Rampion 2 Wind Farm

Category 6: Environmental Statement

Volume 2, Chapter 7: Other marine users (clean)

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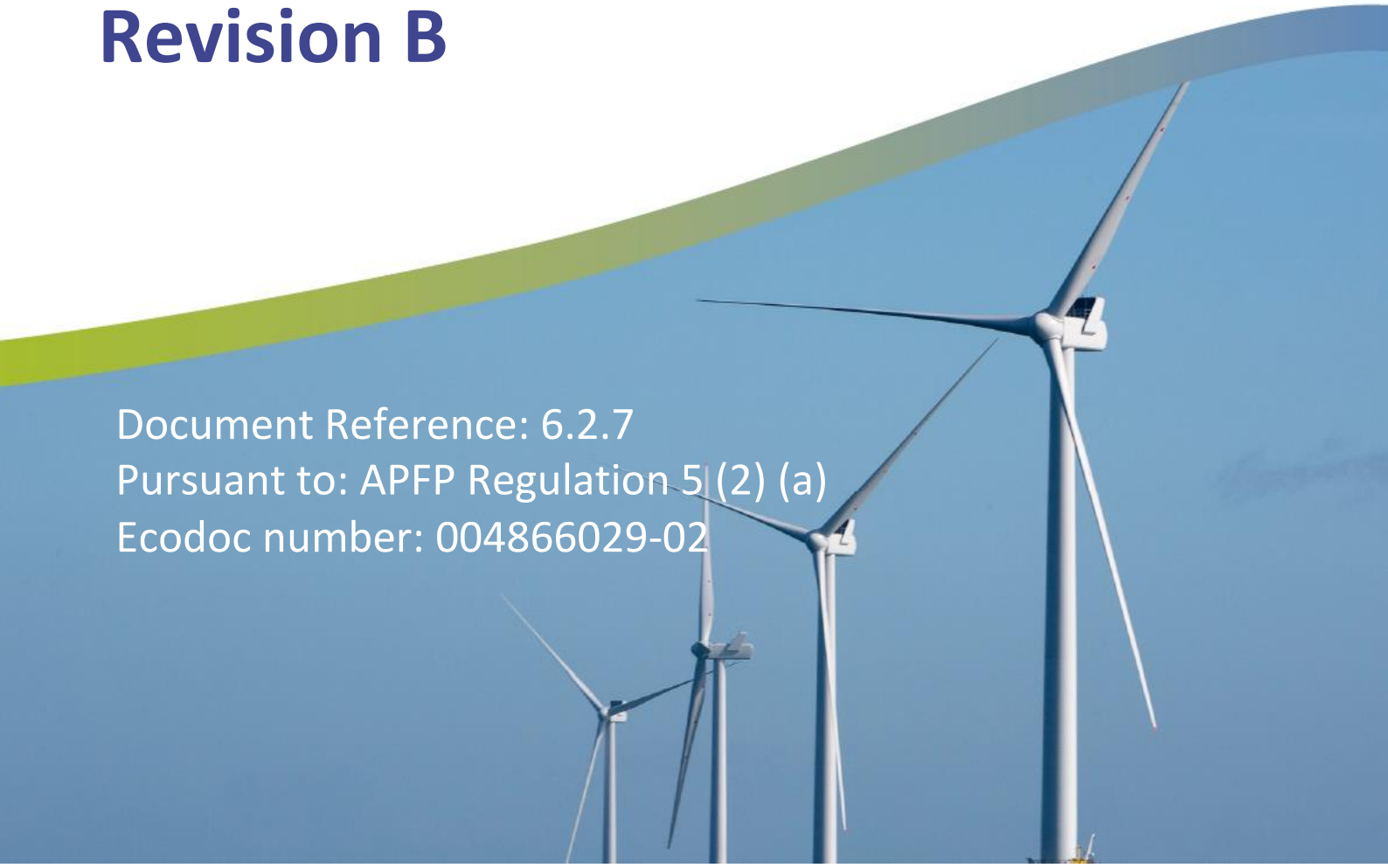

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Executive Summary

The Environmental Statement (ES) identifies any likely significant effects on other marine users (OMU) resulting from the proposed construction, operation and decommissioning of the offshore infrastructure.

The assessment has considered impacts from increased vessel traffic, activity or access displacement, temporary increases in suspended sediment and subsequent deposition, temporary increases in subsea noise throughout the construction and decommissioning phase. During the operational phase impacts that have been assessed include increased vessel traffic, the physical presence of infrastructure and alterations in wave energy direction and period. The study area for the other marine users assessment includes the area over which suspended sediments may travel following disturbance as a result of Rampion 2 activities, extending 16km around each of the array and the offshore export cable corridor components of the Proposed Development Consent Order (DCO) Limits.

The information used in the Environmental Statement has come from a desk study of a variety of sources including information from The Crown Estate on offshore wind leasing sites, oil and gas, aggregates licence areas, aquaculture and other offshore renewable energy; Centre for Environment, Fisheries & Aquaculture Science (Cefas) data on disposal sites; offshore cable, interconnector and pipelines from the Kingfisher Information Service; MoD practice areas; recreational diving records from SeaSearch and Anatec surveys; and Royal Yachting Association (RYA) data from the boating atlas. This ES has also been informed through consultation with the relevant stakeholders.

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7. Other marine users

7.1 Introduction

7.1.1 This chapter of the Environmental Statement (ES) presents the results of the assessment of the likely significant effects of Rampion 2 with respect to other marine users (OMU) during the construction, operation and maintenance and decommissioning phases of the Proposed Development. It should be read in conjunction with the project description provided in **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference 6.2) and the relevant parts of the following chapters:

- **Chapter 6: Coastal processes, Volume 2** of the ES (Document Reference 6.2.6) (changes to coastal processes have the potential to directly and/or indirectly impact OMU receptors and therefore the information from the coastal processes assessment will be used to inform this OMU assessment);
- **Chapter 8: Fish and shellfish ecology, Volume 2** of the ES (Document Reference 6.2) (this aspect has direct links with recreational fishing (which is included within OMU assessment) as it includes the likely species that are caught during recreational angling. They should therefore be informed and assessed together);
- **Chapter 10: Commercial fisheries, Volume 2** of the ES (Document Reference 6.2.10) (this aspect has direct links with OMU receptors as it includes commercial fishing activities whereas recreational fishing is covered within this OMU section. They should therefore be informed and assessed together);
- **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13) (the shipping and navigation aspect will include activities that cross over with the OMU assessment and therefore should be considered together);
- **Chapter 14: Civil and military aviation, Volume 2** of the ES (Document Reference 6.2.14) (this aspect includes other military activities that are not covered within this OMU assessment and therefore should be read together);
- **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference 6.2.16) (the marine archaeology assessment includes any impacts on diving sites and wrecks and therefore has the potential to directly and/or indirectly impact OMU receptors, the information from the marine archaeology assessment is therefore used to inform the OMU assessment); and
- **Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference 6.2.17) (this includes an assessment of the impacts of seaside tourism and therefore has ties with this OMU assessment).

7.1.2 This technical chapter describes:

- the legislation, planning policy and other documentation that has informed the assessment (**Section 7.2: Relevant legislation, planning policy, and other documentation**);
- the outcome of consultation and engagement that has been undertaken to date, including how matters relating to OMU within the Statutory Consultation periods, have been addressed (**Section 7.3: Consultation and engagement**);
- the scope of the assessment for OMU (**Section 7.4: Scope of the assessment**);
- the methods used for the baseline data gathering (**Section 7.5: Methodology for baseline data gathering**);
- the overall baseline (**Section 7.6: Baseline conditions**);
- embedded environmental measures relevant to OMU and the relevant maximum design scenario (**Section 7.7: Basis for ES assessment**);
- the assessment methods used for the ES (**Section 7.8: Methodology for ES assessment**);
- the assessment of OMU effects (**Section 7.9 - 7.11: Assessment of effects** and **Section 7.12: Assessment of cumulative effects**);
- consideration of transboundary effects (**Section 7.13: Transboundary effects**);
- inter-related effects (**Section 7.14: Inter-related effects**);
- a summary of residual effects for OMU (**Section 7.15: Summary of residual effects**);
- a glossary of terms and abbreviations is provided in **Section 7.16: Glossary of terms and abbreviations**; and
- a references list is provided in **Section 7.17: References**.

7.2 Relevant legislation, planning policy and other documentation

Introduction

i. This section identifies the legislation, policy and other documentation that has informed the assessment of effects with respect to OMU. Further information on policies relevant to the Environmental Impact Assessment (EIA) and their status is provided in **Chapter 2: Policy and legislative context, Volume 2** of the ES (Document Reference 6.2.2) of this ES.

Legislation and national planning policy

7.2.1 **Table 7-1** lists the legislation relevant to the assessment of the effects on OMU receptors.

Table 7-1 Legislation relevant to OMU

Legislation description	Relevance to assessment
United Nations Convention on the Law of the Sea (UNCLOS) – Article 79: Submarine cables and pipelines on the continental shelf	This article protects submarine cables and pipelines and requires the Applicant to have due regard for any existing cables or pipelines in position and not prejudice the possibilities of repair. Cables have been considered throughout the preliminary assessment in **Sections 7.9, 7.10** and **7.11**.
UNCLOS – Article 113: high sea areas	This article states that if an existing submarine or power cable is broken or injured, this will be a punishable offence. If a cable or pipeline is broken during the laying or repairing of another cable, Rampion Extension Development Limited (RED) will be subject to pay the repair costs. Cables have been considered throughout the preliminary assessment in **Sections 7.9, 7.10** and **7.11**.
The Submarine Telegraph Act (1885)	This act protects submarine telegraph cables. Rampion 2 has the potential to affect submarine cables and therefore the protection of these cables has been considered within the scope of this assessment and the environmental measures embedded within the design and detailed within **Sections 7.9, 7.10 and 7.11**.
Energy Act (2004)	This act sets out the basic requirements for applying a safety zone round or adjacent to Offshore Renewable Energy Installations (OREIs). Safety zones are included in the environmental measures in **Table 7-13.**
The Electricity (Offshore Generating Stations) (Safety Zones) (Applications Procedures and Control of Access) Regulations 2007	Applications for safety zones must be made to the relevant regulatory authority. In this case, it will be the Department for Energy Security and Net Zero (DESNZ), Safety zones are included in the environmental measures in **Table 7-13.**

7.2.2 **Table 7-2** lists the national planning policy relevant to the assessment of the effects on OMU receptors.

Table 7-2 National planning policy relevant to OMU

Policy description	Relevance to assessment
Overarching National Policy Statement (NPS) for Energy (EN-1) (DECC, 2011a)	Sets out the Government's policy for major energy infrastructure. The impact of marine developments on military activities due to the presence of danger and exercise areas located across the UK Continental Shelf (UKCS) are considered within **Sections 7.9, 7.10 and 7.11** as well as **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13) and **Chapter 14: Civil and military aviation, Volume 2** of the ES (Document Reference 6.2.14) of this ES.
NPS for Renewable Energy (EN-3) (DECC, 2011b)	Sets out guidance and requirements for nationally significant energy infrastructure projects. As Rampion 2 is an offshore wind project of more than 100MW, the Proposed Development falls under this National Policy Statement (NPS).
EN-3, paragraph 2.6.35: *There may be constraints imposed on the siting or design of offshore wind farms because of restrictions resulting from the presence of other offshore infrastructure or activities*.	Site selection is addressed in **Chapter 3: Alternatives, Volume 2** of the ES (Document Reference 6.2.3)
EN-3, paragraph 2.6.179: *Where a potential offshore wind farm is proposed close to existing operational offshore infrastructure, or has the potential to affect activities for which a licence has been issued by Government, the applicant should undertake an assessment of the potential effect of the proposed development on such existing or permitted infrastructure or activities. The assessment should be undertaken for all stages of the lifespan of the proposed wind farm in accordance with the appropriate policy for offshore wind farm EIAs*.	Consideration of other plans, projects and activities throughout the lifetime of this Proposed Development is made throughout this chapter. Existing offshore infrastructure is considered within **Sections 7.9, 7.10 and 7.11** of this assessment.

Policy description	Relevance to assessment
EN-3, paragraph 2.6.180: *Applicants should engage with interested parties in the potentially affected offshore sectors early in the development phase of the proposed offshore wind farm, with an aim to resolve as many issues as possible prior to the submission of an application to the IPC.*	RED have undertaken a thorough pre-application consultation process which has been used to inform the EIA. **Section 7.3** provides full details of the relevant OMU consultation.
EN-3, paragraph 2.6.184: *As such, the IPC should be satisfied that the site selection and site design of the proposed offshore wind farm has been made with a view to avoiding or minimising disruption or economic loss or any adverse effect on safety to other offshore industries. The IPC should not consent applications which pose unacceptable risks to safety after mitigation measures have been considered.*	Site selection is addressed in **Chapter 3: Alternatives and Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference 6.2.3 and 6.2.17 respectively). The proposed DCO Order Limits has been refined since scoping in order to reduce disruption to existing infrastructure and other users. This preliminary assessment (**Sections 7.9, 7.10** and **7.11**) identifies where likely significant effects have been determined and where mitigation is proposed. It also details where consultation with third-parties has been undertaken or is planned in order to seek appropriate controls in order to reduce risks to As Low As Reasonable Possible (ALARP).
EN-3, paragraph 2.6.187: *Detailed discussions between the applicant for the offshore wind farm and the relevant consultees should have progressed as far as reasonably possible prior to the submission of an application to the IPC. As such, appropriate mitigation should be included in any application to the IPC, and ideally agreed between relevant parties.*	RED have undertaken consultation with a number of stakeholders which is detailed in **Section 7.3**. Where there is potential for significant effects on OMUs, following application, RED will continue to consult with the relevant parties to (as noted above) seek appropriate controls in order to reduce risks to ALARP.
UK Marine Policy Statement (MPS)	The MPS is the framework for preparing Marine Plans and taking decisions affecting the marine environment. It contributes to the achievement of sustainable development in the United Kingdom marine area. It was prepared and adopted for the purposes of section 44

Policy description	Relevance to assessment
	of the Marine and Coastal Access Act 2009.
UK MPS, Section 3.2.9: *The construction and operation of offshore marine infrastructure, installations and activities, as well as policies on conservation designations and the health of the wider environment may impact on defence interests in certain areas. Marine plan authorities and decision makers should take full account of the individual and cumulative effects of marine infrastructure on both marine and land based MoD interests. Marine plan authorities, decision makers and developers should consult the MoD in all circumstances to verify whether defence interests will be affected.*	Ministry of Defence (MoD) activities (including danger areas) are identified in the baseline section of this chapter (**Section 7.6**). The assessment (**Sections 7.9, 7.10** and **7.11**) identifies where likely significant effects have been determined and where mitigation is proposed. Where relevant, consultation with the MoD will be continued to (ensure appropriate controls are in place to reduce risks to ALARP). Further information is provided in **Chapter 13: Shipping and navigation** and **Chapter 14: Civil and military aviation, Volume 2** of the ES (Document Reference 6.2.13 and 6.2.14 respectively).

7.2.3 There are no emerging national planning policy considerations relevant to the assessment of the effects on OMU receptors. This includes consideration of the updated draft energy NPSs which were published in March 2023. Although in the 2023 draft NPSs, minor updates have been made to the 2011 NPS paragraphs listed above (such as replacing mentions of the IPC with the Secretary of State), they are not considered to require changes to the information provided in this assessment.

Local planning policy

7.2.4 **Table 7-3** lists the local planning policy relevant to the assessment of the potential effects on OMU receptors.

Table 7-3 Local planning policy relevant to OMU

Policy description	Relevance to assessment
South Marine Plan (SMP) Policies 2018 (Defra, 2018) The SMP contains 12 objectives derived through 53 policies. Some policies apply across the whole of the plan areas and others apply to defined areas. The policies listed below are relevant to Rampion 2 and fall under Objective 1: Co-existence.	
S-AGG-1 Proposals in areas where a licence for extraction of aggregates has been granted or formally applied for should not be authorised, unless it is demonstrated that the other development or activity is compatible with aggregate extraction.	The Rampion 2 export cable corridor and array area borders some marine aggregate sites. These have been considered within the preliminary assessment (**Sections 7.9, 7.10** and **7.11**) against impacts throughout the lifetime of the Proposed Development.
S-AGG-3 Proposals in areas where high potential aggregate resource occurs should demonstrate that they will, in order of preference: a) avoid b) minimise; c) mitigate significant adverse impacts on aggregate extraction. d) if it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.	
S-DD-1 Proposals within or adjacent to licensed dredging and disposal areas should demonstrate that they will, in order of preference; a) avoid b) minimise c) mitigate significant adverse impacts on licensed dredging and disposal areas d) if it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding	The proposed DCO Order Limits overlaps with three dredge and disposal sites. These are detailed within the baseline (**Section 7.6**) and have been considered throughout the preliminary assessment against impacts throughout the lifetime of the Proposed Development.
S-DEF-1 Proposals in or affecting Ministry of Defence Areas should only be authorised with agreement from the Ministry of Defence.	The proposed DCO Order Limits has a small shared border with a MoD Danger area (as outlined in **Section 7.9**).

7.2.5 There is no emerging local planning policy relevant to the assessment of the potential effects on OMU receptors.

Other relevant information and guidance

7.2.6 A summary of other relevant information and guidance that has been taken account of in the assessment undertaken for OMU is provided here.

- Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 654 Safety of Navigation Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021). This guidance is mainly for renewable energy installations and includes guidance on marine cable protection and burial within UK waters. Should water depths be reduced by more than 5% (due to cable protection) of Chart Datum then further consultation would be required.
- International Association of Marine Aids to Navigation (AtoN) and Lighthouse Authorities (IALA), Recommendation O-139 on the marking of man-made offshore structures, Edition 2 (IALA, 2021). These recommendations apply to all offshore structures and/or platforms and make specific reference to offshore wind farms and are required for safe navigation, protection of the environment and protection of the structures themselves.

7.3 Consultation and engagement

Overview

7.3.1 This section describes the stakeholder engagement undertaken for Rampion 2. This consists of early engagement, the outcome of, and response to, the Scoping Opinion in relation to the OMU assessment, the Evidence Plan Process (EPP), non-statutory consultation and Rampion 2's statutory consultation undertaken carried out as part of Section 42 consultation under the Planning Act 2008 (hereafter referred to as the 'Statutory Consultation'). An overview of engagement undertaken for Rampion 2 as a whole can be found in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference 6.2.5).

Early engagement

Introduction

7.3.2 Early engagement was undertaken with a number of prescribed and non-prescribed bodies and local authorities in relation to OMU. This engagement was undertaken to introduce the Proposed Development and the proposed approach to scoping the EIA.

7.3.3 There are a number of chapters which have had early engagement with stakeholders that are relevant to the OMU receptors. These are: **Chapter 10: Commercial fisheries**, **Chapter 13: Shipping and navigation** and **Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference 6.2.10, 6.2.13 and 6.2.17 respectively).

7.3.4 There were a number of sea users organisations that were invited to Project Liaison Groups (PLG), however not all responded. Those who responded were:

- Arun Youth Aqua Centre;

- Bognor Regis Sailing Club;
- Brighton Marina Group;
- Blue Marine Foundation;
- Littlehampton Harbour Board and Stakeholders Association;
- Littlehampton Harbour Jet Ski Club;
- Littlehampton Marina;
- Littlehampton Yacht Club;
- Mulberry Divers, Selsey,
- Newhaven Deep Sea Anglers;
- RNLI – Littlehampton; and
- Shoreham Port.

7.3.5 Early engagement with Stakeholders was undertaken in the form of conference calls and meetings in person.

Scoping Opinion

7.3.6 Rampion Extension Development Limited (RED) submitted a Scoping Report (RED, 2020) and request for a Scoping Opinion to the Secretary of State (administered by the Planning Inspectorate) on 2 July 2020. A Scoping Opinion was received on 11 August 2020. The Scoping Report sets out the proposed OMU assessment methodologies, outline of the baseline data collected to date and proposed, and the scope of the assessment. **Table 7-4** sets out the comments received in section 4 of the Planning Inspectorate Scoping Opinion 'Aspect based scoping tables – Offshore' / Section 5 of the PINS Scoping Opinion and how these have been addressed in this ES. A full list of the Planning Inspectorate Scoping Opinion comments and responses is provided in **Appendix 5.2: Responses to the Scoping Opinion, Volume 4** of the ES (Document Reference 6.4.5.2). Regard has also been given to other stakeholder comments that were received in relation to the Scoping Report.

Table 7-4 Planning Inspectorate Scoping Opinion responses – OMU Planning Inspectorate

ID number	Scoping Opinion comment	How this is addressed in this ES
4.2.1	The Scoping Report demonstrates no spatial overlap between the study area and existing oil and gas infrastructure. The Inspectorate is content for these receptors to be scoped out of the assessment.	This has been noted by RED and on this basis effects on oil and gas infrastructure have been scoped out from this assessment.

ID number	Scoping Opinion comment	How this is addressed in this ES
4.2.2	The Scoping Report demonstrates no spatial overlap between the study area and munitions disposal areas or MoD practice or exercise areas (PEXAs). The Inspectorate is content for these receptors to be scoped out of the assessment (with the exception of MoD Danger Area D037, see the following paragraph). The Inspectorate notes the comments of the MoD around the potential overlap between the Proposed Development and Danger Area boundary for D037 which could impact on Military training and the Navy's freedom to exercise within the Area. This matter should be considered as part of the ES where significant effects are likely to occur.	This has been included within the ES baseline (**Section 7.6**) and assessed in **Section 7.9** onwards. It is also important to note that the overlap with DCO Order limits and D037 has now been removed. The potential exists for a temporary safety zone to overlap with D037 during construction or major maintenance but as described in **Paragraph 7.9.56**, this will only affect a very small portion of D037 and is of temporary and intermittent duration. RED will ensure ongoing engagement and consultation with the MoD (as set out in **Table 7-5**) in order to establish and agree management measures to limit the potential for construction activities to impinge on any military exercises to avoid impacts to the use of the PEXA.
4.2.3	The Scoping Report demonstrates no spatial overlap between the study area and other offshore energy infrastructure. The Inspectorate is content for these receptors to be scoped out of the assessment.	This has been noted by RED and on this basis effects on other offshore energy infrastructure have been scoped out from this assessment.
4.2.4	The Scoping Report seeks to scope out recreational fishing and seaweed farming from the assessments of temporary increases in suspended sediments and deposition, and alteration in wave energy direction. The Scoping Report provides no information regarding the local seaweed farming	Local seaweed farming and recreational fishing information has been included within the ES baseline presented in **Section 7.6**, with

ID number	Scoping Opinion comment	How this is addressed in this ES
	industry, and no justification for scoping out effects on recreational fishing. The Inspectorate does not agree to scope this aspect out of the ES based on current information.	relevant receptors taken through to assessment (**Section 7.9** onwards).
4.2.5	No justification is given to scope out *"effects from the temporary increase in suspended sediments and deposition on recreational boating and sailing"*, however the Inspectorate considers that given their nature significant effects are unlikely to occur to these receptors and they can be scoped out of the assessment. The ES should set out any measures intended to control impacts of this sort through provisions in the relevant embedded measures through DCO requirements and other relevant commitments.	This has been noted by RED and on this basis effects from the temporary increase in suspended sediments and deposition on recreational boating have been scoped out from this assessment. The proposed methods for construction and installation of infrastructure are considered throughout the ES where relevant and appropriate embedded environmental measures are detailed to address significant effects, where relevant.
4.2.6	No justification is given to scope out *[increased subsea noise impacts on: Aggregate extraction, disposal sites, offshore wind, subsea cables and pipelines, recreational boating and sailing],* however the Inspectorate agrees that significant effects are unlikely to occur due to the nature of the receptors and agrees they can be scoped out of the assessment.	This has been noted by RED and on this basis the impact of increased subsea noise on aggregates, disposal sites, offshore wind, subsea cables and pipelines and recreational boating and sailing have been scoped out from this assessment.
4.2.7	No justification is given to scope out *[effects from alteration in wave energy direction and period on: Aggregate extraction, disposal sites, offshore wind, subsea cables and pipelines, recreational boating and sailing, (i.e. all receptors except diving and watersports])*. The Inspectorate considers that insufficient justification has been provided to scope	This has been noted by RED and on this basis the effects from the alteration in wave energy direction and period on aggregates, disposal sites, offshore

ID number	Scoping Opinion comment	How this is addressed in this ES
	out the effects on recreational boating and sailing. However, for receptors others than recreational boating and sailing, the Inspectorate agrees that significant effects are unlikely to occur due to the nature and sensitivity of the receptors and they can be scoped out of the assessment.	wind and subsea cables and pipelines have been scoped out from this assessment. Effects from alteration in wave energy direction and period on recreational boating and sailing diving and water sports are considered further in **Section 7.6**.
4.2.8	The Scoping Report makes no mention of the aquaculture industry as a potential receptor. This is not addressed in Chapter 5.6 for Commercial Fisheries either. The ES should assess the impacts from the Proposed Development to the aquaculture sector where significant effects are likely to occur.	Aquaculture has been included within this assessment's current and future baseline (**Section 7.6**), however there is currently no spatial overlap with the Zone Of Influence (ZOI) and any proposed aquaculture and therefore no further consideration for assessment has been presented in this ES (as explained in **Table 7-8**).

Non-statutory consultation

Overview

7.3.7 Non-statutory engagement captures all consultation and engagement outside of statutory consultation and has been ongoing with a number of prescribed and non-prescribed bodies and local authorities in relation to OMU. A summary of the non-statutory consultation undertaken since completion of the Scoping Report is outlined in this section.

