the piling locations within the Order limits, will ensure that received levels within the MCZ,

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
					which will be further away from the piling locations, are below those recorded at the monitoring station. Adaptive Management: The monitoring will provide empirical data on received noise levels at the MCZ and inform verification of both modelled noise levels and assessment of compliance with the precautionary threshold established for the black seabream designated site feature. As the sequencing of foundation installation is governed by a zoning plan set out within the **In Principle Sensitive Features Mitigation Plan [REP3-045]** (updated at Deadline 4) with locations further from the MCZ being undertaken initially, noise levels at the MCZ monitoring station recorded during piling from locations with the lowest risk of threshold exceedance will be used in an adaptive management loop to evidence appropriate piling distances to the MCZ. These will then be used to

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
					either confirm or trigger refinement of the mitigation measures and/or the foundation installation zoning plan and/or the active mitigation measures deployed to ensure delivery of the required level of protection to the black seabream feature during the spawning/nesting season. The proposed monitoring equipment and deployment is currently envisaged to mirror that employed previously for the collection of ambient noise conditions in proximity to the Kingmere MCZ, as detailed in the Black Seabream Underwater Noise Technical Note and Survey Results - Revision A [PEPD-024], however such details will be set out based on final scheme details pre-construction and submitted to the MMO for written approval at least four months prior to the commencement of any survey works. These will be implemented as approved. Information will also be gathered and processed in accordance with UK

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
					Noise Registry requirements, if appropriate at the time of construction. Noise monitoring data will be recorded, and results will be included in final report submitted to MMO.

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4.7 Marine mammals

Conclusions of the Environmental Statement

4.7.1 **Chapter 11: Marine mammals, Volume 2** of the ES (Document Reference: 6.2.11) concluded that at a project level the impacts from Rampion 2 are assessed as negligible at worst for permanent threshold shift (PTS) from underwater noise from piling for all species, and minor at worst for behavioural disturbance from piling subject to the application of embedded mitigation. All other potential impacts were determined to be minor or negligible during construction, operation, and decommissioning phases. No significant impacts were identified. The conclusions of the assessment are based on varying levels of confidence in the data used. However, a precautionary approach has been taken where there is high uncertainty or low confidence in the data.

4.7.2 Minor adverse (not significant) effects are predicted from the cumulative effect of underwater noise from piling based on worst-case scenarios. However, it should be noted that the contribution of Rampion 2 to this cumulative effect is very small, with a worst-case being for bottlenose dolphin of 1.2% of the reference population (Channel and Southwest England Management Unit) assessed as being potentially disturbed during piling operations (**Table 11-42** in **Chapter 11: Marine mammals, Volume 2** of the ES (Document Reference: 6.2.11)).

In principle monitoring – marine mammals

4.7.3 As no significant effects are expected following assessment, subject to the implementation of mitigation, no further monitoring or independent surveys are proposed for marine mammals specifically, however monitoring of underwater noise levels arising from the installation of ~~the first~~ four piles from the first 12 foundations will be undertaken to validate, within reason, noise levels predicted within the **ES** (Document Reference: 6.2).

4.7.4 A piling Marine Mammal Mitigation Protocol (MMMP) will be produced in accordance with relevant guidance to minimise the risk of injury or mortality to marine mammals during the construction of Rampion 2. A Draft MMMP is presented which shall be finalised prior to construction with input from the contractor (see **Draft Piling Marine Mammal Mitigation Protocol** (Document Reference: 7.14) (C-52) and as required by dML Condition 11 in Schedules 11 and 12 of the DCO.

Conclusions of the Environmental Statement - underwater noise

4.7.5 There is considerable variability in the spatial extent of underwater noise propagation resulting from piling within the Rampion 2 site due to variable bathymetry, with the greatest impact ranges observed to the west (south-west to north-west) of the DCO Order Limits. The noise levels experienced will also depend on the depth of the receptor within the water column. Hearing sensitive receptors near the surface will be exposed to lower noise levels with correspondingly smaller impact ranges.