7.3.8 Note that, with respect to marine aggregate dredging, there is cross over between the OMU chapter and **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13). Issues relating to navigational safety are also covered in **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13), with the OMU chapter presenting assessment of impacts relating to relevant receptors, for example aggregate dredging activities.

Non-statutory consultation Exercise – January / February 2021

7.3.9 RED carried out a Non-statutory consultation Exercise for a period of four weeks from 14 January 2021 to 11 February 2021. This Non-statutory consultation Exercise aimed to engage with a range of stakeholders including the prescribed and non-prescribed consultation bodies, local authorities, Parish Councils and general public with a view to introducing the Proposed Development and seeking early feedback on the emerging designs.

7.3.10 The key themes emerging from the Non-statutory consultation Exercise in January 2021 relating to OMU were:

- Concerns about the impacts to the local fishing industry;
- Concerns about the effects of construction to the fish population and subsequent impacts on the fishing industry; and
- Suggestions to consider how we can minimise impacts to the fishing industry and shipping lane.

7.3.11 Regarding the three themes listed above, effects on recreational fishing are described within this chapter whilst the effects on the commercial fishing industry are described in **Chapter 10: Commercial fisheries, Volume 2** of the ES (Document Reference 6.2.10) and effects on shipping in **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13).

Marine aggregate dredging companies

7.3.12 Engagement with marine aggregate dredging companies with licence areas in proximity to the Proposed Development, including Hanson Aggregates Marine Ltd (HAML), Tarmac Marine Ltd (Tarmac) and CEMEX UK Marine Ltd (CEMEX), was initiated early in the pre-application process, including discussions on data sharing at the pre-scoping stage. Engagement has since been continued through consultation on the Scoping Report (RED, 2020) and through Hazard Workshops, which included attendance and contributions from a range of shipping and navigation stakeholders, including the marine aggregate dredging companies.

7.3.13 The Hazard workshops were undertaken in February 2021 and September 2022. The principal aim of the second workshop was to communicate changes that had been made to the proposed DCO Order Limits in the period following submission of the Preliminary Environmental Information Report (PEIR), taking account of feedback received and also to inform an updated Navigation Risk Assessment (NRA). Key points raised during the Hazard Workshops relating to OMU are set out below.

Hanson Aggregates Marine Ltd

- Concerns were raised by HAML regarding the minimum distance (0.85km) between the offshore wind farm extension boundary and the HAML dredging area 435. HAML considered this to present a potential risk for the operation of its vessels and suggested that 1nm (1.852km) should be considered to be an acceptable distance for a contingency response in deploying an anchor for a drifting vessel. HAML also noted concerns over the proximity of the offshore

wind farm extension to their competitors' licences, should they ever be used by a third party.

- HAML also highlighted that they should be made aware of potential conflicts that may arise during the construction phase and they requested further information of the proposed activities and restrictions which may be imposed during the construction period.
- RED acknowledged that the separation distance between Area 435 and the proposed DCO Order Limits (0.85km), in addition to Licence area 396/1 (at 0.06km), is less than the requested 1nm buffer. RED confirmed that further consideration to establishing an agreed buffer through consultation with HAML and other aggregate dredging parties would continue in order to mitigate these safety concerns.

Tarmac Marine Ltd

- Tarmac raised concerns over the need for sufficient clearance between the southern limit of aggregate extraction area 396 and the nearest Wind Turbine Generator(s) (WTG), in case of a loss of propulsion during future dredging operations in the south of the licence area. Tarmac noted that they conducted a trial with one of their dredgers "City of Westminster" where engines were disengaged (as if there was a power failure) and the dredger drifted 900m before being brought up by the anchor. On the basis of this exercise, a clearance distance of at least 1,000m between their aggregates licence boundary and the WTG foundation is proposed by Tarmac (with consideration given to the tidal streams).
- Tarmac also raised that the Offshore Substation (OSS) would need to be sited away from licence area (396) rather than on the edge of the proposed DCO Order Limits (to the South East of area 396) as per the worst-case location presented in the Hazard Workshop. The stakeholder advised further consultation.
- RED acknowledged that the separation distance between Area 396 and the proposed DCO Order Limits (0.14km) is less than the requested 1km buffer. RED has a MOU in place with Tarmac and that consultation would continue to allow mitigation to be agreed prior to consent to address safety concerns.
- On 6 October 2022 RED received email confirmation from Tarmac that following consultation with the skipper of the "City of Westminster" they would be looking for a 0.5NM clearance from the nearest turbine when dredging across the tide. There will be a need to discuss the final layout of the turbine array where it is close to area 396, when this is further defined.

7.3.14 A project update meeting was held with HAML, Tarmac and CEMEX on the 25 May 2022. RED presented safety buffer zones where no wind turbine or substation structures would be placed, providing a separation distance of 1NM along the tidal flow direction and 0.5NM across tide from the aggregate licence areas, as had been requested by the aggregate dredging parties. In response to question raised by Tarmac, RED also noted that, where seabed conditions allowed, that subsea cables would be buried.

7.3.15 Tarmac stated that buffer zones appeared to ensure that aggregate extraction works could safely continue up to the edges of the licence areas, which is what had been requested. Tarmac stated that consultation with the vessel captains would be undertaken to check acceptability from a mariner's perspective, but considered the 1nm along tide seemed sufficient.

7.3.16 Tarmac confirmed that transit routes for dredging vessels have previously been discussed and appeared acceptable. Tarmac also asked for clarification on whether cables would be installed at the edge of the proposed DCO Order Limits, although noting that it was the presence of WTG/OSS structures that was the main concern. RED responded that it was possible, and would be subject to detailed design works.

AQUIND Limited

7.3.17 RED has engaged with AQUIND Limited to discuss the potential for interaction between the two proposed projects. Early discussions on the need for proximity agreements and, if necessary, crossing agreements where there is potential interaction or overlap have been undertaken. RED will continue to engage with AQUIND to ensure that the required agreements, protocols and, where necessary, cable crossing designs can be agreed between the parties. The AQUIND interconnector project is, at the time of writing, with the Secretary of State for re-determination, following the outcome of a Judicial Review process. Further detail about the results of the Non-Statutory Consultation Exercise can be found in the **Consultation Report** (Document Reference 5.1).

Statutory Consultation

7.3.18 Rampion 2's first statutory consultation exercise ran from 14 July to 16 September 2021, a period of nine weeks. The PEIR (RED, 2021) was published as part of Rampion 2's first statutory consultation exercise which provided preliminary information on shipping and navigation within Chapter 7: Other marine users (RED, 2021).

7.3.19 Following feedback to the Statutory Consultation exercise in 2021 it was identified that some coastal residents did not receive consultation leaflets as intended. Therefore, the first Statutory Consultation exercise was reopened between 7 February 2022 to 11 April 2022 for a further nine weeks. The original PEIR published as part of the first Statutory Consultation exercise in 2021 was unchanged and re-provided alongside the reopened Statutory Consultation exercise in early 2022.

7.3.20 The following statutory consultation exercises focussed on changes made to the onshore cable route, onshore substation, and National Grid interface point and did not consider offshore aspects of the Proposed Development.

7.3.21 The second Statutory Consultation exercise was undertaken from 18 October 2022 to 29 November 2022. This was a targeted consultation which focused on updates to the onshore cable route proposals which were being considered following feedback from consultation and further engineering and environmental works. As part of this second Statutory Consultation exercise, RED sought

feedback on the potential changes to the onshore cable route proposals to inform the onshore design taken forward to DCO application.

7.3.22 The third Statutory Consultation exercise was undertaken from 24 February 2023 to 27 March 2023. This was a targeted consultation which focused on a further single onshore cable route alternative being considered following feedback from consultation and further engineering and environmental works. As part of this third Statutory Consultation exercise, RED sought feedback on the potential changes to the onshore cable route proposals to inform the onshore design taken forward to DCO Application.

7.3.23 The fourth Statutory Consultation exercise was undertaken from 28 April 2023 to 30 May 2023. This was a targeted consultation which focused on the proposed extension works to the existing National Grid Bolney substation to facilitate the connection of the Rampion 2 onshore cable route into the national grid electricity infrastructure. As part of this fourth Statutory Consultation exercise, RED sought feedback on the proposed substation extension works to inform the onshore design taken forward to the DCO Application.

7.3.24 **Table 7-5** provides a summary of the key themes of the feedback received in relation to OMU and outlines how the feedback has been considered in this ES chapter. A list of comments received during the statutory consultation period, and the responses to comments, is provided in the **Consultation Report** (Document Reference 5.1).

Table 7-5 Statutory Consultation feedback

Stakeholder	Theme	How this is addressed in this ES
Marine Management Organisation	7.1.1 [ID 64] SENSITIVITY MATRICES: "*matrices for sensitivity are different to the shipping and navigation and commercial fisheries therefore when cross referencing impacts to marine users this could cause confusion*"	The matrices within this OMU assessment are consistent with **Chapter 10: Commercial Fisheries, Volume 2** of the ES of the ES (Document Reference 6.2.10) and other ES chapters and so remain unchanged. However, **Chapter 13: Shipping and navigation, Volume 2** of the ES of the ES (Document Reference 6.2.13) Shipping and Navigation maintains aspect-specific terminology so will differ to other ES chapters.
Natural England	7.6.42 [ID 1014]: AQUACULTURE "*potential for parties to come forward considering aquaculture (particularly seaweed farming) in the general area*."	Updates have been made from a review of the MMO public register of licences and TCE leases to take account of any recent aquaculture proposals, however the outcome of the assessment is unchanged.

Stakeholder	Theme	How this is addressed in this ES
Natural England	7.6.23 [ID 1015]: CABLES "*Have possible in combination effects [for the now completed IFA2 cable] during the operational phase been considered?*" 7.6.43 [ID 1016]: CABLES "*CrossChannel Fibre cable….should be kept under review. Based on its landfall at Brighton it seems possible it could interact with the array."*	IFA2 was included in CEA **Table 7-22** of the cumulative assessment but is now also added into **Table 7-23** in terms of sediment and follow-on assessment. CrossChannel Fibre became operational December 2021 and updates made. The outcome of the assessment is unchanged.
Natural England	Table 7-16 [ID 1017]: SEDIMENT (Table 7-19 in ES) For Offshore trenching for cables, Offshore ECC and Array, the local sediment deposition in PEIR (and MCZ within) may be "*much more of a potential issue than is described in some of the nature conservation-based chapters*" and relevant details "*should be included in, and inform, the relevant chapters and within the cumulative impacts assessments presented within them.*"	Predicted levels of sediment deposition are described in detail in **Chapter 6: Coastal Processes, Volume 2** of the ES of the ES (Document Reference 6.2.6). That chapter has been used to inform this assessment of OMU – see **Section 7.9**.
Natural England	7.12.11- 7.12.16 [ID 1019]: SEDIMENT "*With the AQUIND Interconnector cable and multiple aggregates dredging sites within, and in extremely close proximity to, the PEIR Boundary it is not seen as sufficient to dismiss the potential for cumulative impacts based on arguments around 'fast flows' and reports that are over 10 years old. The modelling referred to was conducted to examine cumulative impacts with the aggregates sites for Rampion 1, because it was required to understand that impact. Therefore, the same level of consideration should be applied to this project. Given that*	Predicted levels of suspended sediment and sediment deposition have been modelled and are described in detail in **Chapter 6: Coastal Processes, Volume 2** of the ES of the ES (Document Reference 6.2.6) and are also summarised in **Table 7-17**. That chapter has been used to inform an assessment of cumulative impacts on OMU (including with the AQUIND Interconnector and aggregate sites) – this is presented in **Section 7.12**.

Stakeholder	Theme	How this is addressed in this ES
	Rampion 2 is located in extremely close proximity to the aggregates sites, and the licenses have been updated, it follows that up-to-date modelling should be provided. It should be noted that the aggregates companies themselves are required to undertake regular monitoring as part of their license in relation to the sensitivity of ecological receptors in this area."	
Mulberry Marine Experiences Ltd	Table 7-16 [ID 8]: SEDIMENT "*It would be helpful if distances could be provided in nm and thus directly measurable on a chart*" Para 7.9.120 [ID 10]: SEDIMENT Disagreement between statements with "*SSC travelling approximately 5km whereas the Table quotes 16km / 8km."*	Para text amended, 8 / 16km is correct. Distances updated to nm as well in Table.
SWT & TWT	Para 7.6.30 [ID 10]: DIVING (BASELINE) *Clarify that "SeaSearch…point data…[has records]…dating back more than 20 years*"	Text has been amended, though data before 2014 is not used in assessment due to its age Seasearch data from 2014 to 2021 has been used.
Mulberry Marine Experiences Ltd	Para 7.6.30 [ID 1]: DIVING Figure 7.8 "*title is misleading*" given the data source. There are also many more "*dive sites within and immediately adjacent to the PEIR Leach Assessment Boundary*" as the figure is "*based on an incomplete dataset*". Therefore "*the impact on diving activities will have been significantly under-estimated*." Para 7.6.31 [ID 2]: DIVING (EVIDENCE / BASELINE) Concern that dive centres, charter vessels and dive clubs have not been determined, neither in situ or those across Southern England…[and] Greater London that will use	Figure title amended to show indicative dive locations. As a proxy for diving baseline, in the absence of any regional club data (which was requested but not received), the figure is now updated to show dive vessel charter routes; and wrecks and obstructions. The Figure has not been updated with 2022 SeaSearch data as this is not publicly available at the time of writing (although data up to end of 2021 has now been included). Dive clubs, centres and schools were included in text at PEIR but further detail added in ES. Additional information added for UK regional survey data on

Stakeholder	Theme	How this is addressed in this ES
	Littlehampton / Selsey / Newhaven and charter vessels	watersport participation, specific to diving.
Mulberry Marine Experiences Ltd	Para 7.9.14 [ID 4]: DIVING "*This is based on an incomplete dataset and the impact on diving activities will have been significantly under-estimated….The conclusion of the paragraph is considered correct – second sentence and first clause of third sentence should be removed*." Para 7.9.35 [ID 5]: DIVING "*Remove references to majority of sites outside PEIR since not proven / incomplete dataset*"	Evidence base has been updated as above and is considered to be appropriate for the purposes of EIA. Second sentence and third sentence/ first clause removed (which include references to majority of sites being outside of project boundary). The outcome of the assessment is unchanged.
Mulberry Marine Experiences Ltd	Para 7.9.110 [ID 9]: DIVING Emphasis made on impacts to "*dive sites between Selsey and the Export Corridor…[and]…Selsey out to the Owers*". Opposite Pagham, Outer(Far) Mulberry is "*extremely popular …accessible to all levels of diver …used to introduce people to UK Sea Diving …the most popular dive site on our Boat Schedule (typically 30% of our dives will be to this one site) and…varied and numerous marine life and soft/hard corals*." In this region "*visibility is usually best on the ebb tide*". Particular impacts not sufficient as the site "*is within the quoted maximum Neap range for the Plume [and…] therefore likely to have a significant adverse impact*" Activity will not be displaced as "*Dive sites [within Sussex] to the West of the Bill (namely Bracklesham Bay) do not have the same depth / variety / marine life / water visibility as those to the East…[and so] can expect a*	The predicted changes in Suspended Sediment Concentration (SSC) are presented in **Table 7-17** and effects on diving **Paragraphs 7.9.9 *et seq***. The coastal processes modelling has shown that at 5km from the construction works, the levels of suspended sediment will be within the range of 10m/g to 300mg/l and will reduce to immeasurable levels within two to three days of the works. This is therefore a change of negligible magnitude, which is short term and reversible.

Stakeholder	Theme	How this is addressed in this ES
	corresponding decline in business for this period. *Dive Sites [outside of Sussex] to the South West are [not as good as] historically lower visibility than those to the East due to the influence of the Solent and the NAB dredging ground*." Para 7.9.146 [ID 13]: DIVING (SEDIMENT) Impacts not sufficient as "*every dive site East of Selsey is potentially going to be impacted by the Plume [during construction]*", potentially "*worsened by the weather*" and *"with risk that once divers understand [this]… they will simply go elsewhere…until the work is completed*."	
Littlehampton Harbour Board	[ID 3]: DIVING (IMPACTS) Update impacts given "*Proper consideration [should be] given to the economic and potential safety impacts on the harbour and its users, whilst leveraging the opportunities to bring mutual benefits to both the project and local marine stakeholders*." [ID 4]: DIVING (EVIDENCE) "*I do not believe these have yet been fully and fairly assessed due to vessel traffic assessments occurring during the COVID-19 pandemic and an over reliance on AIS data (which only a small minority of the port's users are required to have)*."	**Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13) considers the safety risks to vessel operators, and any impediment to transit to regional harbours. Diver charter vessels now included, limited to those with AIS, as well as consideration of consultation responses received. Socioeconomics and tourism chapter considers fully the impact to local businesses. Including harbours and charter vessels. The assessment has been further supported since the publication of PEIR with additional summer vessel surveys to ensure any effect of the COVID-19 pandemic has been addressed. Winter vessel traffic surveys are also planned for Nov 2022. Evidence therefore represents the best available data.
Mulberry Marine	Table 7-12 C-99 [ID 3]: DIVING (NOISE)	C-99 addresses divers within immediate vicinity <500m from piling. C-101 addresses divers

Stakeholder	Theme	How this is addressed in this ES
Experiences Ltd	(Now Table 7-14) Missing assessment for "*impact that the increased underwater noise from Piling…divers won't want to be in the water within a considerable distance of the PEIR*."	across larger distances from piling, considering that impact is temporary, short lived and reversible. In the absence of mitigation the impact magnitude may be greater than low (albeit there is no UK evidence that any OWF has displaced recreation diving >500m), but as the project has committed to appropriate mitigation the Applicant considers the conclusion robust and has not changed it. It is very rare for OWFs to impact on diving to date in the UK, though this was the case for Rampion 1, but only within 500m of piling (as addressed here for Rampion 2 by C-101). The Rampion 1 communication plan was considered to be effective in its implementation and as such should be given a high degree of confidence in managing likely significant effects. Furthermore, Rampion 2 mitigation for impacts from underwater noise will be implemented, as a minimum including the use of a low noise hammer technology, which will reduce the extents of injurious or startle response extents for human divers as well as for other sensitive receptors such as black seabream and seahorse. The project has therefore proposed appropriate mitigation measures which may also include the use of bubble curtains, depending on the time of year, as defined in the **In principle sensitive features mitigation plan** (Document Reference 7.17).
Mulberry Marine Experiences Ltd	Para 7.9.129 [ID]: NOISE Clarification requested "*It is noted that Piling operations will take place over approximately 48 months*" vs. "*during a Sea Users*	Text has been updated; a duration of approximately 12 months for piling is correct. Noise level contour mapping is not considered a requirement for

Stakeholder	Theme	How this is addressed in this ES
	group meeting it was stated that Piling would take place in a six month period." Para 7.9.138 [ID 11]: NOISE Para 7.9.144 [ID 12]: NOISE There is a need for "*expected noise level …at specific distances*" to map out impacts Note that "*During Rampion 1, piling could be heard on the Outer Mulberry*" (dull thump, 17 miles); and "*Waldrons and near East Borough Head*" (more noticeable, 11 miles); and "*Figure 8.17 … confirms our view that when Piling is in the Western zone of the PEIR, that no diving will be feasible from Selsey Bill*". Anticipated impacts include "*business…[including] accommodation, food providers etc*" and impact should be "*Medium*". Mitigation measures will minimise risk to divers "adjacent to the Construction area" but not "*Selsey Dive Sites within just 5-6nm of the Construction Area, divers will simply stop diving this area until the work is complete*"	diving impacts, as is consistent with other OWF EIAs, however contours shown for fish and shellfish in **Chapter 8: Fish and shellfish ecology, Volume 2** of the ES (Document Reference 6.2.8) provide a precautionary indication given their greater sensitivity to noise. Also see response above in regards to exclusion zones, the appointment of a Diving Liaison Officer and the development of a diver communication plan.
Natural England	7.9.149 [ID 1018]: NOISE "*More than only a relatively small portion of the habitats important for fish in the fish and shellfish study area are affected by noise impacts, as shown by contours*."	The noise impact area has been quantified more precisely based on model outputs and are presented in **Appendix 11.3, Volume 4** (Document Reference 6.4.11.3). Subsequent effects on fish and shellfish ecology are described in **Chapter 8: Fish and shellfish ecology, Volume 2** of the ES (Document Reference 6.2.8).
Fishing Consultee	[ID 24]: DISPLACEMENT More consideration of displacement of other sea users is required as the "*current displacement effect, coupled with that from Rampion 1 site, the*	Other marine users, mainly divers and recreational boating beyond

Stakeholder	Theme	How this is addressed in this ES
	MCZ, MPA, aggregate extraction sites, shipping lanes and IFCA managed areas, leaves very little space for other sea users"	the inshore[1], are not currently displaced from Rampion 1 (apart from during maintenance), aggregates sites (apart from active dredging) or MPAs (unless damaging activities). Existing shipping lanes and IFCA managed areas are not considered in the cumulative effects assessment as they are existing plans or projects and are therefore included in the baseline.

7.4 Scope of the assessment

Overview

7.4.1 This section sets out the scope of the ES assessment for OMU. This scope has been developed as the Rampion 2 design has evolved and responds to feedback received to-date as set out in **Section 7.3**.

Temporal scope

7.4.2 The temporal scope of the assessment of OMU is the entire lifetime of Rampion 2, which therefore covers the construction, operation and maintenance, and decommissioning phases.

Spatial scope and study area

7.4.3 The spatial scope of the OMU assessment is defined as the immediate area of the proposed DCO Order Limits, together with the relevant impact-specific Zones of Influence (ZOIs). For example, for coastal processes the largest distance at which increased sediment deposition is likely to occur, which is defined in **Chapter 6: Coastal processes, Volume 2** of the ES (Document Reference 6.2.6), is 16km around the array boundary and offshore cable corridor. That has formed the basis of the study area for that topic in this OMU chapter.

7.4.4 For the purpose of the ES assessment, a wider study area across the eastern English Channel has also been assumed, to assess broader area effects on receptors such as sailing and cruising routes and dive sites. The dynamic study area is presented in **Figure 7.1, Volume 3** of the ES (Document Reference 6.3.7) and considers marine, coastal and estuarine waters. The study area varies in scale depending on the particular receptor. For example, as the position of existing

[1] Within the context of the OMU chapter, the inshore zone generally refers to within 250m of the coast.

offshore cables and pipelines are well known, the infrastructure and other users study area can be reduced to those exact locations. For each receptor described in this chapter, the spatial variability has been considered and an appropriate baseline description of that receptor's study area is provided.

7.4.5 The exact export cable route is yet to be determined. However, the proposed DCO Order Limits includes an export cable corridor within which the export cables will be routed to link the offshore array with the onshore cables at the landfall location at Climping.

Potential receptors

7.4.6 The spatial and temporal scope of the assessment enables the identification of receptors which may experience a change as a result of Rampion 2. The receptors identified that may experience likely significant effects for OMU are outlined in **Table 7-6**.

Table 7-6 Receptors requiring assessment for OMU

Receptor group	Receptors included within group
Marine aggregates	Marine aggregate licensed areas.
Disposal sites	Dredging disposal areas, including disposal sites for Rampion 1 and AQUIND.
Oil and gas	Exploration and production of hydrocarbon licensed areas, oil and gas licensed blocks and subsurface anchors.
Offshore Wind	Existing wind farm array areas and cable routes.
Other offshore energy	Wave energy, tidal streams and Carbon Capture and Storage (CCS).
Military activity and munitions	Military munition disposal areas and practice areas.
Subsea cables and pipelines	Cables and pipelines.
Recreational boating and sailing	Dinghy racing, yacht racing, motorboating.
Diving and water sports (including surfing)	Recreational diving, surfing, bathing and other water sports.
Recreational fishing	Recreational fishing including sea angling, shore angling and spearfishing.
Aquaculture	Farming of fish, crustaceans, mollusc and aquatic plants, including seaweed

Potential effects

7.4.7 Potential effects on OMU receptors that have been scoped in for assessment are summarised in **Table 7-7**.

Table 7-7 Potential effects on OMU receptors scoped in for further assessment

Receptor	Activity or impact	Potential effect
Construction		
Aggregates, disposal sites, offshore wind, subsea cables and pipelines, recreational boating and sailing, diving and water sports, recreational fishing and aquaculture	Increased vessel traffic	Increased vessel movements associated with the construction and installation of WTGs, OSS platforms and export cables.
Aggregates, disposal sites, offshore wind, subsea cables and pipelines, recreational boating and sailing, diving and water sport, recreational fishing and aquaculture	Activity or access displacement	Displacement of activities or access as a result of safety zones (500m) associated with construction activities, which could interfere with OMUs.
Aggregates, disposal sites, diving and water sports, recreational fishing and aquaculture	Temporary increases in suspended sediment and subsequent deposition	Temporary increases in suspended sediment associated with seabed preparation, installation of cables and drilling, which could cause changes to seabed composition and bathymetry for aggregates/ disposal sites or result in reduced water clarity for recreational users.
Diving and water sports and recreational fishing	Temporary increases in subsea noise	Temporary increases in subsea noise associated with the installation of WTG foundations by percussive piling may directly impact recreational users and have indirect effects on recreational anglers resulting from potential effects on fish.
Operation and maintenance		

Receptor	Activity or impact	Potential effect
Aggregates, disposal sites, offshore wind, subsea cables and pipelines, recreational boating and sailing, diving and water sports, recreational fishing and aquaculture	Increased vessel traffic	Increased vessel movements associated with operation and maintenance activities.
Aggregates, disposal sites, offshore wind, subsea cables and pipelines, recreational boating and sailing, diving and water sports, recreational fishing and aquaculture	Physical presence of infrastructure	Physical presence of infrastructure could interfere with OMU.
Diving and water sports (including surfers)	Alterations in wave energy direction and period	Alterations in wave energy direction and periods from the presence of infrastructure could affect recreational users (for example surfers and kite surfers).
Decommissioning		
Aggregates, disposal sites, offshore wind, subsea cables and pipelines, recreational boating and sailing, diving and water sports, recreational fishing and aquaculture	Increased vessel traffic	Increased vessel movements associated with the decommissioning of WTGs, platforms and export cables.
Aggregates, disposal sites, offshore wind, subsea cables and pipelines, recreational boating and sailing, diving and water sports, recreational fishing and aquaculture	Activity or access displacement	Displacement of activities or access as a result of safety zones (500m) associated with decommissioning, which could interfere with OMUs.
Aggregates, disposal sites, diving and water sports, recreational fishing and aquaculture	Temporary increases in suspended sediment concentration (SSC) and deposition	Temporary increases in suspended sediment associated with decommissioning of cables, which could cause changes to seabed composition and bathymetry for aggregates/ disposal sites or result in reduced water clarity for recreational users.

Activities or impacts scoped out of assessment

7.4.8 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from other projects across the wider industry. The conclusions follow (in a site-based context) existing best practice. Each scoped out activity or impact is considered in turn in **Table 7-8**.

Table 7-8 Activities or impacts scoped out of assessment

Activity or impact	Rationale for scoping out
All impacts (for the lifetime of the project) on oil and gas infrastructure receptors	There is no spatial overlap of the proposed DCO Order Limits or ZOI with active oil and gas infrastructure (as demonstrated in **Section 7.6** and agreed with the Planning Inspectorate in the Scoping Opinion (Planning Inspectorate, 2020)). This is presented in **Table 7-4**
All impacts (for the lifetime of the project) on other offshore energy receptors (excluding offshore wind)	There is no spatial overlap of the proposed DCO Order Limits or ZOI between other offshore energy infrastructures (except offshore wind, which is considered separately) (as demonstrated in **Section 7.6**) and therefore no pathway for effect (as agreed with Planning Inspectorate in the Scoping Opinion) (Planning Inspectorate, 2020) presented in **Table 7-4**.
All impacts (for the lifetime of the project) on aquaculture	There is no spatial overlap of the proposed DCO Order Limits of ZOI between current or proposed aquaculture (as demonstrated in **Section 7.6**) and therefore there is no pathway for effect.

7.5 Methodology for baseline data gathering

Overview

7.5.1 Baseline data collection has been undertaken to obtain information over the study areas described in **Section 7.4: Scope of the assessment**. The current baseline conditions presented in **Section 7.6: Baseline conditions** sets out data currently available information from the study area(s).

Desk study

7.5.2 The data sources that have been collected and used to inform this OMU assessment are summarised in **Table 7-9**.

Table 7-9 Data sources used to inform the OMU ES assessment

Source	Date	Summary	Coverage of study area
The Crown Estate offshore wind leasing sites Rounds 1 – 4	2020	Offshore renewable bidding areas	Full coverage of the study area
The Crown Estate, The Oil and Gas Authority, EMODnet and Department for Business, Energy & Industrial Strategy (BEIS).	2019	Oil and gas data showing all offshore oil and gas activity (surface and subsurface).	Full coverage of the study area.
The Crown Estate, Aggregate Licence Area Charts	2020	Active marine aggregate extraction areas.	Full coverage of the study area.
British Marine Aggregate Production Association (BMAPA) annual reports	2010 – 2019	Active and inactive marine Aggregate extraction areas for the South coast area.	Full coverage of the study area.
The Crown Estate and the UKs Storage Appraisal Project strategic study of the potential for UK carbon dioxide (CO_2) storage	2019	CCS / natural gas storage	Full coverage of the study area.
Centre for Environment, Fisheries and Aquaculture Science (Cefas) GIS shapefile of Disposal Sites	2019	Disposal sites also includes munitions and disposal areas.	Full coverage of the study area.
Kingfisher Information Service – Offshore Renewables and Cable	2019	Offshore cables (active and disused), interconnectors and pipelines.	Full coverage of the study area.

Source	Date	Summary	Coverage of study area
Awareness (KIS-ORCA) charts			
Ocean Wise marine themes	2021	MoD Practice and Exercise Areas (PEXAs) charts.	Full coverage of the study area.
Pale Blue Dot and Axis Well Technology	2016	Potential areas of CSS	Full coverage of the study area.
SeaSearch	2021	Recreational diving records for England and organised dives.	Full coverage of the study area.
Royal Yachting Association (RYA)	2019	RYA UK Coastal Atlas of Recreation Boating v2.1 data including general boating. areas and locations of clubs, training centres and marinas.	Full coverage of the study area.
AQUIND Limited	2020	Shapefile of the proposed AQUIND cable corridor.	Full coverage of the study area.
Arkenford / British Maritime Federation	2013	Regional participation levels in individual marine recreation activities	Full coverage of the study area.
ScubaEarth	2022	Diving locations	Full coverage of the study area.
Anatec	2021	Diver charter vessel routes	Within 10nm of the proposed DCO Order Limits.

Data limitations

7.5.3 With the exception of the recognition that research on the effects of underwater noise on humans is an ongoing scientific study area, there are no data limitations relating to OMU that affect the robustness of the assessment of this ES.

7.6 Baseline conditions

Current baseline

Marine aggregates

7.6.1 The marine aggregate industry is licensed commercially by The Crown Estate (TCE); however, production agreements are only issued once the operator has obtained a Marine Licence under the Marine and Coastal Access Act (MCAA) (2009). A licence allows extraction to take place for a set amount of time (usually<15 years) and is accompanied by operating conditions such as maximum extraction volumes, as well as environmental measures and monitoring requirements.

7.6.2 There are six active marine aggregate-extraction sites located within the study area and are listed in **Table 7-10** below. As shown in **Figure 7.2, Volume 3** of the ES (Document Reference 6.3.7) the closest licence area to the Proposed Development is the Inner Owers aggregate site (Licence area 396/1), from which flint gravel deposits are extracted. This licence area borders the Rampion 2 export cable corridor and at its closest is 0.06km away. RED will continue engagement with the aggregate companies which may include, but is not limited to, data sharing.

It should be noted that there are a further six aggregate sites which are no longer active. All six sites fell within the proposed DCO Order Limits when using the data from BMAPA but had their licences surrendered in, or prior to, 2014. They have been included here for clarity (BMAPA, 2019).

Table 7-10 Marine aggregate sites located within the vicinity of the study area

Licence Area	Operator	Area Name	Status	Distance from proposed DCO Order Limits (km)
Active sites				
435/1	HAML	Inner Owers	Production area	0.85
435/2	HAML	Inner Owers	Production area	1.50
453	CEMEX UK Marine Ltd	Owers Extension	Production area	0.45
488	Tarmac	Inner Owers North	Production area	0.55
396/1	Tarmac	Inner Owers	Production area	0.06
396/2	Tarmac	Inner Owers	Production area	1.90

Licence Area	Operator	Area Name	Status	Distance from proposed DCO Order Limits (km)
Inactive Sites				
122/1A – G	Tarmac	Owers bank	Licence surrendered: 2014	N/A
453/1	CEMEX UK Marine Ltd	Inner Owers	Licence surrendered: 2014	N/A
123A – G	CEMEX UK Marine Ltd	Owers Bank	Licence surrendered: 2014	N/A
124/1A – G	HAML	Unknown	Licence surrendered: 2012	N/A
122/2	Tarmac	Unknown	Licence surrendered: 2012	N/A
122/3	Tarmac	Unknown	Licence surrendered: 2012	N/A

7.6.3 There are also marine aggregate licence areas outside of the study area located close to the Isle of Wight, in the central English Channel and further afield in the Outer Thames / east coast region. Whilst there can be no direct effects on these areas from any phase of the Proposed Development due to separation distance, consideration has also been given to these as cargoes from the licence areas are regularly landed at Shoreham and Newhaven. The preliminary assessment of likely significant effects to marine aggregate dredging vessels using such routes is presented in **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13).

Disposal sites

7.6.4 Since the end of 1998, most forms of disposal at sea have been prohibited. The main exceptions are the disposal of dredged material originating from ports and harbours for the purposes of maintaining navigable shipping channels and the

disposal of material originating from the installation of offshore[2] infrastructure. This could include material from sandwave clearance, seabed preparation and drill arisings.

7.6.5 There are seven disposal sites within the study area, as presented within **Figure 7.3, Volume 3** (Document Reference: 6.3.7) and **Table 7-11**. Of the seven sites, two open sites and one closed site are directly within the study area, these are:

7.6.6 (1) Littlehampton (closed), which is located within the export cable corridor, (2) the existing Rampion 1 project disposal site, which is located in the Rampion 2 proposed DCO Order Limits and (3) the AQUIND Cable Site A, which would run through the south west of the array area.

7.6.7 It should be noted that there is a discrepancy between the Cefas data set for the marine disposal sites which has been raised with the MMO and Cefas. This discrepancy is that the Rampion 1 disposal site (as shown in **Figure 7.3, Volume 3** of the ES (Document Reference 6.3.7)) needs amending, as the disposal site should cover the entire Rampion 1 Order Limits.

Table 7-11 Marine disposal sites located within the vicinity of the study area

Code	Disposal Site	Category of waste	Distance from proposed DCO Order Limits (km)
Open			
WI011	Newhaven	Burial at sea	11.6
WI117	Rampion 1	Disposal for the existing Rampion 1 project	0
WI031	Shoreham	Maintenance dredging	12.4
WI020	Brighton/ Rottingdean	Dredged material from Brig on Marina	13.4
WI060	Nab Tower	Capital and maintenance dredge material	20.2
WI048	AQUIND Cable Site A	Unknown*	0
WI049	AQUIND Cable Site B	Unknown*	16.7
Closed			
WI012	Newhaven	Dredged material from Newhaven harbour and Ouse Estuary	N/A

[2] Within the context of this OMU assessment, offshore is defined as beyond 250m from the coast.

Code	Disposal Site	Category of waste	Distance from proposed DCO Order Limits (km)
WI040	Littlehampton	Unknown*	N/A
WI050	Isle of Wight Industry	Unknown*	N/A
*** The category of waste (Unknown) is categorised as unidentified according to Cefas online database.**			

Oil and gas

7.6.8 The Petroleum Act 1998 gives all rights to the UK's petroleum resources in the Crown and provides the Oil and Gas Authority (OGA) with the power to grant licences that cover exclusive rights to 'search and bore for and get' petroleum.

7.6.9 The English Channel is not currently a focus area for the exploration and production of hydrocarbons and there are no licensed developments in or within the vicinity of the proposed DCO Order Limits. There are currently no blocks licensed or pipelines for oil and gas exploration within the study area.

7.6.10 **Figure 7.4, Volume 3** of the ES (Document Reference 6.3.7) shows that there is a subsurface oil and gas structure within the existing Rampion 1 boundary, which is located approximately 5km from the proposed DCO Order Limits. It should be noted this is a discrepancy within the Cefas dataset which has been raised with the MMO and Cefas. It is a misrepresentation, and is not a subsurface oil and gas structure, but is an anchor.

7.6.11 There are two oil and gas wells over 9km to the south and west of the proposed DCO Order Limits (as shown in **Figure 7.4, Volume 3** of the ES (Document Reference 6.3.7)).

Offshore wind

7.6.12 The UK has the largest operating offshore wind capacity in the world and has a strong market for new offshore wind developments within the UK waters. The Government has made a significant commitment, passing legislation which commits the UK to a 'net-zero' greenhouse gas emissions target by 2050 – a transition in which offshore wind will continue to have a crucial role to play. Included in this a target for offshore wind to reach 40 Gigawatt (GW) by 2030. The British Energy Security Strategy (BEIS, 2022) added to this target by setting an ambition of up to 50GW of offshore wind by 2030. TCE recently closed the Round 4 leasing process which has created the opportunity for almost 8GW of new projects in the waters surrounding the UK.

7.6.13 Although the Rampion 2 study was within Bidding Area 3 (South East) of the Round 4 Leasing Process, the offshore wind leasing round tender process has now concluded, and no Round 4 projects are being brought forward in this area (see **Figure 7.4, Volume 3** of the ES (Document Reference 6.3.7)). Subject to a Plan-Level HRA, six projects are being taken forward from the leasing process:

three projects in the North Wales and Irish Sea Bidding Area, two in the Dogger Bank Bidding Area and one in the South East Bidding Area (The Crown Estate, 2021). As a result, and with the exception of the existing Rampion project (Rampion 1), there will be no overlap within the study area with any other offshore wind farm developments and offshore wind projects are therefore not considered further in this ES.

7.6.14 **Figure 7.4, Volume 3** of the ES (Document Reference 6.3.7) shows that Rampion 1 sits within the northern part of the Rampion 2 study area with the export cable running north to join the coastline at Worthing and is currently the only operational wind farm along the south coast of England. **Chapter 3: Alternatives, Volume 2** of the ES (Document Reference 6.2.3) explains how the different offshore wind farm agreements and extension sites interrelate.

Other offshore energy

7.6.15 The UK government has estimated that wave and tidal stream energy has the potential to deliver around 20% of the UK's current electricity needs, equating to an installed capacity of 30 – 50GW (Renewable UK, 2020). However, there are currently no plans for wave or tidal energy projects within the study area.

7.6.16 CCS is likely to have a major role in reducing UK carbon dioxide (CO_2) emissions in the future, utilising, for example, depleted subsea oil and gas reservoirs to provide long term storage of CO_2. However, there are currently no plans for CCS or any associated pipelines within the study area; neither are there any areas identified for potential CSS in the English Channel (Pale Blue Dot Energy 2016).

Military activity and munitions

7.6.17 A summary of relevant MoD activities and areas is presented within this section, with further information provided in **Chapter 13: Shipping and navigation** and **Chapter 14: Civil and military aviation, Volume 2** of the ES (Document Reference 6.2.13 and 6.2.14 respectively).

7.6.18 During data collection for military activity, no apparent munitions disposal areas were identified in or within the vicinity to the study area (the closest is off the south of the Isle of Wight, approximately 35km from the Proposed Development).

7.6.19 An MoD Firing Practice and Navy exercise area is positioned directly adjacent to the South West of the array study area, with the two boundaries meeting at one single point (but with no actual overlap of the array). This has been identified as MoD PEXA D037 (see **Figure 7.5, Volume 3** of the ES (Document Reference 6.3.7)).

7.6.20 This area is operated under a clear range procedure, that is to say, no firing will take place unless the area is considered to be clear of all shipping. Impacts from Rampion 2 on the vessel traffic movements on the MoD are assessed in **Chapter 13: Shipping and navigation**, while impacts on aviation are assessed in **Chapter 14: Civil and military aviation, Volume 2** of the ES (Document Reference 6.2.13 and 6.2.14 respectively)).

Subsea cables and pipelines

7.6.21 'Subsea cables' is a broad term for a range of cables that are beneath the sea surface, these cables are typically (but not exclusively) subsea telecoms, power cables and inter-connector cables. The baseline data collection exercise identified a number of subsea cables within the study area, but it should be noted that currently none overlap with the proposed DCO Order Limits for Rampion 2.

7.6.22 The closest is the England-France High-Voltage Direct Current (HVDC) interconnector, 'Interconnexion France-Angleterre' (IFA2), which runs in proximity to (approximately 300m from) the western boundary of the proposed DCO Order Limits (see **Figure 7.6, Volume 3** of the ES (Document Reference 6.3.7)). IFA2 makes UK landfall at Lee-on-Solent from Caen (France). Commissioning of the cable was concluded in January 2021 and it is now operational (Interconnexion France-Angleterre, 2021).

7.6.23 The second closest is the CrossChannel Fibre cable, connecting Slough, UK to Paris, France. This cable leaves the UK coast from Brighton, UK and lands in France at Veules-les-Roses (**Figure 7.6, Volume 3** of the ES (Document Reference 6.3.7)) and became Ready For Service (RFS) in December 2021(Crosslake Fibre, 2021). The cable route passes 4.9km to the east of the northeastern part of the Rampion 2 proposed DCO Order Limits at its closest.

7.6.24 The remaining existing cables are a greater distance from the proposed DCO Order Limits, the next closest being the Atlantic Crossing 1, which runs through the mid English Channel, approximately 12km south of Rampion 2, although the disused 'UK France 3' cable is located approximately 1.6km to the east of the proposed DCO Order Limits.

7.6.25 As noted above in the offshore wind baseline (see **paragraph 7.6.12 *et seq.***) the Rampion 1 export cable runs 15km from the north of the study area to the coastline. Ownership of the export cable has now been transferred from Rampion Offshore Wind Limited to TC Rampion OFTO Limited an Offshore Transmission Operator (OFTO).

Recreational boating and sailing

7.6.26 This section provides information on small (up to 2.4m in length) inshore recreational craft. Recreational sailing and cruising in larger vessels (2.4 – 24m) are addressed within **Section 13.9** to **13.11** of **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13).

7.6.27 There is a relatively high number of inshore sailing clubs and organisations in the vicinity of the study area, operating primarily from Littlehampton, Worthing, Lancing, Shoreham, Hove and Brighton. There are also numerous sailing schools and other training establishments along this stretch of coastline (see **Figure 7.7, Volume 3** of the ES (Document Reference 6.3.7)). The Sussex coast is popular for sailing regattas, with the Sussex Regatta, an event organised by the Sussex Combined Clubs committee, consisting of representatives from yacht clubs around Sussex. Races happen frequently in the area, which include races around the Rampion offshore wind farm.

7.6.28 Across the inshore section of the export cable proposed DCO Order Limits there is overlap with a general boating area (**Figure 7.7, Volume 3** of the ES (Document Reference 6.3.7)), with an area marked as being of high level usage across the central section of the cable corridor. Based on the RYA data, this appears to represent a vessel transit route passing through to Brighton and Eastbourne to/from the Solent. There is high recreational boating and sailing use evident around the Isle of Wight, where there is also a relatively large number of sailing schools and an extensive general boating area.

7.6.29 The general coastal and inshore area within the region is popular for dinghy sailing and racing, activities that are undertaken from the various sailing clubs above, as well as independently run from beaches and harbours within the area. During the summer months in particular, jet skiing, water skiing and other small recreational motorboats are launched from the beaches along the coast. The majority of these recreational activities occur inshore, typically within 250m of the coast and are therefore well inshore of the Proposed Development area. However, it is noted that some users they will go further out including with the area of the proposed Rampion 2 DCO order limits Furthermore there will be potential for direct overlap with usage in the vicinity and inshore around Climping, where the export cables will make landfall.

Diving and water sports (including surfing)

7.6.30 The inshore coastal area is used for a variety of activities, from recreational diving to a range of other water sports and bathing at beaches, for the most part, due to its proximity to a large population and good access.

7.6.31 The baseline description has been informed by dive club and shop locations, dive charter vessels, SeaSearch diving records, as well as wreck locations that may attract divers where conditions and logistics allow. Further UK wide regional aggregate data has been used from the UK wide British Maritime Foundation Watersports Participation Survey (Arkenford 2013).

7.6.32 As determined by the UK wide British Maritime Foundation Watersports Participation Survey (Arkenford 2013), the southeast and London regions each represent 9% of all UK diving participants. This is comparable to a range of 5% (Yorkshire) to 15% (Northern Ireland), with 9% for each of the southeast and London being close to the average for all regions (8%).

7.6.33 Owing to the region's popularity with diving, there are a number of important dive centres and schools within the vicinity of the study area including British Sub Aqua clubs including at Folkestone, Eastbourne, Brighton, Shoreham-by-Sea, Chichester, Selsey, Havant, Portsea, Southsea, Portsmouth, Gosport and various locations in the wider Solent. Dive shops also are also present in Peacehaven, Brighton, Hove, Lancing, Selsey, Portsmouth and a few in the wider Solent.

7.6.34 An indication of the most significant dive charter vessel routes is shown in **Figure 7.8, Volume 3** of the ES (Document Reference 6.3.7). This shows routes within 10nm of the proposed DCO Order Limits, derived from 28 days of survey between August 2020 and November 2021 (Anatec, 2021), for those vessels that operate Automatic Identification System (AIS), a legal requirement for vessels 15m or more. Activity is shown to be predominantly from the Brighton area between

Newhaven and Littlehampton, with three of the targeted dive sites / clusters being located within the proposed DCO Order Limits and the majority to the north and northeast towards the coast. For example, the Sussex diving club, based in Brighton Marina, operates dives on two main features: wrecks and reefs (Sussex Diving Club, 2020), attracted by the large number of varied wrecks to choose from within the Sussex area, thus making Sussex extremely popular for all grades of diver (Channel Diving, 2020). Meanwhile the dive club based in Brighton Marina, offers diving trips to wrecks, but also offer boat trips to the Rampion 1 site (Channel Diving, 2020).

7.6.35 Whilst there are fewer routes to the west, this is expected to be due to the use of smaller vessels not using AIS rather than lack of activity, owing to the popularity of dive sites around Selsey Bill.

7.6.36 The dive charter vessel routes often target the dive sites used by SeaSearch users, also presented on **Figure 7.8, Volume 3** of the ES (Document Reference 6.3.7) for the period 2014 and 2021 (SeaSearch, 2022). Whilst SeaSearch records exist prior to 2014, only the most recent seven years of available data has been used to reflect current patterns of use. SeaSearch dives are carried out on a voluntary basis and although they are technically scientific in nature, they often form participants' recreational time. These act as a proxy to recreation diving, as whilst dive club data was requested from several clubs, this was either not available as a single dataset from each club and required significant time by the club to collect data from its members, or the enquiry was not responded to.

7.6.37 **Figure 7.8, Volume 3** of the ES (Document Reference 6.3.7) further shows recorded ScubaEarth diving locations and other possible locations where diving may take place on the wrecks and obstructions. Some of the wrecks and obstructions closer to shore are confirmed as dive sites through the charter vessel routes, SeaSearch and ScubaEarth locations shown.

7.6.38 Overall, the datasets show that diving is a popular activity all year round off the Sussex coast, with peak levels of SeaSearch activity taking place through the summer months. As can be seen in **Figure 7.8, Volume 3** of the ES (Document Reference 6.3.7) the areas either side of the export cable are popular diving areas, however within the proposed DCO Order Limits of Rampion 2 itself there is little diving activity.

7.6.39 Surfing is highly popular along the English south coast, despite the wave conditions along this section of coast being described as relatively low quality and low consistency (Surfers Against Sewage (SAS), 2010). However, to those that participate in wave-related sports (surfing, stand up paddle boating, kite surfing, wind surfing and kayaking) these inshore areas are therefore of high value. Surfing along the Sussex coast is most popular during the summer months (although there is surf all year round), with the peak surf conditions associated with the late summer and autumn months.

7.6.40 Bathing is a popular recreational activity along the Sussex coast within the study area due to the number of beaches available. The main use of bathing waters is predominantly in spring and summer during March to November with peak activity during the school summer holidays. Specific bathing water areas and an assessment of the impacts from the Proposed Development on these bathing

water areas is included in **Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference 6.2.17).

7.6.41 Spearfishing is also popular within the study area and is well established with Sussex having its own spearfishing club – Sussex Spearfishing Club (British Spearfishing Association (BSA), 2020).

7.6.42 There are also a range of clubs offering canoe or kayak hire as well as guided tours in the study area. Canoe clubs operating along the Sussex coast include Hastings, Cuckmere Valley, Hailsham, Chichester, Arun and Adur canoe clubs.

7.6.43 A baseline characterisation of the economy of inshore and offshore recreation (including bathing, surfing, recreational sailing and scuba diving) and a detailed assessment of the potential effects from Rampion 2 are considered further in **Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference 6.2.17).

Recreational fishing

7.6.44 Along the Sussex coast there are significant areas for recreational sea angling, due to the broad diversity of species, ease of access and shallow waters. Shore angling occurs along the Sussex coast from piers, marinas, beaches and estuaries (Sussex Inshore Fisheries and Conservation Authority (IFCA), 2020). Levels of activity are largely dependent on the seasonality and availability of target species.

7.6.45 Climping beach produces good numbers of bass throughout the year, while in the summer stingrays, mullet, smooth hounds, silver eels and other small species are often caught.

7.6.46 Boat-based angling is extremely popular on the Sussex coast, with a number of businesses offering charter fishing trips from harbours and marinas within the study area (see **Figure 13.2, Volume 3** of the ES (Document Reference 6.3.13)). Fishing spots include the Kingmere reef which sits inside the Kingmere Rocks Marine Conservation Zone. Offshore, there are a range of fishing ‘marks’ that are frequented by boat based angling operators. These include the areas known as ‘Utopia’ and ‘The Overfalls’, both of which are located at some distance from the Proposed Development area in the eastern Solent. There are a range of other sites of importance as well, with the Sussex coast offering many sheltered bays and estuaries that are also significant areas for recreational sea anglers to fish from (Sussex IFCA, n.d.).

7.6.47 **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13) and **Chapter 17: Socio-economics, Volume 2** of the ES of the ES (Document Reference 6.2.17) further discuss the impacts on recreational fishing. **Chapter 10: Commercial fisheries, Volume 2** of the ES (Document Reference 6.2.10) discusses the impacts on commercial fisheries and fish.

Aquaculture

7.6.48 Aquaculture is defined as the farming of fish, crustaceans, mollusc and aquatic plants, including seaweed. There has been an increased interest in seaweed aquaculture recently, driven by research on, *inter alia*, algal biofuel technologies,

carbon capture and plastic alternatives and many more (Capuzzo and KcKie, 2016).