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Table 4-5 In principle monitoring proposed for marine mammals

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
Disturbance effects on	All marine mammals	Pre-construction/ Construction	Validate, within reason, predictions in **Chapter 11: Marine mammals, Volume 2** of the ES (Document Reference 6.2.11).	Where piled foundations are used during the construction of Rampion 2, underwater noise monitoring of ~~the first~~ four ~~piles~~ from the first 12 piled foundations of each type (i.e., monopile or pin-pile) will be undertaken to inform comparison against predictions for received levels and source levels that were made in the ES. This will allow validation of the conclusions of **Chapter 11: Marine mammals, Volume 2** of the ES (Document Reference: 6.2.11).	Survey programmes and methodologies for the purposes of monitoring shall be submitted to the MMO for written approval at least six months prior to the commencement of any survey works.
		Construction	Ensure best practice is followed to minimise risk of injury or mortality to marine mammals.	RED will follow the relevant guidelines at the time in relation to development of the Piling MMMP. The specific installation method shall be determined subsequent to appointment of the contractor at pre-construction stage and consideration of best available techniques at that time. The standard mitigation suggested in the MMMP will include the use of visual monitoring and passive acoustic monitoring for at least 30 minutes prior to the start of the soft start of piling.	A **Draft Piling Marine Mammal Mitigation Protocol** (Document Reference: 7.14) is provided with this DCO Application. A Final Piling MMMP will be submitted at least six months prior to construction which will be in accordance with the measures in the **Draft Piling Marine Mammal Mitigation Protocol** (Document Reference: 7.14).

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4.8 Commercial fisheries

Conclusions of the Environmental Statement

4.8.1 **Chapter 10: Commercial fisheries, Volume 2** of the ES (Document Reference: 6.2.10) concluded that that the only commercial fisheries receptors which are predicted to experience sustained significant impacts are UK vessels operating static gear during the construction phase of Rampion 2.

In principle monitoring

4.8.2 The dML includes the requirement for a Fisheries Liaison and Co-existence Plan (FLCP). An **Outline Fisheries Liaison and Co-existence Plan** (Document Reference: 7.19) is provided with this DCO Application. A Final FLCP will be prepared post-consent and ahead of project construction. The Final FLCP will ensure relevant fishing fleets are notified of licensed activities and will address the interaction of the licensed activities with fishing activities, mitigating the significant impacts referred to in **paragraph 4.8.1**.

4.8.3 It is proposed that no further commercial fisheries monitoring is required.

4.9 Shipping and navigation

Conclusions of the Environmental Statement

4.9.1 The effects of the project on shipping and navigation have been assessed in **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference: 6.2.13) with impacts ranging from broadly tolerable to tolerable/as low as reasonably possible, taking account of embedded mitigation measures.

In principle monitoring

4.9.2 **Table 4-6** provides information on the vessel traffic monitoring requirements for shipping and navigation.

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Table 4-6 In principle monitoring proposed for shipping and navigation

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
Effects on the levels of marine traffic across the project	Marine traffic	Construction	Validate, within reason, the predictions made in **Chapter 13: Shipping and navigation** (Document Reference: 6.2.13) and the **Appendix 13.1: Navigational Risk Assessment** of the ES (Document Reference: 6.4.13.1) with respect to potential effects on the levels of shipping traffic.	Construction monitoring shall include vessel traffic monitoring by Automatic Identification System (AIS), including the provision of reports on the results of that monitoring periodically as requested by the Maritime and Coastguard Agency (MCA).	Post-construction vessel traffic monitoring using AIS will be undertaken for a maximum of but not consecutively, 28 days, and will take account of seasonal variation of traffic patterns over a year. This will be done at a suitable time as agreed with the MMO and MCA following the commencement of commercial operation.
		Post construction	Validate, within reason, the predictions made in the **Chapter 13: Shipping and navigation, Volume 2** (Document Reference: 6.2.13) and the **Appendix 13.1: Navigational Risk Assessment** of the ES (Document Reference: 6.4.13.1) with respect to potential effects on the levels of shipping traffic.	Vessel traffic monitoring by Automatic Identification System, totalling a maximum of 28 days taking account of seasonal variations in traffic patterns over one year, following the commencement of commercial operation. A report will be submitted to the MMO and the MCA following the end of the monitoring.	

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4.10 Marine archaeology

Conclusions of the Environmental Statement

4.10.1 **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference: 6.2.16) concluded that for the project alone the sensitivity (value) of the marine heritage receptors is negligible to very high and the magnitude is negligible. With the embedded environmental measures applied, the significance of effect is not predicted to be significant in EIA terms.