7.6.49 There are currently no aquaculture farms along the eastern South Coast (TCE 2022, pers. comms.; MMO 2022) but Southampton, Portsmouth and Portland support a high number of aquaculture services and the south coast does sit within areas of aquaculture potential for a range of species. These include fish such as Atlantic salmon, brown sea trout, rainbow trout, shellfish such as European lobster, king scallop, blue mussel, manila clam, native oyster, and algae such as badderlocks (a type of kelp), dulce, oarweed and sugar kelp (MMO, 2019).

Future baseline

7.6.50 Proposals exist for a further cable, the England-France HVDC 'AQUIND' Interconnector, which would have a nominal net capacity of 2,000MW. The proposed route of this cable passes through the western part of the proposed DCO Order Limits (**Figure 7.6, Volume 3** of the ES (Document Reference 6.3.7)), connecting France and the UK, with landfalls at Dieppe and Portsmouth respectively. Following a Judicial Review process, the AQUIND project is, at the time of writing, with the Secretary of State for re-determination.

7.6.51 There is one known future offshore renewable energy project close to the proposed DCO Order Limits, which is the Perpetuus Tidal Energy Centre (PTEC), located approximately 43km to the west of the proposed DCO Order Limits (see **Figure 7.4, Volume 3** of the ES (Document Reference 6.3.7)). PTEC have achieved planning consents and secured a connection to the electricity network, however, the developer is awaiting further investment and therefore have not progressed to the construction stage at this time. It is set to be the largest tidal stream energy project in England, with a total capacity of 30 megawatts (MW) (Isle of Wight Council, 2020).

7.6.52 As indicated in the current baseline, there are a number of marine aggregate dredging areas in proximity to the proposed DCO Order Limits. All such areas are active, and the current baseline indicates a substantial number of vessel traffic movements directly associated with such areas. In the future these areas may be surrendered, thus reducing the number of associated vessel traffic movements. Likewise, new marine aggregate dredging areas may be designated (noting that no exploration areas currently exist with the next TCE marine aggregate tender round for England and Wales scheduled for during 2021/22 (TCE, 2020)). Given that there is a lack of publicly available information on future changes to the marine aggregate dredging environment, no changes are considered in the future baseline.

7.6.53 There is similar uncertainty associated with long-term predictions for recreational boating, diving and water sports (including surfing) and fishing given that there is limited reliable information on future trends on which any assumptions can be made.

7.6.54 There are two recent licence submissions (August and November 2021) for proposed seaweed farms offshore of Sussex and the Isle of Wight, locations for which are not currently available (MMO 2022). However, the MMO predict that areas around the south coast (such as the Solent and West Sussex) have very

high potential for bivalve mollusc aquaculture, as well as a range of seaweed and fish species (MMO, 2019). Given that there is a lack of publicly available information on the two seaweed farms submitted and that these are subject to funding, no changes are currently considered to the future baseline.

7.7 Basis for ES assessment

Maximum design scenario

7.7.1 Assessing using a parameter-based design envelope approach means that the assessment considers a maximum design scenario whilst allowing the flexibility to make improvements in the future in ways that cannot be predicted at the time of submission of the DCO Application. The assessment of the maximum adverse scenario for each receptor establishes the maximum potential adverse impact. As a result, impacts of greater adverse significance would not arise should any other development scenario (as described in **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference 6.2.4)) to that assessed within this Chapter be taken forward in the final scheme design.

7.7.2 The maximum parameters and assessment assumptions that have been identified to be relevant to OMU are outlined in **Table 7-12** and are in line with the Project Design Envelope (**Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference 6.2.4)).

Table 7-12 Maximum parameters and assessment assumptions for impacts on OMU

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
Construction: Increased vessel movements	Maximum number of smaller WTG foundations: 90 Maximum number of Offshore Substation (OSS): 3 Maximum array cable length of 250km Maximum offshore interconnector cable length of 50km Maximum export cables length of 170km (Total of 4 cables)	**WTG foundation installation:** 25 vessels (680 return trips) **WTG installation:** 22 vessels (1,033 return trips) **OSS installation**: 37 vessels (288 return trips) **Offshore export cable installation:** 24 vessels (154 return trips) **Inter-array cable installation:** 21 vessels (318 return trips) **Total:** 2,473 round trips **Array area** Buoyed construction area deployed around the maximum extent of the array area. 500m radius construction safety zones. 50m radius pre-commissioning safety zones	The maximum adverse scenario for vessel traffic is associated with the installation of multileg foundations being undertaken over the full construction timeline.
Construction: Temporary increases in SSC and deposition	**Drill arisings** Larger wind turbine generator (WTG) monopile maximum diameter: 13.5m Maximum number of larger WTG: 65 Maximum number of Offshore Substations (OSS): 3	**Drill arisings** Maximum % of WTG locations using drilling: 50% Maximum number of larger WTG foundations requiring drilling: 50% of 65 = 33. Assumed representative drilling rate: 5m/hr Maximum volume of sediment released per WTG foundation: 8,588m^3 (based on larger	The scenarios represent the greatest likely local and total volume of sediment disturbed by dredging (and associated spoil disposal) and rate of release into suspension in the water column.

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
	Seabed preparation Maximum number of smaller WTG multileg foundations: 90 Maximum number of Offshore Substations (OSS): 3 **Cable installation** Maximum array cable length of 250km Maximum offshore interconnector cable length of 50km Maximum export cables length of 170km (Total of 4 cables)	WTGs; drilling to 60m with drill diameter of 13.5m) Maximum volume of sediment released in the array from WTG foundations: 283,415m^3 (based on array comprising 33 x larger WTGs; drilling to 60m with drill diameter of 13.5m) Maximum volume of sediment released per OSS foundation: 11,451m^3 (based on 12 pin piles; drilling to 60m with drill diameter of 4.5m) Maximum volume of sediment released from all OSS foundations: 34,353m^3 (based on total 36 pin piles; drilling to 60m with drill diameter of 4.5m **Seabed preparation** Maximum number of smaller WTG foundations requiring seabed preparation: 90 Maximum smaller WTG jacket dimensions at the seabed 30 x 30m. Dredging to 15m beyond the footprint of the jacket, i.e. 60 x 60m = 3,600m^2 Total dredge/ disposal volume of 324,000m^3 (for all smaller WTG foundation bed preparation; 1m seabed preparation; seabed preparation area of 60 x 60m; 90 WTGs) Maximum number of OSS foundations requiring seabed preparation: 3	Jetting and mass flow excavators are considered to have the greatest (similar) potential to cause energetic resuspension of sediment at the seabed, at a rate described by the trench dimensions and rate of cable burial. .

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
		Total dredge/ disposal volume of 19,500m^3 (for OSS foundation bed preparation; 1m seabed preparation; seabed preparation area of 100 x 60m). **Dredge spoil disposal** Disposal technique: carried out using a representative Trailing Suction Hopper Dredger (THSD) (11,000m^3 hopper capacity with split bottom for spoil disposal). Multiple dredgers to be working simultaneously. Disposal location: 'close' to the installation works. Maximum volume of sediment released in the array from WTG and OSS foundations: 343,500m^3 (foundation details as above for seabed preparation). **Sandwave clearance** Total sandwave clearance volume in array area = 1,375,000m^3. **Pre-lay trenching** 4 export cables x 19km in offshore cable corridor, plus interconnectors in the offshore array area, plus contingency. 2 interconnector cables in offshore array area Trench with a 'U' shaped profile. Trench up to 2m wide.	

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
		1.5 m deep in the export cable corridor. 1.0m deep in the offshore array area. Maximum rate of cable burial: 300m /hr Burial technique: Jetting or Mass Flow Excavator (MFE)	
Construction: Increases in subsea noise		**WTG foundation installation:** 90 smaller WTGs supported on either 90 monopile (MP) foundations or 464 pin pile (PP) foundations (assuming four legs per multileg foundation). MP foundations; hammer energy of up to 4,400kJ PP foundations; hammer energy of up to 2,500kJ **OSS foundation installation:** Three substation structures supported on either three MP foundations or 12 PP foundations (assuming six legs per multileg foundation) MP foundations; hammer energy of up to 4,400kJ PP foundations; hammer energy of up to 2,500kJ	The use of the smaller WTGs over the larger WTGs results in a greater number of WTGs being installed. As the hammer energy is the same for both sizes of WTG, the smaller WTG scenario represents the maximum amount of energy emitted into the marine environment as there will be more. Both foundation types (MP and PP) are presented here as the hammer energy differs depending on the type. The higher hammer energy is for MPs and therefore gives the largest spatial impact, meanwhile the additional number of PPs required could result in a greater temporal impact.
Operation and Maintenance:		**Project vessel movements** Increased vessel movement arising from the maintenance requirements of the operational	The scenario represents the maximum number of project vessel movements and therefore the

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
Increased vessel traffic		project: A maximum of 21 vessels at any one time making up to 869 return trips per year. **Application for safety zones** 500m radius major maintenance safety zones	greatest increase in potential encounters and collision risk for other vessels
Operation and Maintenance: Physical presence of infrastructure		**Array area** Vessels may not choose to navigate internally within the array. **Array layout** Structure deployment across the maximum extent of the array area. **Application for safety zones** 500m radius major maintenance safety zones.	The scenario represents the largest extent and the longest operational period, and therefore the greatest potential for effect on OMU from impacts to accessibility of sea areas, displacement and /or restrictions on current activities.
Operation and Maintenance: Alteration in wave energy direction and period	Maximum number of larger WTG multileg foundations: 65 Maximum number of Offshore Substations (OSS): 3	Array comprising the smaller number (65) of larger type WTGs (jacket foundations, four legs, up to 5m diameter; with suction buckets, 15m diameter, up to 10m high) and three OSSs (jacket foundations, six legs, up to 5m diameter; with pin piles). Scour protection up to 3m high at the foundation, extending to 15m beyond the footprint of the foundation. Minimum foundation spacing of 1,130m (centre to centre for larger type WTGs).	The scenario combination of foundation type, dimensions and number represents the greatest total blockage width to currents and waves.

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
Decommissioning: Increased vessel traffic		**Project vessel movements** Decommissioning vessels will be on-site throughout the decommissioning phase. Third-party vessels may experience restrictions on visually identifying project vessels entering and exiting the array during reduced visibility. **WTG foundation decommissioning** A maximum of 25 vessels making up to 680 return trips. WTG decommissioning A maximum of 22 vessels making up to 1,033 return trips. **Offshore substation decommissioning** A maximum of 37 vessels making up to 288 return trips. **Export cable removal** A maximum of 24 vessels making up to 154 return trips. **Array cable removal** A maximum of 21 vessels making up to 318 return trips.	The scenario represents the largest extent and the longest decommissioning period, and therefore the greatest effect on displacement of vessels leading to a potential increase in encounters and restrictions to OMU.
Decommissioning: Displacement of		**Buoyed decommissioning area**	The scenario presents the largest extent and the longest

Project phase and activity/impact	Maximum parameters	Maximum assessment assumptions	Justification
activities and/or access		Deployed around the maximum extent of the array area. **Export cables** Export cable removal activities may result in the displacement of activities. **Application for safety zones** 500m radius decommissioning safety zones.	decommissioning period and therefore the greatest effect on access and activities due to displacement effects.
Decommissioning: Temporary increases in SSC and deposition due to removal of foundations	MDS as defined above for Construction phase	MDS as defined above for Construction phase	Activities associated with the removal of infrastructure during decommissioning will be similar to, or cause less disturbance than, those used during construction.

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Embedded environmental measures

7.7.3 As part of the Rampion 2 design process, a number of embedded environmental measures have been adopted to reduce the potential for impacts on OMU. These embedded environmental measures have evolved over the development process as the EIA has progressed and in response to engagement and consultation.

7.7.4 These measures also include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements. As there is a commitment to implementing these embedded environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and are set out in this ES.

7.7.5 **Table 7-13** sets out the relevant embedded environmental measures within the design and how these affect the OMU assessment.

Table 7-13 Relevant OMU embedded environmental measures

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to OMU assessment
C-43	The subsea export cable ducts will be drilled underneath the beach using horizontal directional drilling (HDD) techniques.	Scoping	DCO works plans, description of development and requirements	HDD minimises disturbance to OMU inshore users during construction.
C-46	Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins. The undertaker must ensure that a Notice to Mariners (NtM) is issued at least 14 days prior to the commencement of the authorised Proposed Development or any part thereof advising of the start date of each activity and the expected vessel routes from	Scoping	DCO requirements or Deemed Marine Licence (DML) conditions.	Advanced warning and location details will allow OMU receptors to undertake activities elsewhere and minimise the risk of collision or disruption from project vessels.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to OMU assessment
	the construction ports to the relevant location.			
C-50	Crossing and proximity agreements with known existing subsea pipeline and subsea cables operators will be sought.	Scoping	DCO requirements or DML conditions.	Crossing agreements will minimise direct impacts to subsea cables that may be affected by the proposed works.
C-51	A Vessel Management Plan will be developed pre-construction which will determine vessel routeing to and from construction areas and ports to minimise, as far as reasonably practicable, encounters with marine mammals. It will also consider vessel codes of conduct provided by WiSe Scheme, Scottish Marine Wildlife Watching Code (MWWC) and the Nature Scott "Guide to best practice for watching marine wildlife".	Scoping, updated at ES	DCO requirements or DML conditions.	The VMP will address aspects of vessel management.
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	Scoping - updated at PEIR	DCO requirements or DML conditions	The MMMP minimises direct disturbance impacts on OMU features such as divers during construction and indirect impacts on target recreational fish species.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to OMU assessment
	the beginning of the piling sequence before increasing energies to higher levels. A **Draft Piling Marine Mammal 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.	Scoping	DCO requirements or DML conditions	The MPCP aims to minimise potential impacts on OMU receptors from potential pollution incidents.
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	Scoping	Electricity application procedures (Section 95 of Energy Act 2004)	Safety zones will minimise the risks to OMU receptors during construction, operation and maintenance activities and decommissioning.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to OMU assessment
	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-85	RED will ensure that the local notice to mariners (NtM) is updated and reissued at weekly intervals during construction activities and at least five days before any planned operations and maintenance works and supplemented with VHF (very high frequency) radio broadcasts agreed with the Maritime & Coastguard Agency (MCA) in accordance with the construction and monitoring programme approved under DML conditions.	Scoping	DML conditions	NtMs will ensure that OMU receptors such as recreational boaters are informed of activities and reduce disturbance.
C-99	The risk of primary (life-threatening physical injury, or fatality) or secondary (non-life-threatening damage) injury to humans will be managed, by recommending an advisory exclusion zone around all piling operations within which no-one (including construction personnel) is recommended to enter the water.	Scoping	DCO requirements or DML conditions.	The advisory exclusion zone will minimise impacts to OMU receptors such as divers during piling.
C-100	The soft-start programme will be determined in	Scoping	DCO requirements	A soft-start programme will

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to OMU assessment
	discussion with the Diving Liaison Officer. Consideration will be given to the potential for divers to be in the water outside of the advisory exclusion zone at the start of pile driving. This consideration will also include diving activities that could result in divers drifting into the advisory exclusion zone as part of their dive (i.e. tide and wind conditions will be assessed as part of the programme).		or DML conditions.	minimise indirect impacts on target recreational fish species.
C-101	To limit potential exposure to hazardous levels of underwater noise, a comprehensive awareness and communications strategy (a Diver Communication Plan) will be developed by RED in agreement with regulatory authorities to notify the diving/ spearfishing community of the timing and duration of proposed works. An **Outline Diver Communication Plan** (Document Reference 7.20) has been submitted with this application. This will include but not be limited to the appointment of a Diving Liaison Officer (who will be the main point of contact) to work with dive centres, diving clubs (including education establishments), boat operators, Coast Guard, and facilities within jetties and marinas etc. The strategy	Scoping	DCO requirements or DML conditions.	A Diving Communication Plan aims to minimise direct impacts on recreational users such as divers and spearfishers during piling.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to OMU assessment
	will include widely publicising (for example on the internet) details of the nature, location and timing of pile driving works and the extent of any relevant advisory exclusion zones. The 'startle' reaction to underwater noise is anticipated as being less likely to occur in divers / spearfishers who have prior knowledge of the possibility of piling noise occurring.			
C-265	Double big bubble curtains will be deployed as the minimum single offshore pilling noise mitigation technology will be utilised 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 and reduce the risk of significant residual effects on the designated features of these sites; • spawning herring; and • marine mammals.	ES	DCO requirements or DML conditions.	Ensures reductions in noise propagation extents from percussive piling, which will subsequently reduce the area affected for OMU.
C-267	A separation buffer zone around Marine Aggregates licence areas (1nm downtide/0.5nm across tide) has been implemented where no turbines or	ES	DCO requirements or DML conditions.	Reduces the potential allision risk for dredging vessels and Rampion 2 structures, providing for an

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to OMU assessment
	substations are to be constructed.			eventuality of a drifting ship from the aggregate licence areas
C-284	There shall be no offshore substation located within 500 metres of the array periphery (as defined in the draft DCO).	ES	DCO requirements or DML conditions.	Reduces allision risk concerns raised by marine aggregate dredging companies in relation to licence areas in proximity to the Proposed Development.
C-288	The Applicant is committed to minimising the release of plastics into the marine environment, and commits to using suitable alternatives, where this is practicable.	Examination	DCO requirements or DML conditions.	Minimises impacts arising from Rampion 2 to OMU caused by plastic pollution.
C-289	The Applicant will use secondary protection material, where practicable, that has the greatest potential for removal on decommissioning of the Proposed Development.	Examination	DCO requirements or DML conditions.	Reduces obstacles left in the marine environment following decommissioning.

7.7.6 Further detail on the environmental measures in **Table 7-13** is provided in the **Commitments Register** (Document Reference 7.22) which sets out how and where particular environmental measures will be implemented and secured.

7.8 Methodology for ES assessment

Introduction

7.8.1 The project-wide generic approach to assessment is set out in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference 6.2.5). The assessment methodology for OMU for the ES is consistent with that provided in

the Scoping Report (RED, 2020) and no changes have been made since the scoping phase and PEIR provided alongside Statutory Consultation.

7.8.2 The assessment of potential impacts upon OMU receptors is based on the maximum development scenario as identified from the design envelope (see **Chapter 4: The Proposed Development, Volume 2 of the ES** (Document Reference 6.2.4)**.** The key maximum assessment assumptions comprise the layout of the wind farm, the number and size of offshore structures, the type and size of foundations used, as well as the timing and duration of the proposed offshore works (see **Table 7-12**).

7.8.3 The assessment of impacts and effects on OMU is supported by the baseline desk study work summarised earlier in this chapter to ensure identification of relevant details on the OMU receptors within the study area. The collation of baseline information and use across the study area was supported by consultation following publication of the PEIR, to ensure appropriate detail was obtained to inform the assessment of potential impacts.

7.8.4 The assessment considers all relevant marine recreational pursuits, offshore and coastal activities, and marine infrastructure. For each of the identified receptors, impacts are considered throughout the construction, operation and decommissioning phases of the Proposed Development.

7.8.5 Cumulative effects have been assessed by taking into consideration all other relevant developments, proposed or existing, that are in the vicinity of the development zone and which have the potential to affect the same receptors. Where other developments are expected to be completed prior to the construction of Rampion 2, and the effects of these developments are fully determined, the effects arising from the developments are considered as part of the baseline but may also be considered as part of the construction and operational cumulative assessment. Developments forming part of the dynamic baseline, and those included in the cumulative assessment are clearly identified in the Cumulative Effects Assessment (CEA).

Impact assessment criteria

7.8.6 The approach to determining the significance of the effect is a two-stage process that involves defining sensitivity of the receptors and the magnitude of the impacts against set criteria. This section describes the criteria applied in this chapter to assign values of sensitivity to the receptors and determine the magnitude of potential impacts. The terms used to define sensitivity and magnitude are informed by the EIA Regulations 2017 and the Ministry of Housing, Communities and Local Government's (MHCLG). Further details are provided in Chapter 5.

7.8.7 The sensitivities (or importance) of OMU receptors are defined by both their potential vulnerability to an impact from the proposed development, their recoverability, and the value or importance of the receptor. The definition of terms relating to the sensitivity of OMU receptors is detailed in **Table 7-14**.

Table 7-14 Definition of terms relating to receptor sensitivity or importance.

Sensitivity / importance	Definition used in this chapter
High	Receptor is of high value or importance, with critical importance to the local, regional or national economy. Receptor is highly vulnerable to impacts that may arise from the Proposed Development and recoverability is long-term or not possible.
Medium	Receptor is of medium value or importance, with reasonable contribution to the value of the local, regional or national economy. Receptor is moderately vulnerable to impacts that may arise from the Proposed Development and has moderate to high levels of recoverability.
Low	Receptor is of minor value or importance with small levels of contribution to the value of the local, regional or national economy. Receptor is not generally vulnerable to impacts that may arise from the Proposed Development and/or has high recoverability.
Negligible	Receptor is of very low value or importance, with negligible contribution to the value of the local, regional or national economy. Receptor is not vulnerable to impacts that may arise from the Proposed Development and/or has high recoverability.

7.8.8 The magnitude of potential impacts is defined by a series of factors including the spatial extent of any potential interaction, the likelihood, duration, frequency and reversibility of a potential impact. The definition of the levels of magnitude used within this assessment are shown below in **Table 7-15**.

Table 7-15 Definition of terms relating to magnitude of impact.

Magnitude	Definition used in this chapter
High	Total loss of ability to carry on activities. Impact is of extended temporal or physical extent and of long-term duration (total life of Proposed Development) and/or frequency of repetition is continuous and/ or effect is not reversible.
Medium	Loss or alteration to significant portions of key components of current activity leading to a reduction in the level of activity that may be undertaken and/or physical extent of impact is moderate and/ or medium-term duration (operational period) and/ or frequency of repetition is medium to continuous and/ or effect is not reversible for thet phase.
Low	Very slight change from baseline condition and/or physical extent of impact is negligible and/ or short-term duration (construction period)

Magnitude	Definition used in this chapter
	and/ or frequency of repetition is negligible to continuous and/ or effect is reversible.
Negligible	No change from baseline conditions.

7.8.9 The significance of the effect on OMU receptors will be determined by correlating the sensitivity of the receptor and the magnitude of the impact. The method employed for this preliminary assessment is presented in **Table 7-16**, with the final assessment for each effect based upon expert judgement. For the purpose of this ES, any effects with a significance level of minor or less are considered as not significant in terms of the EIA Regulations (2017).

Table 7-16 Significance assessment matrix for the significance of residual effect.

Receptor sensitivity/importance	Magnitude of impact: High	Magnitude of impact: Medium	Magnitude of impact: Low	Magnitude of impact: Negligible
High	Major (Significant)	Major (Significant)	Moderate (Potentially Significant)	Minor (Not Significant)
Medium	Major (Significant)	Moderate (Potentially Significant)	Minor (Not Significant)	Minor (Not Significant)
Low	Moderate (Potentially Significant)	Minor (Not Significant)	Minor (Not Significant)	Negligible (Not Significant)
Negligible	Minor (Not Significant)	Minor (Not Significant)	Negligible (Not Significant)	Negligible (Not Significant)

7.9 Assessment of effects: Construction phase

Increased vessel movements

Overview

7.9.1 The construction of Rampion 2 will increase vessel movements within the area by a maximum of 2,636 return trips (as per identified in **Table 7-12**) over the 4-year construction period from the seabed preparation works (for example sandwave clearing and boulder clearance) and the installation of infrastructure (WTGs, OSSs and cables (inter-array and export)).

7.9.2 The larger installation vessels (such as jack-up vessels), transport barges and cable laying vessels are likely to transit directly to the site from their homeports, or from construction ports (WTGs, cable, foundation etc.). The vessels likely to operate out of local UK harbours are likely to be the smaller vessels, such as Crew Transfer Vessels (CTVs).

7.9.3 The construction vessels will be required to deploy a number of embedded environmental measures that are listed in **Table 7-13**.

7.9.4 Those that are relevant to vessel movements are:

- C-46 which require the Proposed Development to promulgate advanced warning and information of the associated safety zones via Notice to Mariners (NtM) and bulletins within the Kingfisher bulletins;
- C-51 regarding the Vessel Management Plan (VMP);
- C-56 which details the safety zones (500m); and
- C-85 which provides for regular updates to the NtM and supplemental VHF broadcasts agreed with MCA to ensure all parties are updated on planned works and locations of activities.

Magnitude of impact

Marine aggregates

The impact arising from increased vessel activity as a result of the construction phase of the Proposed Development has been considered in detail within in **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13) in which the risk was considered to be 'tolerable' which is not considered to be **Significan**t in EIA terms (see **Table 7-24** for definition of 'tolerable') against baseline levels of vessel movements. Whilst the specific assessment presented within that chapter relates to vessel passage to and from the worked licence areas, the assessment also holds for operation of dredging vessels whilst on site. This finding is based on the relatively minor increase in baseline vessel numbers (as identified in **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13)) in the area resulting from the operation of the construction vessels, together with advance and regular notifications for planned works promulgated (C-46, C-85,**Table 7-13**) and the implementation of the VMP (C-51, **Table 7-13**) to ensure any risks of collision or impacts to dredging operations are appropriately managed. The impact is considered to be short to medium-term (throughout the construction phase), of local extent, intermittent and reversible and there is no impact arising on the long-term viability of the aggregate sites. Therefore, the magnitude of the impact from construction activity vessel movements relating to Rampion 2 is considered to be **low**.

Disposal sites

7.9.5 As described in **paragraph 0**, the impact has been considered in detail within in **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13) in which the magnitude was considered to be 'tolerable' against baseline levels of vessel movements.