4.10.2 Potential impact to the Historical Seascape Character (HSC) is assessed in terms of its ability to adapt to change and **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference: 6.2.16) concluded that the ability to accommodate change is mainly a positive perceived change equalling a negligible magnitude. The significance of effect is assessed as not significant in EIA terms.

4.10.3 Known archaeological receptors are not considered to be subject to significant cumulative impacts on the basis that they should be avoided by implementation of the Rampion 2 embedded environmental measures, as well as appropriate mitigation applied by the projects considered in the cumulative assessment.

4.10.4 The transboundary effect screening exercise concluded that there is no potential for significant transboundary effects upon the interests of European Economic Area States in relation to marine archaeology to occur as a result of the construction, operation, or decommissioning phases of Rampion 2. No inter-related effects are predicted to occur that are of any greater significance compared to the impacts considered alone.

In principle monitoring

4.10.5 The relevant embedded environmental measures within the design and how these affect the marine archaeology assessment are detailed in **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference: 6.2.16).

4.10.6 The principal mechanism for delivery of monitoring is through the agreement of the final Agreed Marine Written Schemes of Investigation (WSI) which will be developed based on the **Outline Marine WSI** (Document Reference: 7.13) and will follow the Draft Marine WSI (Rampion 2, 2021). The development of the Marine WSI documents has been in line with the guidance in *Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects* (The Crown Estate, 2021) and in agreement with Historic England and the MMO (commitment **C-57** of the **Commitments Register** (Document Reference: 7.22).

4.10.7 Further monitoring will be delivered by ensuring that geophysical surveys and geotechnical campaigns throughout the life of the project are undertaken following archaeological input and that data derived from any such surveys is assessed for archaeological potential (commitments C-58 Offshore geophysical surveys (including UXO surveys) undertaken during the life of the project will be subject to full archaeological review, where relevant, in consultation with Historic England. and C-59 Offshore geotechnical surveys prior to construction will be undertaken following early discussions with Historic England. Areas with geoarchaeological

potential will be targeted during the geotechnical sampling campaigns and the results of the geoarchaeological assessment will be presented in staged geoarchaeological reports inclusive of publication. The published results will aim to enhance the palaeogeographic knowledge and understanding of the area. of the **Commitments Register** (Document Reference: 7.22). Monitoring will also specifically be undertaken under C-277 (**Commitments Register** (Document Reference: 7.22). Where a post-construction monitoring plan as per the Marine WSI will be produced. The post-construction monitoring plan will identify areas or sites of high archaeological significance and outline how post-construction monitoring campaigns will collect, assess, and report on changes to marine heritage receptors that may have occurred during the construction phase.

4.10.8 **Table 4-7** provides information on proposed monitoring requirements for marine archaeology.

Table 4-7 In principle monitoring proposed for marine archaeology

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
Direct impact: removal of sediment containing undisturbed archaeological contexts during seabed preparation ahead of construction activities.	Marine heritage receptors	Construction	Validate, within reason, that the assessments made were reasonable in **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference: 6.2.16) with respect to potential effects on known and potential marine heritage receptors and to confirm, reject or amend suggested mitigation.	C-57 secures the Marine Written Schemes of Investigation document which details all archaeological mitigation that might be required in the light of pre-construction and construction investigations, including field investigation, surveys, geotechnical campaigns, post-fieldwork activities, archiving and dissemination of results. The **Outline Marine WSI** (Document Reference: 7.13) includes provision to update the document as the project design is refined and as the results of further archaeological assessment become available, dML Condition 11 in Schedules 11 and 12 draft DCO require the submission and approval of the offshore WSI which must be in accordance with the Outline Offshore WSI A post-construction monitoring plan as per Marine Written Schemes of Archaeological Investigation (WSI) will be produced. Offshore geophysical surveys (including UXO surveys) undertaken during the life of the project will be subject to full archaeological review, where relevant, in consultation with Historic England (C-58). Offshore geotechnical surveys prior to construction will be undertaken following early discussions with Historic England.	In regard to marine archaeology monitoring requirements throughout the life of the proposed development are embedded in the mitigation strategies outlined in the **Commitments Register** (Document Reference: 7.22) and detailed within **Chapter 16: Marine archaeology, Volume 2** (Document Reference: 6.2.16). Areas with geoarchaeological potential will be targeted during the geotechnical sampling campaigns and the results of the geoarchaeological assessment will be presented in staged geoarchaeological reports inclusive of publication. The published results will aim to enhance the palaeogeographic knowledge and understanding of the area (C-59). The post-construction monitoring plan will recommend areas or sites of high archaeological significance and outline how post-construction monitoring campaigns will collect, assess and report on changes to marine heritage receptors that may have occurred during the construction phase.
Direct impact: penetration, compression, and disturbance effects of piling foundations.		Construction	As above	As above	As above
Direct impact: penetration, compression, and disturbance of cable laying operations		Construction	As above	As above	As above
Direct impact penetration, compression and disturbance effects of jack-up barges and anchoring of construction vessels during construction activities.		Construction	As above	As above	As above