7.9.6 Again, whilst the specific assessment presented within that chapter relates to vessel passage between port and disposal grounds, the shipping and navigation assessment identified a relatively minor increase in baseline vessel numbers in the area resulting from the operation of the construction vessels. This, coupled with the notifications for planned works that will be issued (C-46, C-85, **Table 7-13**) and the implementation of the VMP (C-51), will ensure any risks of collision or impacts to disposal operations are appropriately managed. The impact is considered to be short to medium-term (throughout the construction phase), of local extent, intermittent and temporary and there is no impact arising on the long-term viability

of any of the disposal sites. Therefore, the magnitude of the impact from construction activity vessel movements relating to Rampion 2 is considered to be **low**.

Offshore wind

7.9.7 As described above in **Section 7.6**, with the exception of the proximal Rampion 1, offshore wind projects do not overlap directly with the proposed DCO Order Limits, and there are no other proposed (future) offshore wind projects in the region. For Rampion 1, which is operational, the relatively minor increase in baseline vessel numbers in the area resulting from the operation of the construction vessels is not anticipated to affect the operations and maintenance vessel activities associated with the existing project. Additional controls and notifications of works that will be applied to the Rampion 2 construction vessel activity (C-46, C-85 and C-51, **Table 7-13**), will ensure any risks of collision or disturbance impacts are appropriately managed. The impact is considered to be short to medium-term (throughout the construction phase), of local extent, intermittent and temporary. Therefore, the magnitude of the impact from construction activity vessel movements relating to Rampion 2 is considered to be **low**.

Military activity and munitions

7.9.8 Whilst sharing a common boundary at a single point, there is no actual overlap between the proposed DCO Order Limits and the D037 PEXA area (see **Figure 7.1, Volume 3** of the ES (Document Reference 6.3.7). Based on this, the impact of increased vessel movements associated with the construction of Rampion 2 is considered to be **negligible**.

Subsea cables

7.9.9 The majority of existing subsea cables in the area are at distance from the Proposed Development (>12km) and therefore the increase in construction vessel activity arising from the Proposed Development is considered unlikely to affect any maintenance or other activities associated with this infrastructure. The impact to operational activities for these cables is, therefore, in relation to vessels transiting to and from these cables from home ports; this was assessed within **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13) as tolerable against baseline levels. For the IFA2 and CrossChannel Fibre cables (approximately 300m west and 4.9km east of the proposed DCO Order Limits at its closest points, respectively), the controls and notifications of works that will be applied to the Rampion 2 construction vessel activity (C-46, C-85 and C-51, **Table 7-13**), will ensure that any risks of collision or disturbance impacts are appropriately managed, limiting the potential magnitude of any impact. The same controls and commitments will be applied to the AQUIND cable proposal, should that be consented and installed before Rampion 2. Overall, impacts are considered to be short to medium-term (throughout the construction phase), of local extent, intermittent and temporary. The magnitude of increased vessel movements arising from the construction activity of the Proposed Development is therefore considered to be **low** for the IFA2, CrossChannel Fibre and AQUIND cables and **negligible** for the other subsea cables within the study area.

Recreational boating and sailing

7.9.10 As identified in **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13), the increase in vessels from the construction of Rampion 2 will be 'tolerable' against baseline levels of vessel movements within the area, however there is potential for recreational sailing and boating activities to overlap with construction vessel activities. Much of the smaller recreational activity will be concentrated relatively close to the coastline and inshore of the Proposed Development, as shown in the RYA baseline data, with interaction principally possible in the inshore parts of the export cable corridor. However, the RYA route data also indicates that vessels, likely the larger motorboats and yachts, utilise areas further offshore and across the Rampion 2 proposed DCO Order Limits (see **Figure 7.7, Volume 3** of the ES (Document Reference 6.3.7)). There is thus potential for vessel encounter and/or disruption in areas when the construction vessels are actively working at the site.

7.9.11 Notwithstanding that the potential for impact is limited by the relatively minor increase in baseline vessel numbers in the area as a result of the construction phase works, the potential impact magnitude will also be limited by the controls and notifications of works related to Rampion 2 construction vessel activity (C-46, C-85 and C-51, **Table 7-13**). Even so, whilst recreational craft activity could be affected by construction vessel activity, the potential for impact will be short to medium-term (throughout the construction phase), of local extent, intermittent and temporary. The magnitude is therefore considered to be **low** for both vessels using the offshore areas (with the management commitments in place) and smaller craft in the inshore zone (on the basis of a lower likelihood of encounter together with the management controls).

Diving and water sports (including surfing)

7.9.12 As identified in **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13), the increase in vessels from the construction of Rampion 2 will be tolerable against background levels of vessel movements within the area.

7.9.13 Whilst the specific assessment presented within that chapter relates to vessel passage, the increase in marine traffic arising from the construction activities was identified as being relatively minor with respect to baseline vessel numbers in the area. Considering the notifications for planned works that will be issued (C-46, C-85, **Table 7-13**) and the implementation of the VMP (C-51, **Table 7-13**), it is considered that any risks of collision or disruption to dive vessels and activities will be minimised.

7.9.14 Other sea-based recreational activities (surfing, kite surfing, wind surfing, bathing and canoeing/kayaking) are not likely to be affected by construction vessel activity given the inshore locations of the majority of such pursuits.

7.9.15 Overall, the impact is considered to be short to medium-term (throughout the construction phase), of local extent, intermittent and temporary and there will be no impact arising on the long-term viability of any of these activities. Therefore, the magnitude of the impact from construction activity vessel movements is assessed as being **low** for diving and **negligible** for other water sports.

Recreational fishing

7.9.16 As identified in **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13), the increase in vessels from the construction of Rampion 2 will be tolerable against baseline levels of vessel movements within the area, with a relatively minor increase in baseline vessel numbers as a result of the construction phase works. There is potential for some disruption to the use of the sites within the proposed DCO Order Limits, however the areas subject to active construction works (and therefore increased vessel movements) at any one time will be small and therefore any attendant restriction on boat based angling activities will be similarly limited in extent. As a result, and with reference to the provisions for advance notification of the specific locations of construction work during this phase of the Proposed Development (C-46, C-85, **Table 7-13**) and the implementation of the VMP (C-51, **Table 7-13**), it is considered that any risks of collision or disruption to recreational (boast based) angling activities will be minimised. There are no anticipated impacts on shore-based angling as a result of increased vessel movements. The impact is considered to be short to medium-term (throughout the construction phase), of local extent, intermittent and temporary and the magnitude of impact is therefore low for boat based angling and negligible for shore-based angling.

Sensitivity or value of receptor

Marine aggregates

7.9.17 Access to aggregate resource may be temporarily affected as a result of dredgers not being able to work up to the edge of an area due to the increased presence of construction vessels and this could constrain dredger access to aggregate resources from the need to maintain separation to ensure safe operations.

7.9.18 The sensitivity to impact is expected to be greatest in the Owers Bank extraction region, due to proximity to the development area (in particular 396/1 and 488). RED will continue engagement with the relevant aggregate companies (Tarmac, HAML and Cemex) to discuss and agree appropriate measures to ensure that conflicts are minimised as far as reasonably possible between vessel movements across the proposed DCO Order Limits and any third-party usage of the areas.

7.9.19 The receptor is considered to be of low vulnerability, high recoverability and of high-value and therefore considered to be of **medium** sensitivity.

Disposal sites

7.9.20 As a result of the separation distance of the majority of disposal grounds from the proposed DCO Order Limits (>12km) it is unlikely that actual operations at these locations could be affected. Although disposal operations could be impacted via potential interruptions to normal routes and navigational passage to and from the disposal sites, the potential impact on vessels in the area was assessed in **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13), as being tolerable against baseline levels. On this basis, the sensitivity of these sites is considered to be **low**.

7.9.21 The exception to this relates to the Rampion 1 disposal area and that of the future AQUIND cable which will, if consented, be licensed as a disposal site along its

length. The AQUIND Cable Site A disposal site would overlap with the Rampion 2 site and the Rampion 1 disposal site is immediately adjacent to the boundary of the Proposed Development.

7.9.22 Engagement will be conducted with both operators to manage the potential for impact and to discuss and agree appropriate measures to minimise the risk of conflicts arising between vessel movements within the study area in connection with aggregate operations. In addition to consultation, the controls applied through the commitments (notifications and the use of a VMP as set out in **Table 7-13**) will ensure any potential for conflict is minimised so that access to and use of these disposal sites will not be impacted. It is considered, therefore, that the sensitivity of the Rampion 1 and the AQUIND Cable A disposal sites to the increased vessel movements is **medium**, reflecting that whilst potential for interruption exists, with management and communication, any interruptions to access and usage of disposal sites will be minimised to ensure disruption to activities will not be beyond tolerable levels.

Offshore wind

7.9.23 The existing (and operational) Rampion 1 project will be sensitive to the potential for interruption to operational and maintenance activities. RED will continue ongoing interaction and engagement with the operators of Rampion 1 in order to manage this and to manage the potential for impact and minimise the potential for conflicts to arise between the construction vessels of Rampion 2 and operation and maintenance vessels for Rampion 1. Additionally, the impact will be mitigated through the use of a VMP and advanced warning of construction activities through NtM (as identified in **Table 7-13**), therefore ensuring any potential for impacts on vessel access to the Rampion 1 will be appropriately managed.

7.9.24 The sensitivity of the offshore wind receptors to the increased vessel movement is therefore considered to be **low**, on the understanding that potential impacts are tolerable and short term.

Military activity and munitions

7.9.25 Impacts from increased vessel movements have the potential to disrupt military activities within the impact area. As discussed within **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13), on average there are fewer than one unique military vessel per day recorded within the study area and therefore disruption to military exercises is likely to be limited.

7.9.26 RED will ensure ongoing engagement and consultation with the MoD (as set out in **Table 7-5**) in order to establish and agree management measures to limit the potential for construction activities to impinge on any military exercises to avoid impacts to the use of the PEXA. It is envisaged that the impact will be mitigated through the use of a VMP and advanced warning of construction activities through NtM (as identified in **Table 7-13**). On this basis, the sensitivity of military activity and munition receptors to the increased vessel movement is considered to be **medium.**

Subsea cables and pipelines

7.9.27 Impacts from increased vessel movements have the potential to disrupt maintenance activities for the relevant subsea cables and pipelines, should these be required during the construction phase of the Proposed Development.

7.9.28 The greatest potential for impact is expected to arise for the proposed AQUIND interconnector cable that might run through the south west of the site, principally due to proximity. However, this impact will only arise if the AQUIND cable is installed prior to the Rampion 2 construction phase. Furthermore, if this is consented RED will seek to engage again with the operator of the AQUIND interconnector and manage works to avoid any significant disruption as a result of the Rampion 2 construction phase, in order to manage the potential for impact and to minimise the potential for conflicts to arise. As part of this process, the potential for disruption will be mitigated through the management of vessel movements via the VMP and there will be advanced warning of vessel transits through NtM (as identified in **Table 7-13**). The sensitivity of the receptor is therefore considered to be **low.**

Recreational boating and sailing

7.9.29 There is potential for temporary disruption of some sailing routes and general boating in the area.

7.9.30 The greatest potential for impact will be on the general boating area through which the export cable corridor passes, however, this will be limited spatially to the locations where construction vessels are present and of temporary duration. RED will engage with the relevant clubs and associations in order to minimise the potential for disturbance, and the adoption of the VMP, with advanced warning of vessel transits through the NtM as an embedded environmental measure to be used during construction will minimise this impact (see **Table 7-13**).

7.9.31 As set out in **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13), on the basis of the high level of vessel activity that already uses the area, and the minor increase in vessel traffic arising from the construction of the Proposed Development, the recreational boating and sailing communities are unlikely to be sensitive to this impact.

Recreational boating and sailing users are deemed to be of low vulnerability, high recoverability and medium value and therefore the sensitivity is considered to be **medium.** This is on the understanding that the receptors will be able to undertake these activities elsewhere within the area and the impact is temporary and reversible.

Diving and water sports (including surfing)

7.9.32 Impacts from the increased vessel traffic could potentially interfere with any diving or water sport activity within the area.

7.9.33 The greatest impact is expected to be on dive sites to the existing Rampion 1 project and dive sites nearby as the construction activities and their associated safety zones (including vessel traffic) will prevent any dives being undertaken in the close vicinity of the works or along vessel transit routes. As described in **Section 7.6**, there are a number of dive centres based along the coast, many of

which run dive trips to locations in the area around the proposed development site, though few are located within the proposed DCO Order Limits. The sensitivity of diving as a receptor to increased vessel traffic is therefore considered to be low, as interaction will be minimal, the majority of sites visited are outside the area of works and any short-term interruption will be temporary.

7.9.34 The remaining water sports activities take place inshore and therefore are unlikely to be sensitive to the potential impacts of increased vessel traffic as they will not be affected by the increased vessel movements.

7.9.35 The sensitivity of the receptor is therefore considered to be **low** for diving and **negligible** for all other activities.

Recreational fishing

7.9.36 Impacts from the increased vessel traffic could potentially interfere with recreational boat based and charter fishing activities within the area. However, given the baseline vessel movements within the area it is understood that this receptor is unlikely to be sensitive to increased vessel movements of the scale predicted for Rampion 2 construction works. Additionally, environmental measures will be implemented in order to minimise the effects from increase vessel activities, including the use of the VMP, and there will be advanced warning of vessel transits through NtM (as identified in **Table 7-13**). Shore based angling is not considered to be sensitive as it will not be affected by the increase in vessel movements on the basis of the shoreline locations from which this activity is undertaken.

7.9.37 It is therefore considered that the sensitivity of the receptor is **low** (boat-based angling) and **negligible** (shore-based angling).

Significance of residual effect

Marine aggregates

7.9.38 Overall, it is considered that the sensitivity of the receptor is **medium**, and the magnitude of the impact is **low**. The effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Disposal sites

7.9.39 For the Rampion 1 and AQUIND Cable A disposal sites, it is considered that the sensitivity of the receptor is **medium**, and the magnitude of the impact is **low.** The effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms. For all other disposal sites, the receptor is deemed to be of **low** sensitivity and the magnitude of impact is also **low**; the effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Offshore wind

7.9.40 Overall, it is considered that the sensitivity of offshore wind is **low**, and the magnitude of the increased vessel movements is predicted to be **low**. The effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Military activity and munitions

7.9.41 RED will have ongoing consultation and communication with the MoD to ensure that there will be no conflict between RED vessels and the MoD and there are a number of embedded environmental measures that will be deployed, for example, circulation of information and notice to mariners. It is likely that the construction activities will be taken into consideration by the MoD.

7.9.42 Overall, it is considered that the sensitivity of military activity and munition is **medium**, and the magnitude of the increased vessel movements is **negligible**, the effect will be of **minor** significance, which is **Not Significant** in EIA terms.

Subsea cables and pipelines

7.9.43 Overall, it is considered that the sensitivity of cables and pipelines is **low**, and the magnitude of the impact is predicted to be **low** for the IFA2, CrossChannel Fibre and AQUIND cables and **negligible** for all other subsea cables. The effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Recreational boating and sailing

7.9.44 Overall, it is considered that the sensitivity of recreational boating is **medium**, and the magnitude of the impact is **low**, the effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Diving and water sports (including surfing)

7.9.45 It is considered that the sensitivity of diving is **low** and for other water sports **negligible**. The magnitude of impact is predicted to be **low** for diving and **negligible** for all other water sports. The effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Recreational fishing

7.9.46 It is considered that the sensitivity of boat based recreational fishing is **low**, and negligible for shore-based angling. The magnitude of the impact is **low** for boat based angling and **negligible** for shore-based angling. The effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Displacement from the use of safety zones (500m) associated with construction

7.9.47 As described within **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference 6.2.4), the construction of Rampion 2 will include a maximum of 90 WTGs, 90 associated inter-array cables with a total length of 250km, a maximum of three OSSs and their associated inter-export cables up to 50km in length and a maximum of four export cables with a total length of 76km.

7.9.48 Throughout the construction period, RED will circulate detailed information including construction vessel routes, locations and dates, associated safety zones (see **paragraph 7.9.49** below) through Notice to Mariners (NtM) and Kingfisher bulletins in advance (further details of this environmental measure can be found in **Table 7-13**, C-46).

7.9.49 During the construction of each part of the infrastructure listed above, there will be 500m safety zones established in order to maintain safety of the other users and the construction site. This is in line with embedded environmental measure C – 56 (see **Table 7-13** for details) which details how RED will apply for safety zones up to 500m radius over the construction phase. Guard vessels will also be used where appropriate to ensure that adherence to these safety zones is kept in order to minimise risks to surface navigation.

Magnitude of impact

Marine aggregates

7.9.50 There is potential for access to the aggregate resource to be constrained as a result of dredgers not being able to dredge up to the edge of the area due to the presence of safety zones. This could constrain dredger access to aggregate resources from the need to respect the safe working separation distance from Rampion 2 construction works.

7.9.51 Additional controls and notifications of works that will be applied to the Rampion 2 construction vessel activity (C-46, C-85 and C-51, **Table 7-13**), will ensure any potential for access or dredging activity displacement can be appropriately managed to minimise any potential for conflict or constraint on operations.

7.9.52 The magnitude of the impact from the presence of temporary safety zones (500m) during construction activities relating to Rampion 2 is considered to be **low** as the impact is predicted to be local spatial extent and of short duration, being applicable only during works undertaken within the part of the Proposed Development area that borders the boundary of areas 396, 488 and 453/1 and /2, see **Table 7-10** and **Figure 7.2, Volume 3** of the ES (Document Reference 6.3.7). Additionally, the control measures relating to the placement of structures (WTGs and OSS) to ensure separation of at least 1NM down-tide and 0.5NM across tide (C-267, **Table 7-13**) will minimise any potential impact from temporary safety zones on marine aggregate dredging activities in proximity to Rampion 2 during construction.

Disposal sites

7.9.53 The magnitude of the impact from the presence of temporary safety zones (500m) has the potential to impact on access to the AQUIND Cable Site A (if consented and developed) and Rampion 1 disposal sites. The impact is however considered to be small scale and of short duration in that it is predicted to potentially affect these disposal sites for a number of weeks and is temporary. In addition, the presence of construction and the attendant safe passing separation zones will be promulgated via the notifications for planned works that will be issued (C-46, C-85, **Table 7-13**) as well as the implementation of the VMP (C-51, **Table 7-13**). Collectively these embedded environmental measures will ensure any risks of activity or access displacement at the disposal sites will be appropriately managed. Due to the distances from the Proposed Development, there will be no potential for disruption to the operation of the other disposal sites within the study area arising from the implementation of safety zones around construction works.

7.9.54 On this basis the use of safety zones during construction activities relating to the Rampion 1 and AQUIND Cable A disposal sites is considered to be **low** and **negligible** for all other sites.

Offshore wind

7.9.55 There is only one offshore wind farm located in the close vicinity to the proposed DCO Order Limits (Rampion 1) and which could, therefore, be subject to potential localised disturbance from the presence of temporary safety zones. Additional controls and notifications of works that will be applied to the Rampion 2 construction vessel activity (C-46, C-85 and C-51, **Table 7-13**), will ensure that any risks of collision or disturbance impacts are appropriately managed. Any impacts will be of short to medium-term duration (throughout the construction phase), of localised extent, intermittent and temporary. The magnitude is therefore considered to be **low.**

Military activity and munitions

7.9.56 The proposed DCO Order Limits borders the D037 PEXA area but does not overlap with it – they share a common boundary at a single point (see **Figure 7.1, Volume 3** of the ES (Document Reference 6.3.7)). Temporary safety zones of 500m will be established around structures during construction and major maintenance activities. As the PEXA lies within 500m of the Order Limits, it is possible that there might be a small spatial overlap between the PEXA and a safety zone around the closest WTG. This will be of short and temporary duration. Based on this, the magnitude of the impact from the presence of temporary safety zones (500m) during construction activities relating to Rampion 2 is considered to be **low**, as impacts are spatially localised, of short duration and affect only a minor and peripheral area of the PEXA.

7.9.57 In the event that a WTG is installed within 500m of the Order limit boundary in the area adjacent to the PEXA/Danger area, which would result in an area of overlap between the temporary safety zone and the PEXA/Danger area, then consultation would be undertaken with the MoD to establish appropriate controls/measures to ensure no impact on the operations of the MoD within the PEXA/Danger area (or safety issues for the required construction/O&M works undertaken) would arise.

Subsea cables and pipelines

7.9.58 The majority of existing subsea cables in the area are at distance from the proposed DCO Order Limits (>12km) and therefore the implementation of safety zones will not affect any maintenance or other activities associated with this infrastructure. For the IFA2 and CrossChannel Fibre cables (approximately 300m west of the proposed DCO Order Limits; and 4.9km east at its closest points), the controls and notifications of works that will be applied to the Rampion 2 construction vessel activity (C-46, C-85 and C-51, **Table 7-13**), will ensure that any risks of collision or disturbance impacts are appropriately managed, limiting the potential magnitude of any impact. Both the area and time period over which the potential buffer areas could affect operations at the cable are also small and any impacts will, therefore, be similarly spatially and temporally limited. As the AQUIND cable runs through the Rampion 2 proposed DCO Order Limits, both the spatial and duration extent of impacts will be greater than for the IFA2 and CrossChannel Fibre cables, however the same controls and commitments will be applied to the AQUIND cable proposal, should that be consented. Overall, impacts are considered to be short to medium-term (throughout the construction phase), of local extent, intermittent and temporary. The magnitude of activity or access displacement due to safety zones arising from the construction activity of the

Proposed Development is therefore considered to be **low** for the IFA2, CrossChannel Fibre and AQUIND cables and **negligible** for the other subsea cables within the study area.

Recreational boating and sailing

7.9.59 The use of safety zones during construction has the potential to impact on recreational boating and sailing by restricting access to boating areas and could lead to some deviation from sailing and boating routes. Much of the recreational activity by smaller craft will be concentrated relatively close to the coastline and inshore of the proposed DCO Order Limits, as shown in the RYA baseline data. Interaction with Rampion 2 is principally possible in the inshore parts of the export cable corridor, however the RYA route data also indicates that vessels, likely the larger motorboats and yachts, utilise areas further offshore and across the Rampion 2 proposed DCO Order Limits (see **Figure 7.7, Volume 3** of the ES (Document Reference 6.3.7)). There is thus potential for sailing or boating routes to be affected by safety zones around construction operations when the construction vessels are actively working at the site.

7.9.60 The magnitude of potential impacts will be reduced by the controls and notifications of works related to Rampion 2 construction vessel activity (C-46, C-85 and C-51, **Table 7-13**). Even so, whilst recreational craft activity could be affected by displacement from some areas during the construction phase, the potential for impact will be short to medium-term, of local extent, intermittent and temporary. The magnitude is therefore considered to be **low** for both vessels using the offshore areas (with the management commitments in place) and smaller craft in the inshore zone (on the basis of a lower likelihood of encounter together with the management controls).

Diving and water sports (including surfing)

7.9.61 The use of safety zones (500m) during construction has the potential to restrict access to dive sites and recreation activities. As noted in the baseline section (**Section 7.6**), the majority of dive sites visited in the area fall outside the proposed DCO Order Limits of the Proposed Development (see **Figure 7.8, Volume 3** of the ES (Document Reference 6.3.7)), which limits the potential for impacts to sites in close proximity to the Proposed Development, although there are a number of sites within 500m of the boundary of the Array area. Whilst such sites within 500m of the Array boundary could therefore be affected by safety zones, this will be intermittent and short-term, with the safety zones impacting access only during active construction of the structure (and reduced to 50m for pre-commissioned structures). As a result, and with the implementation of the notifications for planned works that will be issued (C-46, C-85, **Table 7-13**) and control of vessel routeing under the VMP (C-51, **Table 7-13**), it is considered that any risks of exclusion from dive locations or displacement of diving activities will be effectively minimised.

7.9.62 Impacts to other sea-based recreational activities (surfing, kite surfing, wind surfing, bathing and canoeing/kayaking) are not likely to be affected by safety zones during construction of the Proposed Development given the inshore locations of the majority of such pursuits.

7.9.63 The impact from the presence of temporary safety zones (500m) during construction activities relating to Rampion 2 is short to medium-term (throughout the construction phase), of local extent, intermittent and temporary and there will be no impact arising on the long-term viability of any of these activities. The magnitude of the impact is therefore considered to be **low** for diving and **negligible** for all other water sports.

Recreational fishing

7.9.64 The use of safety zones (500m) during construction has the potential to restrict access to boat-based fishing areas within the proposed DCO Order Limits and up to 500 beyond it, however the areas subject to active construction works (and therefore increased vessel movements) at any one time will be small and therefore any attendant restriction on boat based angling activities will be similarly limited in extent. As a result, and with reference to the provisions for advance notification of the specific locations of construction work during this phase of the Proposed Development (C-46, C-85, **Table 7-13**) and the implementation of the VMP (C-51, **Table 7-13**), it is considered that any risks of activity or access displacement to recreational (boast based) angling activities will be minimised. There are no anticipated impacts on shore-based angling as a result of the implementation of safety zones around construction works.

7.9.65 The impact is considered to be short to medium-term (throughout the construction phase), of local extent, intermittent and temporary, and the magnitude of impact is therefore **low** for boat based angling and **negligible** for shore-based angling.

Sensitivity or value of receptor

Marine aggregates

7.9.66 Impacts are expected to occur in the form of interruptions to the normal routes and navigational passages used by aggregate extraction vessels, due in part to the implementation of safety zones at the Proposed Development. This may lead to exclusion to small areas of aggregate resources.

7.9.67 The impact is expected to be greatest in the Owers Bank extraction area due to their proximity to the proposed DCO Order Limits (including areas 453, 488, 396/1, 435/1 and 435/2), see **Table 7-10** and **Figure 7.2, Volume 3** of the ES (Document Reference 6.3.7).

7.9.68 RED have agreed to a buffer zone sought by the dredging companies of 1NM down-tide and 0.5NM across tide from the edge of the licence areas within which no WTGs or OSSs will be installed to address concerns regarding safety and licensed dredging operations at the extraction areas to avoid the potential for conflicts to arise.

7.9.69 Marine aggregates are potentially vulnerable to exclusion from any part of the aggregate licence area that may be incurred through the implementation of safety zones, though both the actual location of dredging interest within the licence area and the proximity of that to construction activities (i.e. whether or not within 500m) will have an influence on the dredger vessels sensitivity to impact. The aggregate extraction activities are currently focused on areas more than 500m distance to the

proposed DCO Order Limits (TCE & BMAPA, 2018, 2019, 2020) and this will therefore reduce the sensitivity to the potential impact.

7.9.70 In relation to potential activity or access displacement arising from the temporary safety zones, the receptor is considered to be of low vulnerability, high recoverability and of high-value and therefore considered to be of **medium** sensitivity.

Disposal sites

7.9.71 As a result of the separation distance of the majority of disposal grounds from the proposed DCO Order Limits (>12km) it is unlikely that actual operations at these locations could be affected by the implementation of safety zones around construction works. The most sensitive receptors will be the Rampion 1 and the proposed AQUIND cable development (AQUIND Cable Site A) disposal sites which are adjacent to and overlap the proposed DCO Order Limits, respectively. The potential for activity or access displacement to both areas will constitute only a minor part of the two disposal sites and will be of short-term duration. RED will have ongoing engagement with the relevant company in order to manage these impacts to reduce the potential for conflicts to arise from the construction. RED will continue to consult with the relevant companies in order to identify the appropriate mitigation which will be agreed through commercial agreement prior to consent and will address safety concerns.

7.9.72 The sensitivity of disposal sites to displacement from the use of safety zones (500m) is therefore considered to be **medium**, reflecting that the receptor is able to tolerate the potential impacts and are able to recover.

Offshore wind

7.9.73 The existing (and operational) Rampion 1 project will be sensitive to the potential for interruption to operational and maintenance activities that could arise as a result of the use of safety zones at construction locations for Rampion 2. RED will continue ongoing interaction and engagement with the operators of Rampion 1 in order to manage this and to reduce the potential for conflicts to arise from between the construction vessels of Rampion 2 and operation and maintenance vessels for Rampion 1. Additionally, any potential impact will be mitigated through the use of a VMP and advanced warning of construction activities through NtM (as identified in **Table 7-13**), therefore ensuring any potential for impacts on vessel access to Rampion 1 will be appropriately managed.

7.9.74 The sensitivity of the offshore wind receptors to the implementation of safety zones is therefore considered to be **low**, on the understanding that potential impacts are short term.

Military activity and munitions

7.9.75 Impacts are expected to be in the form of disruption to military activities within the impact area.

7.9.76 The greatest impact is expected to be on D037 which borders (but does not overlap) the Assessment Boundary. RED will continue ongoing consultation and

communication with the MoD in order to ensure that there will be no conflict between RED vessels and the MoD and there are a number of embedded mitigation measures that will be deployed, for example, circulation of information and notice to mariners (as identified in **Table 7-13**). It is likely that the construction activities will be taken into consideration by the MoD.

7.9.77 The sensitivity of military activity and munition receptors to displacement from the use of safety zones (500m) is considered to be **low**.

Subsea cables and pipelines

7.9.78 There is the potential for impacts to arise from any interruption of construction and maintenance activities for the relevant subsea cables and pipelines.

7.9.79 The greatest potential for impact is expected to arise for the AQUIND interconnector cable which might run through the south west of the site (if secured), principally due to proximity. However, RED will continue to seek to engage with the operator of the AQUIND interconnector and manage works to avoid any significant disruption as a result of the Rampion 2 construction phase, reducing the potential for conflicts to arise between the two infrastructure activities. As part of this process, the potential for disruption through any restricted access or displacement of activity as a result of the safety zones implementation will be mitigated through the management of vessel movements via the VMP, along with advanced warning of construction works activities and locations transits through NtM (as identified in **Table 7-13**). The sensitivity of the receptor is therefore considered to be **low.**

Recreational boating and sailing

7.9.80 There is potential for temporary disruption of some sailing routes and general boating in the area.

7.9.81 The greatest impact will be from the export cable corridor, as this is within a general boating area and a high density of recreational vessel movements. RED will engage with the relevant sailing groups and associations in order to minimise disruption, and the adoption of the VMP, with advanced warning of vessel transits through the NtM as an embedded mitigation measure to be used during construction will minimise this impact (see **Table 7-13**).

7.9.82 For recreational and public users of the area in the vicinity of the development, public notifications outlining the timing and scale of construction operations, as well as NtM for users of inshore areas, will be provided well in advance of construction works commencing and throughout the construction phase.

7.9.83 Recreational boating and sailing users are deemed to be of low vulnerability, high recoverability and medium value and therefore the sensitivity is considered to be **medium**, on the understanding that the receptors will be able to undertake these activities elsewhere within the area and the impact is temporary and reversible.

Diving and water sports (including surfing)

7.9.84 Impacts from displacement from the use of safety zones could potentially interfere and restrict access to diving and water sports activities within the area.

7.9.85 The greatest impact is expected to be on any dive sites and recreational activities which are usually undertaken within 500m of the proposed DCO Order Limits, such as dive trips to the existing Rampion 1 project and therefore diving activities may be displaced. As described within **Section 7.6**, there are a number of dive centres based along the coast, many of which dive at locations around the Proposed Development, though few appear to be located within the proposed DCO Order Limits itself.

7.9.86 The remaining water sports activities take place inshore and therefore are unlikely to be sensitive to potential impacts arising from displacement or access issues as a result of the use of safety zones.

7.9.87 Details on the timings and schedules of works will be promulgated (as identified in **Table 7-13**) ahead of works in order to allow for recreational activities to plan to avoid these construction areas.

7.9.88 The sensitivity of the receptor is therefore considered to be **low** for diving, on the understanding that the receptors will be able to undertake these activities elsewhere within the area and the impact is temporary; and **negligible** for all other water sports.

Recreational fishing

7.9.89 Impacts from the displacement from the use of safety zones could potentially interfere with recreational fishing activities within the area.

7.9.90 Boat based angling will potentially be sensitive to exclusion from favoured fishing spots within the proposed DCO Order Limits, however the areas subject to active construction works (and therefore safety zones) at any one time will be small (less than 0.8km^2) and of limited duration. Furthermore, there are a wide range of alternative locations and areas that will remain unaffected during construction, both inside and outside of the proposed DCO Order Limits.

7.9.91 As a result of the provisions for advance notification of the specific locations of construction work during this phase of the Proposed Development (C-46, C-85, **Table 7-13**) and the implementation of the VMP (C-51, **Table 7-13**), angling boat operators will be kept fully informed as to the location and duration of any potential restricted areas during the construction phase. Details on the timings and schedules of works will be promulgated (as identified in **Table 7-13**) ahead of works in order to allow for recreational fishmen to avoid these construction areas and safety zones. Therefore, these provisions, alongside the flexibility to fish in alternative and available locations, reduces the potential for these receptors to be sensitive to the potential impacts arising.

7.9.92 There are no anticipated impacts on shore-based angling as a result of the implementation of safety zones. It is therefore considered that the sensitivity of the receptor is **low** for boat based angling and **negligible** for shore-based fishing**.**

Significance of residual effect

Marine aggregates

7.9.93 Overall, it is considered that the sensitivity of the receptor is **medium**, and the magnitude of the impact is **low**, the effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Disposal sites

7.9.94 Overall, it is considered that the sensitivity of the receptor is **medium**, and the magnitude of the impact would be **low** for the proposed AQUIND Cable A area (if consented and developed before Rampion 2 is developed) and Rampion 1 and **negligible** for all other disposal sites. The effect would therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Offshore wind

7.9.95 Overall, it is considered that the sensitivity of offshore wind is **low**, and the magnitude of displacement from the use of safety zones (500m) is **low** and the effect will be of **minor** significance, which is **Not Significant** in EIA terms.

Military activity and munitions

7.9.96 Overall, it is considered that the sensitivity of military activity and munition is **low**, and the magnitude of the physical presence of infrastructure and temporary safety zones (500m) is **low**, and the effect will be of **minor** significance, which is **Not Significant** in EIA terms.

Subsea cables and pipelines

7.9.97 Overall, it is considered that the sensitivity of cables and pipelines is **low**, and the magnitude of the impact is **low** for IFA2, CrossChannel Fibre and the proposed AQUIND interconnectors and **negligible** for all other subsea cables. The effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Recreational boating and sailing

7.9.98 Overall, it is considered that the sensitivity of recreational boating is **medium**, and the magnitude of the impact is **low**, and the effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Diving and water sports (including surfing)

7.9.99 It is considered that the sensitivity of diving is **low** and **negligible** for all other water sports, and the magnitude of the impact is **low** for diving and **negligible** for all other water sports. The effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Recreational fishing

7.9.100 It is predicted that the sensitivity of boat based recreational fishing is low and for shore-based angling **negligible.** The magnitude of the impact is **low** on boat-based angling and **negligible** for shore-based fishers. The effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Temporary increases in suspended sediment and subsequent deposition

7.9.101 Temporary localised increases in SSC and associated sediment deposition are expected from foundation and cable installation works and seabed preparation works (including sandwave clearance). This assessment should be read in conjunction with **Chapter 6: Coastal Processes, Volume 2** of the ES (Document Reference 6.2.6) and **Appendix 6.3: Coastal processes technical report: Impact assessment, Volume 4** of the ES (Document Reference 6.4.6.3) which provide a full description of the offshore physical environment assessment.

7.9.102 Background surface SSCs values within the study area typically range between 10 to 20mg/l during winter months and generally less than 4mg/l during the summer period. Surface turbidity is relatively low across the offshore array area, with monthly averaged concentrations typically less than 5mg/l across the whole year (Cefas, 2016). **Table 7-17** presents the maximum assessment assumptions associated with increases in SSC and deposition.

7.9.103 **Table 7-17** details the maximum sediment plume distance and the peak increases in SSC and deposition that could occur because of construction activities and relates to individual plumes/activities.

7.9.104 Plumes, as a result of boulder clearance, will be similar in nature to that described for ‘offshore trenching of cables’ in **Table 7-17**. The SSC, dimensions and duration of the plumes resulting from boulder clearance will be at most similar to, or relatively smaller than, that described for trenching activities.

7.9.105 Jack-up vessels might cause very localised and temporary plumes as their legs are lowered into and raised from the seabed. The volume of sediment disturbed will be relatively small compared to the other activities considered (proportional to the size and number of feet on the vessel). The SSC, dimensions and duration of the resulting plumes will be at most similar to, or relatively smaller than described for other activities.

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Table 7-17 Temporary increases in SSC and sediment deposition as a result of construction activities at Rampion 2

Construction impact	Location	Maximum sediment plume distance	Details of increase in SSC and deposition
Sandwave clearance Seabed preparation for foundations (overspill during active dredging using a trailing suction hopper dredger)	Offshore export cable corridor and array area	16km (springs) and 8km (neaps)	• Within small distances (<50m) of the dredger, SSC associated with overspill at the water surface during active dredging can be in the order of thousands to low tens of thousands of mg/l, reducing rapidly with time and distance (through settlement and dispersion) to the order of hundreds or tens of mg/l. • All SSC effects associated with overspill of sands during active dredging are expected to be spatially limited to within 150 to 500m of the dredger, settling to the seabed within 5 to 15 minutes following the surface release (depending on the local water depth and current speed). Effects associated with gravels are expected to be more limited (up to tens of metres and 0 to 1.5 minutes). • At 2km downstream during or shortly after active dredging, the concentration of any fine sediments persisting in suspension is expected to be less than approximately 100mg/l; at 5km downstream, this may have reduced to approximately 10mg/l. Concentrations of suspended fines will continue to reduce gradually over time through dispersion, to less than measurable levels (<10mg/l) within two to three days. • For the Maximum Design Scenario of 90 smaller WTG multileg foundations and three OSP multileg foundation**s**, resulting from overspill, an average deposit thickness of 0.50m has been calculated to occur over a maximum area of 16,950m^2 whilst an average deposit thickness of 0.05m has been calculated for an

Construction impact	Location	Maximum sediment plume distance	Details of increase in SSC and deposition
			area of 169,503m^2. These relate to 0.01% and 0.09% of the total Rampion 2 Offshore Array area, respectively. • Fines are expected to become widely dispersed and so will not resettle with measurable thickness locally.
Sandwave clearance Seabed preparation for foundations (spoil disposal from a trailing suction hopper dredger)	Offshore export cable corridor and array area	16km (springs) and 8km (neaps)	• Approximately 90% of the total spoil volume in the hopper will descend directly to the seabed as a high-density discrete unit in the 'active phase' of the plume. This does not directly cause any meaningful change of SSC. The remaining 10% of material will form a more diffuse suspension in the 'passive phase' of the plume. • Within a few tens of metres, at the time of spoil release, very high passive phase plume concentrations are expected, up to hundreds of thousands to millions of mg/l initially, reducing to thousands of mg/l as the plume diffuses to a size of 100m or larger. • All SSC effects associated with sands and gravels in the passive phase of the plume are expected to be spatially limited to within 65 to 650m of the dredger, and temporally limited to 5 to 15 minutes following release (depending on the local water depth and current speed). Effects associated with gravels are expected to be more limited (up to tens of metres and 0 to 1.5 minutes). • The concentration of any fine sediments persisting in suspension will vary in proportion to the dimensions of the plume as it is dispersed over time. A plume with a small footprint (100m) may have a maximum concentration in the order of thousands of mg/l, but when dispersed to a larger footprint (1000m) may have a

Construction impact	Location	Maximum sediment plume distance	Details of increase in SSC and deposition
			maximum concentration in the order of low tens of mg/l. Concentrations of suspended fines will continue to reduce gradually over time through dispersion and deposition, to less than measurable levels (<10mg/l) within two to three days. • The final distribution of sediment on the seabed from the active phase cannot be predicted in advance, but the total volume, and therefore the area of effect for a given average thickness, is limited. If the average local thickness of deposition is 5cm, the maximum area of effect per spoil disposal event is approximately 198,000m^2, equivalent to a 500m diameter circle. If the average local thickness of deposition is 30cm, the maximum area of effect per spoil disposal event is approximately 33,000m^2, equivalent to a 200m diameter circle. In all cases, a relatively thicker deposit will have a smaller footprint and a relatively larger footprint will require a smaller average thickness. • Sands and gravels in the passive phase will also be advected by any tidal currents present as they settle to the seabed, and so may or may not overlap the main active phase deposit. The additional deposit may contribute or may add up to approximately 10% to the area of effect for the given average thicknesses above, or 10% additional thickness for the same area, or a proportional combination of the two. • Fines in the passive phase are expected to become widely dispersed and so will not resettle with measurable thickness locally.

Construction impact	Location	Maximum sediment plume distance	Details of increase in SSC and deposition
Offshore trenching for cables	Offshore export cable corridor and array area	16km (springs) and 8km (neaps)	• Within 5m of active trenching, very high plume concentrations are expected. SSC could be hundreds of thousands to millions of mg/l. • Within 100 to 200m downstream from active trenching (depending on the initial height of ejection and the local current speed) in a relatively narrow plume (up to tens of metres wide), mainly resuspended sands and gravels will cause high SSC in the order of thousands to tens of thousands of mg/l. However, the majority of such coarser sediments are expected to resettle to the seabed (reducing or ending any associated plume effects) within approximately 2 to 5 minutes of resuspension. • At 2km downstream during or shortly after active trenching, the concentration of any fine sediments persisting in suspension is expected to be less than approximately 100mg/l; at 5km downstream, this may have reduced to approximately 50mg/l. Concentrations of suspended fines will continue to reduce gradually over time through dispersion, to less than measurable levels (<10mg/l) within two to three days. • The maximum expected average local thickness of deposition in the case of predominantly gravelly sediments is 30 to 60cm, over an area up to 5 to 10m downstream, along the length of the trench. • The maximum expected average local thickness of deposition in the case of predominantly sandy sediments is 3 to 6cm, over an area up to 100 to 200m downstream, along the length of the trench.

Construction impact	Location	Maximum sediment plume distance	Details of increase in SSC and deposition
			• Fines are expected to become widely dispersed and so will not resettle with measurable thickness locally.
HDD exit pit preparations	Offshore export cable corridor	16km (springs) and 8km (neaps)	• Within 5m of active pit preparation (using dredging or trenching type techniques), very high plume concentrations are expected. SSC could be hundreds of thousands to millions of mg/l, but decreasing rapidly with distance, and with time following cessation of active works. • Within 100 to 200m downstream from active pit preparation (depending on the method and rate of excavation and the local current speed) in a relatively narrow plume (up to tens of metres wide), mainly resuspended sands and gravels will cause high SSC in the order of hundreds to thousands or tens of thousands of mg/l. However, the majority of such coarser sediments are expected to resettle to the seabed (reducing or ending any associated plume effects) within approximately 2 to 5 minutes of resuspension. • At 2km downstream during or shortly after active trenching, the concentration of any fine sediments persisting in suspension is expected to be less than approximately 100mg/l; at 5km downstream, this may have reduced to approximately 50mg/l. Concentrations of suspended fines will continue to reduce gradually over time through dispersion, to less than measurable levels (<10mg/l) within two to three days. • The material excavated from the subtidal pits will be temporarily stored, either sidecast nearby or moved into a nearby spoil disposal area (e.g. the array area). The thickness and extent of the deposit

Construction impact	Location	Maximum sediment plume distance	Details of increase in SSC and deposition
			will be variable depending on the method and nature of the deposition, but will be relatively small, in proportion to the total volume of the pits being excavated. The material in storage may be subject to redistribution by naturally occurring sediment transport during the storage period. • Any fully resuspended fines are expected to become widely dispersed and so will not resettle with measurable thickness locally.
Drilling at foundations	Array area	16km (springs) and 8km (neaps)	• Within small distances (<50m) of the drilling, SSC associated with overspill at the water surface during active drilling can be in the order of thousands to low tens of thousands of mg/l, reducing rapidly with time and distance (through settlement and dispersion) to the order of hundreds or tens of mg/l. • All SSC effects associated with overspill of sands during active dredging are expected to be spatially limited to within 400 to 700m of the dredger, and temporally limited to the period of active dredging plus 10 to 25 minutes afterwards (depending on the local water depth and current speed). Effects associated with gravels are expected to be more limited (up to 100m and one to five minutes). • At 2km downstream during or shortly after active dredging, the concentration of any fine sediments persisting in suspension is expected to be less than approximately 1000mg/l; at 5km downstream, this may have reduced to approximately 300mg/l. Concentrations of suspended fines will continue to reduce gradually

Construction impact	Location	Maximum sediment plume distance	Details of increase in SSC and deposition
			over time through dispersion, to less than measurable levels (<10mg/l) within two to three days. • Deposition thicknesses are comparable to and no more than described for spoil disposal from a trailing suction hopper dredger.

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7.9.106 To summarise the information presented above in **Table 7-17**, sediment plumes caused by seabed preparation and installation activities are expected to occur over a maximum distance of 16km (at spring tides) from the source. Sediment plumes are expected to quickly dissipate after cessation of the activities, due to settling and wider dispersion with the concentrations reducing quickly over time to background levels. Sediment deposition will consist primarily of coarser sediments deposited close to the source, with a small proportion of silt deposition (reducing exponentially from source). **Figure 6.3.4** within **Appendix 6.3, Volume 4** of the ES (Document Reference 6.4.6.3), provides a useful schematic summarising the spatial extent of the impact zones associated with SSC and deposition in relation to Rampion 2. The figure details that the results of modelling can be summarised broadly in terms of four main zones of effect, based on the distance from the activity causing sediment disturbance:

- 0 to 50m – zone of highest SSC increase and greatest likely thickness of deposition. All gravel sized sediment likely deposited in this zone, also a large proportion of sands that are not resuspended high into the water column, and also most or all dredge spoil in the active phase. Plume dimensions and SSC, and deposit extent and thickness, are primarily controlled by the volume of sediment released and the manner in which the deposit settles.
- 50 to 500m – zone of measurable SSC increase and measurable but lesser thickness of deposition. Mainly sands that are released or resuspended higher in the water column and resettling to the seabed whilst being advected by ambient tidal currents. Plume dimensions and SSC, and deposit extent and thickness, are primarily controlled by the volume of sediment released, the height of resuspension or release above the seabed, and the ambient current speed and direction at the time.
- 500m to the tidal excursion buffer distance – zone of lesser but measurable SSC increase and no measurable thickness of deposition. Mainly fines that are maintained in suspension for more than one tidal cycle and are advected by ambient tidal currents. Plume dimensions and SSC are primarily controlled by the volume of sediment released, the patterns of current speed and direction at the place and time of release and where the plume moves to over the following 24 hours.

7.9.107 Further information on sediment plume distances and modelling are provided in **Chapter 6: Coastal processes, Volume 2** of the ES (Document Reference 6.2.6) and **Appendix 6.3, Volume 4** (Document Reference 6.4.6.3).

Magnitude of impact

Marine aggregates

7.9.108 SSC and deposition has the potential to impact on aggregate sites by causing changes to seabed composition and bathymetry. However, given the above information summarised in **Table 7-17** it can be confirmed that there is sufficient distance between the array area and the aggregate sites that any increase in bed level will be immeasurable in practice.

7.9.109 Taking the above into consideration, the impact of SSC and deposition from construction activities is expected to be short-term, temporary and of relatively localised extent (mostly within the tidal excursion) and reversible. The magnitude of the impact is therefore considered to be low, indicating that there is no potential for the impact to threaten the long-term viability of the site.

Disposal sites

7.9.110 Construction activities have the potential to cause changes to seabed composition and bathymetry due to potential increases in suspended sediment and associated sediment deposition. This has the potential to have impacts on marine disposal sites by increasing the seabed level within disposal sites.

7.9.111 Rampion 2 overlaps with two disposal sites (AQUIND Cable A and Rampion 1). Taking **Table 7-17** into consideration, the impact of SSC and deposition from construction activities is expected to be short-term, intermittent and of relatively localised extent (mostly within the tidal excursion) and temporary.

7.9.112 The magnitude of the impact is therefore considered to be low, indicating that there is no potential for the impact to threaten the long-term viability of the site.

Diving and water sports (including surfing)

7.9.113 Taking **Table 7-17** into consideration, whilst the impact of SSC and deposition from construction activities is expected to cover a number of dive sites within the sediment plume area, this will be short-term, intermittent and of relatively localised extent (mostly within the tidal excursion) and temporary.

7.9.114 Piling will be undertaken for approximately 12 months within the marine area, and while the worst-case magnitude of impacts theoretically has the potential to be medium, the mitigation measures outlined above and in **Table 7-13** (C-99, C-100, C-101, **Table 7-13**), will ensure that any participation in diving with reduced visibility and / or the risk of harm to divers in the area at any point during the construction of the Proposed Development is minimised. In particular, a comprehensive awareness and communications strategy (a Diver Communication Plan, C-101) will be developed by RED in agreement with regulatory authorities to notify the diving/spearfishing community of the timing and duration of proposed works. This will include but not be limited to the appointment of a Diving Liaison Officer (who will be the main point of contact) to work with dive centres, diving clubs (including education establishments), boat operators, Coast Guard, and facilities within jetties and marinas etc. The strategy will include widely publicising (for example on the internet) details of the nature, location and timing of pile driving works and the extent of any relevant safety zones.

7.9.115 The magnitude of the impact is therefore considered to be low, indicating that there is no potential for the impact to threaten the long-term viability of the activities.

Recreational fishing

7.9.116 Taking **Table 7-17** above into consideration, the impact of SSC and deposition from construction activities is expected to be short-term, intermittent and of relatively localised extent (mostly within the tidal excursion) and temporary. The magnitude of the impact is therefore considered to be low, indicating that there is no potential for the impact to threaten the long-term viability of recreational fishing.

Sensitivity or value of receptor

Marine aggregates

7.9.117 Impacts have the potential to arise as a result of potential changes to seabed composition and bathymetry due to the increases in SSC and associated sediment disposition, thus potentially affecting the seabed level within the disposal sites. The scenario that represents the worst-case is the use of jetting tools (including mass flow excavators) which are assumed to result in 100% of the material within the cable trench being liquidised and dispersed in the lower water column, as well as the drilling of up to 50% of foundations with the drill arisings being deposited at the surface.

7.9.118 The magnitude of the maximum potential increase in SSC and deposition resulting from construction activities is within the natural range of the region (**Chapter 6: Coastal processes, Volume 2** of the ES (Document Reference 6.2.6)) and the impact will be short-term, temporary and of localised extent and reversible. Sufficient distance between the installed infrastructure for Rampion 2 and existing aggregate sites will be left (see **Table 7-12**) such that any changes in bed height will be immeasurable in practice. The closest aggregate extraction area is 396/1 and therefore may be more affected by sediment deposited from cable installation activities. It is expected that increases in bed level may be 3 – 6cm (over an area of up to 200m downstream).

7.9.119 Marine aggregate sites are deemed to be of medium vulnerability, medium recoverability and medium value. The sensitivity of marine aggregates to temporary increases in SSC is therefore considered to be **medium**.

Disposal sites

7.9.120 Impacts have the potential to arise as a result of potential changes to seabed composition and bathymetry due to the increases in SSC and associated sediment disposition, thus potentially affecting the seabed level within the disposal sites.