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
Indirect impact: disturbance of sediment containing potential marine heritage receptors (material and contexts) during construction activities.		Construction	As above	As above	As above
Direct impact: penetration compression and disturbance effects of maintenance activities at WTG substation foundations and along, inter-array and export cables		Operation and maintenance	As above	As above	As above
Indirect impact: Disturbance of sediment containing potential marine heritage receptors during maintenance activities.		Operation and maintenance	As above	As above	As above
Direct impact: penetration compression and disturbance effects of jack-up barges and anchoring of operation and maintenance vessels during the operation and maintenance phase.		Operation and maintenance	As above	As above	As above
Indirect impact: scour effects caused by the presence of WTG substation foundations and the exposure of inter-array and export cables or the use of cable protection measures.		Operation and maintenance	As above	As above	As above
Direct impact: Penetration, compression and disturbance effects of jack-up barges and anchoring of decommissioning vessels.		Decommissioning	As above	As above	As above
Indirect impact: Draw-down of sediment into voids left by removed WTG foundations leading to loss of sediment or destabilisation of archaeological sites and contexts.		Decommissioning	As above	As above	As above
Indirect impact: changes to the HSC as a result of construction and survey vessel activities and the addition of cables, foundations and turbines.		Construction	No monitoring recommended	HSC principles have been applied to complement onshore Historic Landscape Characterisation (HLC) approaches in relation to Rampion 2 to integrate and interpret the large study areas and are presented as a narrative focused on the ability to adapt to change. The HSC assessment will not be monitored or updated.	N/A

Potential Effect	Receptor/s	Phase	Headline reason/s for monitoring	Monitoring Proposal	Details
Indirect impact: Changes to the HSC as a result of operation and maintenance vessel activities and the presence of the		Operation and maintenance	As above	As above	N/A
Indirect impact: Changes to the HSC as a result of decommissioning activities and the removal of wind farm components.		Decommissioning	As above	As above	N/A

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5. References

Ministry of Housing, Communities and Local Government (2021). *National Planning Policy Framework.* [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf [Accessed 19 May 2023].

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Natural Environment and Rural Communities Act (2006). [online] Available at: https://www.legislation.gov.uk/ukpga/2006/16/contents. [Accessed 19 May 2023]

Rampion 2 (2021). *Appendix 17.2 Draft Marine Outline Written Scheme of Investigations.* [online] Available at: [redacted] [Accessed 19 May 2023].

The Crown Estate. (2021). *Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects.* Salisbury: Wessex Archaeology. [Online] Available at: [redacted] [Accessed 19 May 2023].

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6. Glossary of terms and abbreviations

Table 6-1 Glossary of terms and abbreviations

Term	Definition
AIS	Automatic Identification System
DCO	Development Consent Order
dML	Deemed Marine Licences
EIA	Environmental Impact Assessment
ES	Environmental Statement
FLCP	Fisheries Liaison and Co- existence Plan
HAT	Highest Astronomical Tide
HDD	Horizontal Directional Drilling
HLC	Historic Landscape Characterisation
HSC	Historical Seascape Character
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IHO	International Hydrographic Organization
MCA	Maritime and Coastguard Agency
MMO	Marine Management Organisation
PTS	Permanent threshold shift
UXO	Unexploded Ordnance
WSI	Written Scheme of Investigation
WTG	Wind Turbine Generators

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Appendix A
Outline Vessel Traffic Monitoring Strategy