7.9.121 There is sufficient distance between the array area of the proposed DCO Order Limits and most disposal sites, that any increases in bed levels will be immeasurable in practice. The greatest impact is expected to be on the proposed AQUIND cable development (AQUIND Cable Site A) disposal sites which would overlap with the Rampion 2 site and the Rampion 1 disposal site that is located adjacent. As presented in **paragraph 7.9.100 *et seq***. sediment deposition is expected to increase bed level up to 3 – 6cm during cable installation and up to 30cm during sandwave clearance (in gravelly sediments).

7.9.122 Increases in bed level at disposal sites could be critical to their use, essentially adding to the volume of material disposed within them, however considering the magnitude of the impact, this is considered unlikely.

7.9.123 Disposal sites and their users are deemed to be of low vulnerability, medium recoverability and medium value and therefore considered to be **medium** sensitivity, reflecting that the receptor is able to tolerate the potential impact.

Diving and water sports (including surfing)

7.9.124 Impacts from temporary increases in SSC have the potential to interfere with diving and water sports activities within the area through reduced water clarity.

7.9.125 The level of increase in SSC will vary with the type of works taking place (see **Table 7-17** for details). For example, during sandwave clearance, at 2km downstream during or shortly after active dredging, the concentration of any fine sediments persisting in suspension is expected to be unlikely to exceed 100mg/l; at 5km downstream, this may have reduced to approximately 10mg/l. Concentrations of suspended fines will continue to reduce gradually over time through dispersion, to less than measurable levels (<10mg/l) within two to three days.

7.9.126 Whereas, during drilling of foundations, at 2km downstream during or shortly after the activity the concentration of any fine sediments persisting in suspension is expected to be unlikely to exceed 1000mg/l at 5km downstream, this may have reduced to approximately 300mg/l. Concentrations of suspended fines will continue to reduce gradually over time through dispersion, to less than measurable levels (<10mg/l) within two to three days.

7.9.127 The greatest impact is therefore expected to be on the small number of dive sites directly within the proposed DCO Order Limits or within 2km, as the construction activities will prevent any dives being undertaken in the close vicinity of the works for the order of two to three days.

7.9.128 Between 5km and 16km from construction works, SSC is predicted to reduce to levels of 10mg/l during sandwave clearance, 50mg/l during trenching and HDD pit works, and 300mg/l during drilling of foundations. These will reduce to less than measurable levels within two to three days. Therefore, at a distance of 6km, which includes the popular dive sites east of Selsey Bill, it is likely to be in the region of 10m/g to 300mg/l for up to three days associated with each period of works.

7.9.129 The majority of other water sport activities take place close to the coast and therefore will not be affected by the potential increases in SSC and deposition.

7.9.130 The sensitivity of the receptor is therefore considered to be **low**, on the understanding that the receptors will be able to undertake these activities elsewhere within the area and the impact is temporary and reversible to both divers and local businesses.

Recreational fishing

7.9.131 Impacts from the temporary increases in SSC have the potential to affect recreational fishing via smothering of important habitats, thus affecting fish species targeted by anglers.

7.9.132 As detailed within **Chapter 8: Fish and shellfish ecology, Volume 2** of the ES (Document Reference 6.2.8), the sensitivity of fish receptors is assessed as being of medium – low sensitivity and therefore it is considered that the sensitivity of recreational fishing is **medium - low**, on the understanding that the receptor will be largely unaffected, and the impact is temporary and reversible.

Significance of residual effect

Marine aggregates

7.9.133 Overall, it is predicted that the sensitivity of the receptor is **medium**, and the magnitude of the impact is **low**, the effect will be of **minor** significance, which is **Not Significant** in EIA terms.

Disposal sites

7.9.134 Overall, it is predicted that the sensitivity of the receptor is **medium**, and the magnitude of the impact is **low**, the effect will be of **minor** significance, which is **Not Significant** in EIA terms.

Diving and water sports (including surfing)

7.9.135 It is predicted that the sensitivity of diving and water sports is **low**, and the magnitude of the impact is **low**, the effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Recreational fishing

7.9.136 It is predicted that the sensitivity of recreational fishing is **medium - low**, and the magnitude of the impact is **low**, the effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Temporary increases in subsea noise associated with the installation of WTG foundations

7.9.137 The assessment focuses on underwater noise from pile-driving for the installation of foundations for offshore structures (such as WTGs and substations). While other activities such as cable laying, dredging and vessel movements will result in underwater noise, these have the potential to affect a very localised extent only, in the immediate vicinity of activities and are therefore insignificant in the context of underwater noise from piling operations (see **Appendix 11.3: Underwater noise, Volume 4** of the ES (Document Reference 6.4.11.3)).

7.9.138 Piling operations will take place at Rampion 2 during the construction phase with piling operations taking place over a period of approximately 12 months.

7.9.139 As noted above in **Table 7-12**, the maximum design scenario considered with respect to underwater noise from piling is 90 monopiles (plus offshore substation foundations) being driven with a 4,400kJ hammer energy. It should be noted that this maximum hammer energy is considered highly conservative and this is considered the absolute maximum for the design envelope. Hammer energies will be considerably lower for the majority of the time. The hammer energy will only be raised to 4,400kJ when absolutely necessary.

7.9.140 The temporal maximum design scenario represents the longest duration of effects from subsea noise and assumes a scenario whereby piled multileg foundations are used for all offshore structures (including WTGs and OSSs). The temporal scenario includes a maximum hammer energy of 2,500kJ for pin-pile installation, which is also considered conservative, as with many of the other assumptions discussed in the paragraph above which are expected to be relevant to maximum hammer energy.

7.9.141 In order to quantify the spatial extent of the potential noise impacts, a semi-empirical underwater noise propagation model (INSPIRE) was undertaken using the maximum design hammer energy (4,400kJ for monopiles and 2,500kJ for pin-piles) at three noise modelling locations (one at the Eastern edge of the proposed DCO Order Limits, one at the North-west edge of the proposed DCO Order Limits (the shallowest location) and one to the South of the proposed DCO Order Limits (the deepest location). The following sensitivity assessment provides a summary of the key results of this modelling in the context of the impact assessment on OMU receptors, with full details of the underwater noise modelling presented in **Appendix 11.3: Underwater noise, Volume 4** of the ES (Document Reference 6.4.11.3).

Magnitude of impact

Diving and water sports (including surfing)

7.9.142 Underwater noise from piling could present a safety hazard and deterrence to divers if not controlled effectively. As described in the baseline section (**Section 7.6**), the study area supports a relatively high level of recreational diving activity and a wide variety of dive spots. Ensuring the safe construction and operation of Rampion 2 is of paramount importance to RED, not only in meeting its duties under the Health & Safety At Work Act, Construction Design & Management (CDM) Regulations and other legislation, but is a fundamental value of the company to provide a duty of care to others who may be affected by its activities.

7.9.143 As set out in **Appendix 11.3: Underwater noise, Volume 4** of the ES (Document Reference 6.4.11.3), the effects of waterborne noise on humans have not been widely investigated, with most research and analysis having been conducted for the military sector. However, where there has been a great deal of attention given to exposure of noise to humans in air then the possibility of waterborne noise exposure should be taken into consideration. In the case of impact piling for the installation of offshore wind turbines which are in the vicinity of popular diving sites or are situated close to the coast, the potential risk of adverse effects exists.

7.9.144 The effects of exposure of humans to underwater impulsive sound depends on the level of exposure, and may be divided into three categories – primary, or life

threatening physical injury, including mortality and severe physical injury; secondary, or non-life threatening physical injury, and in particular auditory damage; and tertiary injury, due to behavioural effects.

7.9.145 Existing criteria are defined in the Control of Noise at Work Regulations (2021) (CoNaWR) and are utilised to judge the hazard from airborne noise exposure. It has been determined that where exposure to a sound level equivalent of 85 dB(A) re 20 µPa (111 dB re 1 µPa) for an eight hour period is exceeded, a significant risk of long term hearing loss exists; for each halving of the duration of exposure an increase in level of 3 dB is permitted. Peaks in excess of 130 dB re 20 µPa (166 dB re 1 µPa) are also hazardous and can cause traumatic injury, in which permanent damage can be caused by a single exposure.

7.9.146 In terms of the effects of a single loud event, the CoNaWR peak limit of 137dB(C) (2nd action level) is a less useful reference as the criteria is primarily concerned with the onset of auditory injury from a single loud event. However, in the context of diving the effect of startle is more relevant as this may lead to tertiary injury as a result of the diver panicking and surfacing too quickly or losing control of their breathing or apparatus. In this instance a study by Nedwell (see **Appendix 11.3: Underwater noise, Volume 4** of the ES (Document Reference 6.4.11.3) proposed 110dB(UW) as the level of a single event that may evoke a significant startle response.

7.9.147 It is difficult to definitively quantify the levels of exposure to underwater sound and the effects it can have on humans, however, based on the above paragraphs and a number of underwater studies (see **Appendix 11.3: Underwater noise, Volume 4** of the ES (Document Reference 6.4.11.3)), as well as referring back to the levels of exposure defined for airborne noise, the following source levels and durations of exposure have been used in the noise modelling to characterise the main levels of impact. It should also be noted that the potential impacts of noise on humans underwater is an area of ongoing scientific research.

7.9.148 Experiments conducted using animals and volunteer divers demonstrated that severe symptoms of blast occurred for blast waves with peak pressures of about 246 dB re 1 µPa and above. These results suggested underwater blast waves with a level of 246 dB re 1 µPa peak pressure or above could prove lethal to unprotected divers. It is important to highlight that such extreme levels of noise from piling at very close proximity is treated with utmost caution. This risk will be ‘designed out’ of any piling operation by imposing strict exclusion zones which extend significantly beyond these zones of risk (C-99, C-100, C-101, C-265 **Table 7-13**). For dB(UW), three levels of noise threshold have been used and modelled to inform the assessment.

7.9.149 A level of 90 dB(A) in air is judged to be “loud” 90 dB(UW) re 20 µPa for divers in the water is equivalent to 90 dB(A) re 20 µPa for people normally in air. This criterion is similar in level to 145 dB SEL/SPLRMS re 1µPa, which Parvin *et al*. (2007) suggests as guidance to avoid an aversion response. In order to establish a relevant noise level to elicit a ‘startle’ response, it is considered that 110 dB(UW) may be appropriate (this is mid-way between the ‘loud’ 90 dB(UW) and 130 dB(UW), which is likely to be injurious).

7.9.150 The maximum ranges modelled for these three criteria, based on the maximum design scenario of 4,400 kJ hammer and 13.5m diameter monopile foundation are

presented below in **Table 7-18**. Ranges presented reflect unmitigated values to set the worst-case, along with the propagation distance reductions predicted arising from the application of example of noise mitigation measures (low noise hammer) that will be employed for the duration of piling at Rampion 2[3] (C-265, **Table 7-13**).

Table 7-18 Maximum ranges to which 130, 110 and 90 dB(UW) levels are predicted to occur (maximum design scenario)

Piling Scenario	Threshold levels		
4,400 kJ Hammer, 13.5m monopile	**90 dB(UW)/145 dB SPL Maximum Range**	**110 dB(UW) Maximum Range**	**130 dB(UW) Maximum Range**
Unmitigated	39 km	7.2 km	500 m
PULSE Hammer (-6dB)	27 km	3.4 km	300 m
MENCK MNRU Hammer (-9dB)	22km	2.2 km	200 m

7.9.151 For the 130 dB(UW) level, which has the potential to cause permanent traumatic auditory injury, it can be seen that the maximum extent range over which this level extends is 500m (unmitigated), but with the application of the low noise hammers reduces to 200-300 m depending on the technology employed. The 110 dB(UW) threshold, which is considered to represent the level at which a diver may be startled, extends 7.2 km (unmitigated) and up to 39 km for the 90 dB(UW) level. With the mitigation in place, these reduce to 2.2-3.4 km and 22-27 km respectively.

7.9.152 All piling activities will also commence with a soft-start process (C-52, C-100, **Table 7-13**). The application of this process at the start of a foundation installation, where the first hammer blows are undertaken at a low energy, in this instance for the purposes of assessment at 880 kJ, and gradually increased over the initial piling period, means that the first noise levels emitted are much lower than the maximum design scenario case presented above. The distances over which divers would therefore be exposed to 130, 110 and 90 dB(UW) levels have also been modelled, as it is at the start of piling that the risk of startle, i.e. a panic reflex, is at its highest. These results are presented below in **Table 7-19**.

[3] Whilst the application of noise abatement technology is secured (C-265), the precise technology will be confirmed once project design has been finalised and set out in the Final Sensitive Features Mitigation Plan, secured under Condition 11 of Schedules 11 and 12 of the Rampion 2 draft DCO.

Table 7-19 Maximum ranges to which 130, 110 and 90 dB(UW) levels are predicted to occur (soft-start, 880kJ)

Piling Scenario	Threshold levels		
4,400 kJ Hammer, 13.5m monopile	**90 dB(UW)/145 dB SPL Maximum Range**	**110 dB(UW) Maximum Range**	**130 dB(UW) Maximum Range**
Unmitigated	25 km	3.0 km	300 m
PULSE Hammer (-6dB)	15.3 km	1.3 km	200 m
MENCK MNRU Hammer (-9dB)	11.3 km	0.8 km	100 m

7.9.153 From the soft-start modelling, it is evident that the 130 dB(UW) (potential permanent traumatic auditory injury) reduces to <500m (300m) unmitigated, reducing further to 100-200m depending on the hammer technology used. The 110 dB(UW) threshold (startle), reduces to 3 km (unmitigated) and to 25 km for the 90 dB(UW) level. With the mitigation in place, these reduce to 0.8-1.3 km and 11.3-15.3 km respectively.

7.9.154 Piling activities will be undertaken for approximately 12 months within the area, and while the worst-case magnitude of impacts theoretically has the potential to be major, the mitigation measures outlined above and in **Table 7-13** (C-99, C-100, C-101, **Table 7-13**), will ensure that the risk of harm to divers in the area at any point during the construction of the Proposed Development is minimised. The management measures include the reduction of noise in-situ through a Sensitive Features Mitigation Plan (secured under Condition 11 of Schedules 11 and 12 of the Rampion 2 draft DCO, an **In principle sensitive features mitigation plan** (Document Reference 7.17) has been submitted with this application) through use noise abatement mitigation measures (C-265, **Table 7-13**). The risk of primary (life-threatening physical injury or fatality) or secondary (non-life threatening damage) injury to divers will be managed by the imposition of a safety exclusion zone around all piling operations within which no-one is permitted to enter the water (C-99, **Table 7-13**). This measure is set out in more detail within the **Outline diver communication plan** (Document Reference 7.20) submitted as part of this application), with submission of the Final Plan secured within Condition 11(1)(g) of Schedules 11 and 12 of the draft DCO..

7.9.155 In addition, in order to mitigate potential exposure to hazardous levels of underwater noise, a comprehensive awareness and communications strategy (a Diver Communication Plan in accordance with the **Outline diver communication plan** (Document Reference 7.20), which will be developed by RED in agreement with regulatory authorities to notify the diving/spearfishing community of the timing and duration of proposed works. This will include but not be limited to the appointment of a Diving Liaison Officer (who will be the main point of contact) to work with dive centres, diving clubs (including education establishments), boat

operators, Coast Guard, and facilities within jetties and marinas etc. The strategy will include widely publicising (for example on the internet) details of the nature, location and timing of pile driving works and the extent of any relevant safety zones. The 'startle' reaction to underwater noise is anticipated as being less likely to occur in divers/spearfishers who have prior knowledge of the possibility of piling noise occurring (C-101, **Table 7-13**).

7.9.156 Finally, the soft-start mitigation referenced above (C-52, **Table 7-13**) will be determined in discussion with the appointed Diving Liaison Officer and will include engagement and management to ensure divers will not inadvertently drift within a safety zone during the dive, even where they have entered the water at an appropriate distance from the site works (C-100, **Table 7-13**).

7.9.157 On the basis of this, the potential impact magnitude to divers will be significantly reduced. Therefore, the magnitude of the increase in subsea noise that construction activities relating to Rampion 2 will have is considered to be **low,** indicating that the potential is for localised disturbance and/or loss of some areas on a temporary basis that does not threaten the long-term viability of the activity in the study area.

7.9.158 For all other water sports, the predominant nearshore focus of the activities and the relatively shorter periods spent submerged, and thus potentially subject to underwater noise emissions, the magnitude of the potential impact is considered to be **negligible**.

Recreational fishing

7.9.159 Construction activities, particularly the pile-driving of foundations for offshore structures, will result in levels of underwater noise that may impact upon fish species that are sensitive to noise, thereby leading to potential impacts on recreational fishing resource (in terms of target species) (see **Chapter 8: Fish and shellfish ecology, Volume 2** of the ES (Document Reference 6.2.8) and **Appendix 11.3, Volume 4** of the ES (Document Reference 6.4.11.3)). This impact has the potential to extend several km around Rampion 2, depending on the fish species receptor.

7.9.160 As assessed within **Chapter 8: Fish and shellfish ecology, Volume 2** of the ES (Document Reference 6.2.8), the significance of effect for fish species as a result of the generation of piling noise is not significant for any species in terms of mortality, mortal injury or recoverable injury. However, moderate adverse behavioural effects to one species, black seabream, were identified and this is a potentially significant effect. However, boat-based angling is a mobile sport and other fishing locations, and indeed fish species, can be targeted should black seabream in a specific location be temporarily affected by the piling work. The lack of significant effect for the vast majority of species indicates that the potential magnitude of impacts on recreational fishing will be **low** for all boat based and shore-based anglers, including trips targeting black seabream, on the basis of the availability of other locations and species.

Sensitivity or value of receptor

Diving and water sports (including surfing)

7.9.161 The subsea noise has the potential to impact diving through displacement of diving activities during piling operations undertaken during construction.

7.9.162 The effects of underwater noise on humans have not been widely investigated, with most research and analysis having been conducted for the military sector. However, where there has been a great deal of attention given to exposure of humans to noise in air then possibility of waterborne noise exposures should be taken into consideration. In the case of potential impacts due to piling for the installation of offshore WTGs in the vicinity of popular diving sites, the potential risk of adverse effects exists.

7.9.163 The effects of exposure of humans to underwater impulsive sound depends on the level of exposure and is divided into three categories:

- primary (life-threatening physical injury or fatality);
- secondary (non-life-threatening physical injury such as auditory damage); and
- tertiary (injury or death from behavioural effects, such as startling from noise and sustaining injury directly from rapid resurfacing without appropriate time to decompress).

7.9.164 It should be stated at the outset that the potential worst case scenario (fatal traumatic shock) from piling at very close proximity is treated with utmost caution and it is ensured that this risk is 'designed out' of any piling operation by imposing strict exclusion zones which extend significantly beyond this zone of risk and a number of other embedded environmental measures (as identified in **Table 7-13**) and summarised below:

- C–46: Advanced warning and accurate details of the construction activities through NtM and the Kingfisher bulletin service;
- C-52: The use of a soft start/ramp up to gradually increase to the maximum hammer energy;
- C–56: The use of safety zones of up to 500m during construction activities and the use of guard vessels in order to ensure adherence;
- C–99: The risk of primary (life threatening physical injury, or fatality) or secondary (non-life-threatening damage) to humans will be managed by recommending a safety zone around all piling operations;
- C–100: The soft-start programme will be implemented during all piling operations which will be determined in discussion with a Diving Liaison Officer (DLO); and
- C–101: The implementation of a comprehensive awareness and communications strategy (an **Outline diver communication plan** (Document Reference 7.20)) developed in agreement with regulatory authorities in order to notify OMU receptors of the timing and duration of the proposed piling

activities. This also includes widely publicising details of the nature, location and timings of the pile driving works.

- C-265: The implementation of at least one noise mitigation technology for all piling operations in the Array area to deliver noise attenuation.

7.9.165 As discussed in **paragraph 7.6.30**, although there are a range of dive sites that will be within the potential ZOI from noise generated during the piling of foundations, there will also be a range of alternative dive sites that will remain unaffected. The sites available, or constrained, during the construction phase of the Proposed Development will change during the construction period so although impacts may arise across a relatively wide area over the entirety of the construction phase, there will also be a wide range of alternative dive sites for the activity to continue throughout this time. Safety zones will be centred on construction activity and will therefore move as construction work moves. This is likely to result in only temporary limitation to some dive sites at any given time. Furthermore, impacts will be minimised by clear and proactive communication about restrictions to access, including a schedule detailing any restricted locations, and will be co-ordinated by the Proposed Development DLO and notified well in advance to the relevant diving and spearfishing groups.

7.9.166 The short-term nature of the impact, and the embedded environmental measures, such as a DLO to promulgate all necessary safety information, will be implemented during the construction phase. It is therefore considered that the sensitivity of this receptor is **medium**.

Recreational fishing

7.9.167 Impacts from subsea noise associated with the installation of the WTG foundations have the potential to affect recreational fishing through permanent threshold shift (PTS) and temporary threshold shift (TTS) on recreational fish species. The sensitivity of recreational angling (both shore- and boat-based) is related to the sensitivity of those species targeted and information has therefore been drawn from the assessment presented in **Chapter 8: Fish and shellfish ecology, Volume 2** of the ES (Document Reference 6.2.8).

7.9.168 The fish and shellfish assessment identified that construction related underwater noise represents a temporary, short- to medium-term duration and intermittent impact, affecting only a relatively small portion of the habitats in the fish and shellfish study area. Modelling shows an impact zone of up to 43km from the southern pin piles.

7.9.169 Overall, it is predicted that the sensitivity of fish and shellfish receptors is considered to be low to medium and the magnitude of impact is deemed to be low. The effect, therefore, was predicted to be of minor adverse significance, which is **Not Significant** in EIA terms.

7.9.170 Whilst fish may, therefore, be affected by underwater noise, and some temporary changes to species distribution may occur, such effects are temporary and intermittent and will be relatively localised in extent. Potential avoidance reactions of fish from intermittent piling noise may mean that fish are temporarily displaced from an area. Theoretically this movement could be both away from, and towards, recreational fishers. The associated sensitivity of recreational angling receptors

will therefore mirror the predicted range and extent of effects on the target species and is therefore considered to be **low** to **medium**.

Significance of residual effect

Diving and water sports (including surfing)

7.9.171 The sensitivity of divers to the impacts of underwater noise generation is considered to be **medium**, with a magnitude of **low**. The effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

7.9.172 For all other water sports, the receptor sensitivity is **low** and impact magnitude **negligible**, which gives an effect of **minor** significance, which is **Not Significant** in EIA terms.

Recreational fishing

7.9.173 It is predicted that the sensitivity of recreational fishing is **low** to **medium** and the magnitude of the impact is **low**, the effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

7.10 Assessment of effects: Operation and maintenance phase

Increased vessel movements

7.10.1 Increases in vessel movements during the operation and maintenance phase will be smaller than those for construction and are of a lesser magnitude. The magnitude of impacts and the sensitivities of OMU receptors to increased vessel movements are described in detail in **paragraph 7.9.1** *et seq*.

7.10.2 The magnitude of the impacts has been assessed as **low**, with the maximum sensitivity of the receptors being **medium**.

7.10.3 Mitigation will also be deployed during the operation and maintenance phase of Rampion 2 and is identified in **Table 7-13**, and includes: C–46 advanced warning of operations and vessel routes and C-51, whereby a VMP will be implemented. Therefore, the significance of effect from increased vessel movements occurring from the operation and maintenance phase of Rampion 2 will be of **minor** significance, which is **Not Significant** in EIA terms.

Physical presence of infrastructure

Introduction

7.10.4 As set out in **Table 7-12**, the maximum design parameters for Rampion 2 state that up to 90 WTGs and three OSS could be constructed.

7.10.5 RED will implement a number of embedded environmental measures during operation and maintenance (as detailed in **Table 7-13**), notably C-46, C-56 and

C-85. The physical infrastructure will be detailed on all navigational charts and maps. This infrastructure will also have the relevant lighting and marking in accordance with Trinity House (TH) and the International Association of Marine Aids to Navigation (AtoN) and Lighthouse Authorities (IALA).

Magnitude of impact

Marine aggregates

7.10.6 During operation, the presence of the Rampion 2 structures (WTGs and OSSs) along the proposed DCO Order Limits closest to the dredging licence areas may create an obstacle for dredging vessels during active dredging works or from turning into or out of the area, which may occur outside of the licensed dredging area, the vessel at that time being limited in its ability to manoeuvre. The impact of the presence of structures leading to an increased allision risk for aggregate vessels is considered in detail within **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13) in which the magnitude is assessed to be broadly acceptable – tolerable.

7.10.7 The potential for impact on dredging vessel operations will be mitigated through ongoing consultation with aggregate operators on the minimum spacing of WTGs in relation to active dredging areas.

7.10.8 In addition, and in relation to the safe and efficient operation of marine aggregate dredging vessels on the licence areas adjacent to the proposed DCO Order Limits, control measures have been agreed relating to a buffer zone within which no structures (WTG or OSS) will be installed to ensure separation of at least 1NM down-tide and 0.5NM across tide (C-267, **Table 7-13**) and that no OSS will be installed within 500m of the periphery of the Array (as defined in the DCO (C-284, **Table 7-13**) These will ensure that the safety of dredging vessels is maintained whilst the economic resource for each party is maintained.

7.10.9 Therefore, the magnitude of this impact is considered to be managed to a low level on the basis that agreement between the parties is reached and management control procedures are implemented.

Disposal sites

7.10.10 The Proposed Development overlaps with the AQUIND Cable Site A and Rampion 1 offshore wind farm disposal sites. The operation and maintenance of Rampion 2, including relevant advisory safe passing distances around maintenance vessels, may restrict access to and use of the AQUIND and Rampion 1 disposal sites. Loss of access associated with occurrence of maintenance activities is considered to be limited in extent and infrequent.