Introduction

Purpose of this Document

At the request of the Maritime and Coastguard Agency (MCA) and Trinity House, an Outline Vessel Traffic Monitoring Strategy has been prepared by Anatec Limited for Rampion 2 Wind Farm. The purpose of this document is to agree a method with the MCA for the use of vessel traffic monitoring during both the construction and operation of Rampion 2 to ensure that **Appendix 13.1 Navigational Risk Assessment, Volume 4** of the ES (Document Reference: 6.4.13.1) (NRA) remains accurate through both the construction and post construction phases of the project. The results of the vessel traffic monitoring will also be reviewed against the predictions made in the NRA for the project with respect to anticipated changes in traffic patterns as well as to the effectiveness of the mitigation measures implemented (see **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference: 6.2.13)).

Licence Details

Following consultation with the MCA, the following text has been incorporated into the deemed Marine Licence (dML):

- Construction monitoring must include vessel traffic monitoring by automatic identification system for the duration of the construction period. An appropriate report must be submitted to the MMO, Trinity House and the MCA at the end of each year of the construction period.
- Post construction monitoring must include vessel traffic monitoring by automatic identification system for a duration of three consecutive years following the completion of construction of authorised project, unless otherwise agreed in writing by the MMO. An appropriate report must be submitted to the MMO, Trinity House and the MCA at the end of each year of the three year period.

Guidance

MCA

Current UK guidance on navigational monitoring is contained within Marine Guidance Note (MGN) 654 (Merchant and Fishing) Safety of Navigation: Offshore Renewable Energy Installations (OREI) – Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021).

Specifically, Annex 4 of this guidance document discusses the safety and mitigation measures recommended for the wind farms during the construction, operational, and

decommissioning phases, noting that these should be appropriate to the level and type of risk determined in the Environmental Impact Assessment (EIA).

Agreed Control Mechanism

Scope

The type, duration, area, and frequency of navigational monitoring is detailed below. From general consultation with the MCA and Trinity House undertaken to date, the scope of monitoring summarised in **Table A-1Table** is understood to be acceptable in order to mitigate any potential impact of Rampion 2.

Table A-1 Scope of Navigational Monitoring

Type	AIS Only
Duration	Minimum of 28 days covering seasonal variations in traffic patterns and fishing operations i.e., 2 x 14 days.
Area	Within a 10 nautical mile (nm) buffer of the 'as built' Rampion 2 site. This area will be clarified in the Final Vessel Monitoring Strategy.
Frequency	Annually throughout the construction phase (construction traffic monitoring surveys) and the first three years post construction (post construction traffic monitoring surveys).
Reporting	A report will be submitted to the MMO, Trinity House and the MCA following each year of the construction period (next quarter following the completion of the construction year) and after the end of first, second, and third years of operation (next quarter following completion of the operational year).

The associated report for each survey (construction and post-construction) shall be undertaken using AIS data captured by offshore AIS recording equipment which shall be installed at the Rampion 2 site either on fixed structures or vessels working at the site. The location of this equipment shall be chosen so as to ensure that a high level of coverage is obtained for the Rampion 2 site and the adjacent sea area (typically this is within 10 nautical miles (nm) of the site).

The AIS recording equipment shall not transmit any information and is not considered to be an Aid to Navigation. The AIS will not be actively monitored and shall not be transmitted directly to shore; instead, it shall be recovered periodically for both storage and use within the assessment as required.

Assessment

The AIS data shall be processed and assessed by an experienced navigation consultant based upon the traffic survey methodology outlined in Annex 1 of MGN 654 and shall be

reviewed against the conclusions of the NRA. This may include, but not be limited to, the following information included within the NRA:

- Main route 90th percentiles;
- Main route Closest Point of Approach (CPA);
- Maritime Accident and Investigation Branch (MAIB) incident data; and
- Royal National Lifeboat Institution (RNLI) incident data.

Additionally, each survey report shall analyse the navigational features found in proximity to the Rampion 2 site, noting any changes to the features defined in the NRA.

Submission

Upon completion, should there be any changes noted since the submission of the NRA, consideration shall be given by the Applicant to meeting with the MCA and/or Trinity House to discuss the results in further detail.

References

MCA (2021). *MGN 654 (Merchant and Fishing) Safety of Navigation: Offshore Renewable Energy Installations (OREI) – Guidance on UK Navigational Practice, Safety and Emergency Response*. Southampton: MCA.

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