7.10.11 RED will seek proximity agreements with the operators of both disposal sites to reduce the potential conflicts on the operability of any of the projects that will arise by the overlap between the project areas.

7.10.12 Any impact is predicted to be of local spatial extent and reversible.. The magnitude is therefore considered to be **negligible**.

Offshore Wind

7.10.13 There is only one offshore wind farm within the proposed DCO Order Limits and that is Rampion 1. Although the Rampion 1 consented order limit overlaps with the proposed DCO Order Limits, the offshore wind farm infrastructure itself does not and therefore the magnitude of the impact from physical presence of infrastructure at Rampion 2 is considered to be **negligible**.

Military activity and munitions

7.10.14 The Proposed Development is adjacent to but does not overlap with D037 PEXA area (see **Figure 7.5, Volume 3** of the ES (Document Reference 6.3.7)). The presence of installations close to Danger Area D037 will therefore not restrict the military exercises. On this basis, the magnitude of this impact is therefore considered to be **negligible**.

Subsea cables

7.10.15 There is the potential that repair or maintenance works are required to existing cables in the vicinity of Rampion 2 during the operational phase. The potential impact relates to both the proposed AQUIND Interconnector (if consented and developed before Rampion 2), which might pass through the Rampion 2 proposed DCO Order Limits; and the IFA2 and CrossChannel Fibre cables that are routed in proximity to the western part of the Proposed Development (300m separation) and east of the Proposed Development (4.9km) respectively.

7.10.16 Restriction of access to an active cable for inspection and maintenance activities could be critical to the operation of that cable. Pipeline and cable proximity agreements and crossings are common across the UK Continental Shelf (UKCS), and there are established mechanisms for controlling the level of impact to both parties. As such, the magnitude of impact is considered to be **negligible** as crossing agreements will be secured.

Recreational boating and sailing

7.10.17 The presence of structures in the offshore environment may increase allision risk for recreational vessels using offshore areas. This impact is considered in detail within **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13) in which the magnitude is assessed to be broadly acceptable – tolerable. There will be no surface piercing infrastructure in the inshore areas where much of the smaller craft boating and sailing activities occur, which reduces any potential for effect in such circumstances to a negligible level. Where smaller craft use areas further offshore, for example during racing events or general use, the same assessment findings as for larger recreational vessels (in terms of allision risk) will be relevant and therefore these are included in that assessment.

7.10.18 The physical presence of infrastructure will also lead to potential obstruction issues for recreational sailing and boating. Again, this will be relevant only to areas where surface infrastructure is in place (i.e. the wind turbine array) and therefore whilst there is overlap between the export cable corridor and areas of high density use, including the general boating area (**Figure 7.7, Volume 3** of the ES (Document Reference 6.3.7)), the lack of any obstacles within this overlap reduces

any potential for effect in such circumstances to a negligible level. Maintenance activities within the export cable corridor may be required during the operational phase, however any loss of access associated with occurrence of maintenance activities is considered to be limited in extent and infrequent. There will therefore be minimal change from current baseline conditions during operation and maintenance phase of the Proposed Development.

7.10.19 The presence of the WTGs and OSSs will not exclude vessels from passing through the proposed DCO Order Limits and although some sailors may decide to avoid the array area, it is anticipated that the majority will continue to route through the array area if sailing or cruising further offshore, as is the case for the existing Rampion 1 project (based on the recreational usage data shown in **Figure 7.7, Volume 3** of the ES (Document Reference 6.3.7)). The level of obstruction to sailing and boating in the offshore array area will be related to the presence of infrastructure, such as the WTGs and OSSs, however such restrictions will be highly localised to the immediate structures and therefore of negligible magnitude.

7.10.20 With regards to potential effects on recreational boating and sailing from changes in wave climate, the predicted effects on wave climate are described in **Chapter 6: Coastal processes, Volume 2** of the ES (Document Reference 6.2.6).

7.10.21 The general effect of the wind farm infrastructure is to cause a local reduction in wave height at each foundation, and an array scale reduction in wave height in proportion to the overall blockage density presented by the WTG and substation foundations. The magnitude of the array scale effect on wave height gradually increases with distance downwind from the upwind edge through the array area. The effect then extends downwind of the array, gradually recovering to background values with distance. The changes in the wave regime have been assessed through the numerical modelling of various completed layouts and wave climate scenarios as presented in **Appendix 6.3** of **Chapter 6, Coastal processes, Volume 4** of the ES (Document Reference 6.4.6.3) along with figures of numerical model results.

7.10.22 The magnitude of change in the wave climate is shown in **Figure 6.4, Volume 3** of the ES (Document Reference 6.3.7) and is concluded to be the following:

- A very localised area of wave shadowing might occur immediately behind individual foundations, but wave heights are expected to recover rapidly (within a few tens of metres of the foundation) due to normal lateral spreading of the ambient wave energy.
- Associated changes to wave period and direction in the wave shadow are not measurable (namely, less than approximately 0.1 seconds and three degrees, respectively). Where present, the small magnitude of change follows a similar spatial pattern and footprint of effect as wave height, recovering to baseline conditions with distance (order of tens to a few hundreds of metres) downwind from the array.
- The relatively slender WTG monopiles and the single multileg foundation OSS installed in Rampion 1 alone cause little to no effect on wave height greater than 2.5 percent of the baseline condition, either locally around each foundation, or as an array scale effect. A very localised effect between 2.5 and 5 percent is occasionally visible at the location of the Rampion 1 OSS.

- The greatest relative magnitude of effect of the MDS multileg foundation WTG and OSS foundations in Rampion 2 and relatively slender WTG monopiles and the smaller single multileg foundation OSS installed in Rampion 1 together is between five and ten percent of the baseline wave height. This will occur within and immediately downwind of the Rampion 2 array area, associated with the 50 percent exceedance return period scenario, for each of the wave directions tested. The magnitude of effect reduces to less than five percent within a short distance (three to 4km) downwind of the array area. Even the smallest potentially measurable effects on wave height (more than 2.5 to five percent) do not extend to any of the adjacent coastlines.

7.10.23 It is considered that the magnitude of the change in wave climate on recreational sailing and boating is negligible because a reduction in wave height will have no adverse effect on these activities.

7.10.24 It is therefore considered that the overall magnitude of this impact is negligible to low.

Diving and water sports (including surfing)

7.10.25 The presence of the Rampion 2 operational infrastructure is not considered likely to affect diving or the majority of inshore and coastal water sports given its that the closest WTG will be situated at least 13.9km from the coast and the continued access to the Proposed Development area for recreation once fully operational.

7.10.26 For surfing and activities reliant on wave climate, the presence of the foundation structures within the water column does have the potential to affect wave conditions at the coast. This has, however, been assessed specifically within **Chapter 6: Coastal processes, Volume 2** of the ES (Document Reference 6.2.6), with the relevant findings as follows:

7.10.27 With respect to the recreational surfing venues the following is concluded.

- Very localised area of wave shadowing might occur immediately behind individual foundations, but wave heights are expected to recover rapidly (within a few tens of metres of the foundation) due to normal lateral spreading of the ambient wave energy.
- Associated changes to wave period and direction in the wave shadow are not measurable (namely, less than approximately 0.1s and 3 degrees, respectively). Where present, the small magnitude of change follows a similar spatial pattern and footprint of effect as wave height, recovering to baseline conditions with distance (a few tens of metres) downwind from the array.
- The relatively slender monopiles at multileg foundation oss platform installed in rampion 1 alone cause little to no effect on wave height greater than 2.5% of the baseline condition, either locally around each foundation, or as an array scale effect. A very localised effect between 2.5-5% is occasionally visible at the location of the rampion 1 oss platform.
- The greatest relative magnitude of effect of rampion 2 and rampion 1 together is between 5-10% of the baseline wave height, within and immediately downwind of the rampion 2 array area, associated with the 50% exceedance return period scenario, for each of the wave directions tested. The magnitude

of effect reduces to less than 5% within a short distance (3-4km) downwind of the array area. Even the smallest potentially measurable effects on wave height (more than 2.5-5%) do not extend to any of the adjacent coastlines.

- The relative magnitude and extent of the effect is greatest for the 50% exceedance return period scenario (the lowest energy wave height condition considered), and progressively decreases through higher return period scenarios for all of The wave directions tested. This occurs because wave energy is proportional to the product of the wave height and the square of the wave period. A reduction in wave energy at higher energy levels will therefore result in a smaller proportional reduction in wave height. For a given return period, the relative magnitude and extent of the effect is similar for the range of wave directions simulated.

7.10.28 Overall, the following was concluded.

- Wave direction is naturally variable over time and only locations directly downwind of the Rampion 2 array area will have any pathway for change under a particular wave condition and are therefore intermittent over time. The model results show that the array scale effects extending outside of the array area are relatively dispersed and do not lead to a focused effect at any particular location.
- Wave height, period and direction (for a wide range of typical everyday to severe storm conditions) will not be measurably changed at any coastal locations, including any recreational surfing venues. The magnitude of impact to recreational surfing venues is therefore considered **very low** with no discernible change from background conditions.

7.10.29 On this basis, the magnitude of this impact is considered to be negligible.

Recreational fishing

7.10.30 The presence of structures in the offshore environment may increase allision risk for recreational boat angling. This impact is considered in detail within **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13) in which the magnitude is assessed to be broadly acceptable – tolerable, and therefore of low magnitude.

7.10.31 Recreational angling boats may be subject to a degree of obstruction within the area of the WTG array due to the physical presence of the WTGs and OSSs, however such obstructions will be limited to the exact footprint of the surface infrastructure and therefore of negligible magnitude. The assessment of potential impacts on fish (as the targeted resource for anglers) in the operational phase identified generally low magnitude impacts for changes to or loss of habitat as a result of the operational development, although there is potential for a medium magnitude impact on black seabream within the export cable corridor. The potential effects of operational (energised) transmission cables are also assessed for electro-sensitive species, however on the basis of the highly localised spatial extent of any such potential effects, magnitude of impact was recorded as low. Maintenance activities associated with the operation of the wind farm also resulted in a predicted low magnitude impact.

7.10.32 The potential impacts only apply to boat-based angling, as shore-based angling will not be affected by the physical presence of infrastructure.

7.10.33 The associated magnitude of impact on recreational angling receptors will therefore mirror the predicted range and extent of effects on the target species and is therefore considered to be negligible to medium.

Sensitivity or value of receptor

Marine aggregates

7.10.34 As described in **Table 7-10** and presented in **Figure 7.2, Volume 3** of the ES (Document Reference 6.3.7), the proposed DCO Order Limits is in close proximity to a number of extraction areas. The closest extraction areas lie immediately east of the offshore cable corridor (areas 453, 488, 396/1, 435/1 and 435/2), and are operated by Cemex, Tarmac Marine and Hanson Aggregates Marine. There are also groups of marine aggregate dredging areas to the west of the proposed DCO Order Limits (near the Isle of Wight) and to the south east of the proposed DCO Order Limits (within the Eastern English Channel area).

7.10.35 With respect to the adjacent aggregate licence areas, dredging operations are potentially sensitive to restrictions on access and any displacement of activity as a result of the operational development, principally due to proximity of structures to worked areas within the licence areas and the attendant issues arising on safe vessel manoeuvring. Agreement has been reached through consultation with the licence holders and operators to address safety concerns prior to consent through provision of an appropriate buffer zone to separate dredging operations from the wind farm structures, with associated working arrangements such that the safety of dredging vessels is maintained whilst the economic resource for each party is maintained (C-267, C-284, **Table 7-13**).

7.10.36 The other aspect relates to transit routes from the dredging licence areas to ports for the discharge of cargoes, which could potentially affect both the adjacent licence areas and those further afield (close to the Isle of Wight and in the Eastern English Channel regions). This has been assessed within **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13) with the assessment identifying that the main routes used by the marine aggregate dredgers will require either no deviation due to the presence of Rampion 2, or the level of deviation is considered to be low (maximum 2.8nm). On this basis it is considered the commercial effect on these routes, including additional transit time and fuel consumption will be minimal with no substantial disruption. One of the routes, highlighted by Britannia Aggregates between Newhaven and the central English Channel to the east of the proposed DCO Order Limits, is evident in the vessel traffic survey data but not in sufficient numbers to constitute a main route. However, such traffic is recorded as passing well clear of the proposed DCO Order Limits and so the effect associated with such traffic was noted as negligible.

7.10.37 Marine aggregates are therefore considered to be of **medium** sensitivity to the physical presence of the Proposed Development in the operation and maintenance phase.

Disposal sites

7.10.38 There is direct overlap with two disposal sites; the AQUIND Cable Site A and Rampion 1. On the basis of the controls applied to the operation of the Proposed Development and the licence holders through securing proximity agreements prior to consent, which will ensure the operation and maintenance phase of the Proposed Development will not conflict with access or activities associated with either disposal ground. Disposal sites and their users are deemed to be of low vulnerability, medium recoverability, and medium value. The sensitivity of the receptor is therefore considered to be **medium**.

Offshore wind

7.10.39 The existing (and operational) Rampion 1 project will be sensitive to the potential for interruption to operational and maintenance activities that could arise as a result of the proximity of the Rampion 2 structures and cables during its operations and maintenance phase. In addition, there is potential for sensitivity due to maintenance activities, including relevant advisory safe passing distances around such maintenance works, for the Proposed Development that may be required in proximity to Rampion 1.

7.10.40 The sensitivity of the receptor (Rampion 1) relates principally to restrictions on access and any displacement of its own maintenance activities as a result of the operational development, principally due to proximity of structures to Rampion 1 and the attendant issues arising on safe vessel manoeuvring. Agreement will be sought with the operators of Rampion 1 prior to consent in order to provide for an appropriate buffer zone to separate the Proposed Development's operations from the wind farm structures together with associated working arrangements such that the safety of maintenance vessels for both projects is maintained.

7.10.41 The operators of Rampion 1 are deemed to be of medium vulnerability, medium recoverability, and high value. However, with proximity agreements and managed safe working arrangements in place, the sensitivity of the receptor is therefore considered to be **medium**.

Military activity and munitions

7.10.42 The Proposed Development borders but does not overlap with the D037 PEXA , they share a common boundary at a single point (see **Figure 7.1, Volume 3** of the ES (Document Reference 6.3.7)). Temporary safety zones of 500m will be established around structures during major maintenance activities during Operation. As the PEXA lies within 500m of the Order Limits, it is possible that there might be a small spatial overlap between the PEXA and a safety zone around the closest WTG. This will be of short and temporary duration. Based on this, the magnitude of the impact from the presence of temporary safety zones (500m) during maintenance activities relating to Rampion 2 is considered to be **low**, as impacts are spatially localised, of short duration and affect only a minor and peripheral area of the PEXA. In the event that a WTG is installed within 500m of the Order limit boundary in the area adjacent to the PEXA/Danger area, which would result in an area of overlap between the temporary safety zone and the PEXA/Danger area, then consultation would be undertaken with the MoD to establish appropriate controls/measures to ensure no impact on the operations of

the MoD within the PEXA/Danger area (or safety issues for the required construction/O&M works undertaken) would arise.

7.10.43 The sensitivity of military activity and munitions to the physical presence of infrastructure is therefore considered to be **negligible**, due to the lack of overlap.

Subsea cables

7.10.44 The operation and maintenance of Rampion 2, including relevant advisory safe passing distances around maintenance activities, may restrict access to the existing IFA2 Interconnector and CrossChannel Fibre cable, which are routed in proximity to (circa 300m from) the western extent of the proposed DCO Order Limits and (circa. 4.9km) to the east (respectively), and the proposed AQUIND Interconnector, which might run through the Rampion 2 array area.

7.10.45 RED will liaise and engage with the relevant companies in order to arrange the necessary proximity and working practice agreements (**Table 7-13** (C-50) and **Table 7-5**).

7.10.46 The operators of active cables are deemed to be of medium vulnerability, medium recoverability, and high value. However, due to the very low likelihood of spatial and temporal overlap of repair works with the constructed Rampion 2, and the embedded mitigation in place, the sensitivity of the receptor is therefore considered to be **medium**.

Recreational boating and sailing

7.10.47 Recreational boating use will be potentially sensitive to obstruction impacts arising from the presence of surface infrastructure, particularly where this precludes ongoing use of the area within which sailing and boating is currently undertaken. Inshore sailing and motorboat use, including the highest density use areas for recreational craft and the general boating area inshore of the Proposed Development (**Figure 7.7, Volume 3** of the ES (Document Reference 6.3.7)) will not be affected as no surface infrastructure will be installed where these areas and the project overlap. For offshore sailing, whilst there will be the need to avoid structures, the limited extent of such restrictions, the ability of sailors to avoid such obstacles and the wide separation (minimum 860m) between WTGs will result in little change to available areas within which to sail across the area. The sensitivity to such minimal changes from baseline conditions is therefore considered to be low.

Diving and water sports (including surfing)

7.10.48 The majority of water sport users, including divers, will not be sensitive to the presence of the offshore infrastructure as either the activities are undertaken inshore, away from the location of the installed WTGs and OSSs, or the activities will be able to continue much as before across the area, the main change being the need to avoid the structures themselves. This is supported by the evidence from Rampion 1 for diving activities, with clubs offering dives specifically to the operational development area, demonstrating the resilience and lack of sensitivity of diving clubs and divers to installed and operational wind farm projects.

7.10.49 Surfing activities, along with other water sports that rely on wave conditions, for example kite surfing, will be sensitive to any changes arising from the physical interruption to waves and currents arising from the presence of the wind farm infrastructure in the water column.

7.10.50 Therefore, the sensitivity of diving and water sports (excluding surfing and wave-reliant pursuits) is considered to be **negligible**, and **medium** sensitivity applicable to surfing and kite surfing.

Recreational fishing

7.10.51 The physical presence of infrastructure has the potential to affect recreational fishing. **Chapter 8: Fish and shellfish ecology, Volume 2** of the ES (Document Reference 6.2.8) assesses the impact of long-term habitat and increased hard substrate and structural complexity due to the presence of WTG foundations, scour protection and cable protection on fish and shellfish receptors. This concludes that fish and shellfish species (as receptors) have a low sensitivity to this impact, the impact will be of low magnitude and therefore effects arising will be of minor adverse significance.

7.10.52 Access to fishing locations within the Proposed Development area will be maintained for boat-based angling.

7.10.53 Boat based angling will still be possible within the Rampion 2 array area, with the exception of safety zones around infrastructure and no significant effects on the availability or distribution of targeted species is predicted. Therefore, overall it is considered that the sensitivity of recreational fishing to this impact is **low**.

Significance of residual effect

Marine aggregates

7.10.54 Overall, it is predicted that the sensitivity of the receptor is **medium**, and the magnitude of the impact is **low**, the effect will be of **minor** significance, which is **Not Significant** in EIA terms.

Disposal sites

7.10.55 Overall, it is predicted that the sensitivity of the receptor is **medium**, and the magnitude of the impact is **negligible**, the effect will be of **minor** significance, which is **Not Significant** in EIA terms.

Offshore wind

7.10.56 Overall, it is predicted that the sensitivity of offshore wind is **medium**, and the magnitude is **negligible**, the effect will be of **minor** significance, which is **Not Significant** in EIA terms.

Military activity and munitions

7.10.57 Overall, it is predicted that the sensitivity of military activity and munition is **negligible**, and the magnitude is **negligible**, the effect will be of **minor** significance, which is **Not Significant** in EIA terms.

Subsea cables and pipelines

7.10.58 Overall, it is predicted that the sensitivity of cables and pipelines is **medium**, and the magnitude of the impact is **negligible**, the effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Recreational boating and sailing

7.10.59 Overall, it is predicted that the sensitivity of recreational boating is **low**, and the magnitude of the impact is **negligible to low**, the effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Diving and water sports (including surfing)

7.10.60 It is predicted that the sensitivity of surfing and wave-reliant water sports is **medium**, with diving and all other water sports ascribed a sensitivity of **negligible**, and the magnitude of the impact is **negligible.** The effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

Recreational fishing

7.10.61 It is predicted that the sensitivity of recreational fishing is **negligible to medium**, and the magnitude of the impact is **low**, the effect will therefore be of **minor** significance, which is **Not Significant** in EIA terms.

7.11 Assessment of effects: Decommissioning phase

Overview

7.11.1 The nature and scale of impacts arising from decommissioning are expected to be of similar or reduced magnitude to those generated during the construction phase. Certain activities, such as piling, will not be required.

7.11.2 It is possible that closer to the time of decommissioning in discussion with relevant regulators and statutory bodies, it is determined that removal of certain parts of the development (e.g. cables) will have a greater environmental impact than leaving the subsurface infrastructure *in situ*. In such an eventuality, and for these components of the Proposed Development, the impacts will be similar to those described for the operational phase, although aspects relating to maintenance or repair will not be required.

7.11.3 To date, no large offshore wind farm has been decommissioned in UK waters. It is anticipated that any future programme of decommissioning will be developed in close consultation with the relevant statutory marine and nature conservation bodies. This will enable the guidance and best practice at the time to be applied to

minimise any potential impacts. A decommissioning programme will be submitted to DESNZ at least six months pre-construction and it will be subject to regular review throughout the operational phase.

Increased vessel movements

7.11.4 Increases in vessel movements during the decommissioning works will be similar to those for construction and are of a similar magnitude. The magnitude of impacts and the sensitivities of OMU receptors to increased vessel movements are described in detail in **paragraph 7.9.1** *et seq*.

7.11.5 The magnitude of the impacts has been assessed as **low**, with the maximum sensitivity of the receptors being **medium**.

7.11.6 Mitigation will also be deployed during the decommissioning of Rampion 2 and is identified in **Table 7-13**, and includes: C – 46, advanced warning of decommissioning operations and vessel routes, and C- 51, a VMP will be implemented. Therefore, the significance of effect from increased vessel movements occurring from the decommissioning of Rampion 2 will be of **minor** significance, which is **Not Significant** in EIA terms.

Displacement from the use of safety zones (500m)

7.11.7 The physical presence of infrastructure and temporary safety zones (500m) from the decommissioning works will be similar to those for construction and of a similar magnitude. The magnitude of the impact and sensitivities of OMU receptors to this impact are described in detail in **paragraph 7.9.47 *et seq***.

7.11.8 The magnitude of the impact has been assessed as low, with the maximum sensitivity of the receptors being medium.

7.11.9 RED will implement a number of mitigation measures during decommissioning (as detailed in **Table 7-13**) such as C-46 and C-56. Therefore, the significance of effect from the displacement from the use of safety zones (500m) associated with the decommissioning activities has a maximum of minor significance, which is **Not Significant** in EIA terms.

Temporary increases in suspended sediment and subsequent deposition

7.11.10 Increases in SSC and sediment deposition from the decommissioning works will be similar to that for construction and are of a similar magnitude. The magnitude of the impact and the sensitivities of OMU receptors to increased SSC and sediment deposition are described in detail in **paragraph 7.9.101** *et seq*.

7.11.11 The magnitude of the impact has been assessed as **low**, with the maximum sensitivity of the receptors being **medium**. Therefore, the significance of effect from changes in SSC and associated sediment deposition occurring as a result of decommissioning activities in the subtidal and intertidal area has a maximum of **minor** significance of effect, which is **Not Significant** in EIA terms.

7.12 Assessment of cumulative effects

Approach

7.12.1 A cumulative effects assessment (CEA) examines the combined impacts of Rampion 2 in combination with other developments on the same single receptor or resource and the contribution of Rampion 2 to those impacts. The overall method followed in identifying and assessing potential cumulative effects in relation to the offshore environment is set out in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference 6.2.5).

7.12.2 The offshore screening approach is based on the Planning Inspectorate's Advice Note Nine (Planning Inspectorate, 2018) and Advice Note Seventeen (Planning Inspectorate, 2019), with relevant components of the RenewableUK (RenewableUK, 2013) accepted guidance, which includes aspects specific to the marine elements of an offshore wind farm, addressing the need to consider mobile wide-ranging species (foraging species, migratory routes etc).

Cumulative effects assessment

7.12.3 For OMU, a ZOI as described in **Section 7.4: Scope of the assessment** and shown in **Figure 7.1, Volume 3** of the ES (Document Reference: 6.3.7)) has been applied for the CEA to ensure direct and indirect cumulative effects can be appropriately identified and assessed. The ZOI has been determined as the largest distance over which an impact may occur, for the purposes of the OMU assessment, this is defined over the distance which increased SSC and deposition may occur and therefore extends 16km around the array boundary and offshore cable corridor.

7.12.4 The OMU ZOI is shown in **Figure 7.1, Volume 3** of the ES (Document Reference 6.3.7).

7.12.5 A short list of 'other developments' that may interact with the Rampion 2 ZOIs during their construction, operation or decommissioning is presented in **Appendix 5.4: Cumulative effects assessment shortlisted developments, Volume 4** of the ES (Document Reference 6.4.5.4) and on **Figure 5.4.1** to **5.4.4, Volume 4** of the ES (Document Reference 6.4.5.4). This list has been generated applying criteria set out in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference 6.2.5). and has been collated up to the finalisation of the ES through desk study, consultation and engagement.

7.12.6 Only those 'other developments' in the short list that fall within the OMU ZOI have the potential to result in cumulative effects with the Proposed Development on OMU. All 'other developments' falling outside the OMU ZOI are excluded from this assessment. The following types of 'other development' have the potential to result in cumulative effects on OMU:

- subsea cables and pipelines (telecom and power cables);
- aggregate production areas;
- offshore wind farms; and

- telecom cables.

7.12.7 On the basis of the above, the ‘other developments’ that are scoped into the OMU CEA are outlined in **Table 7-20**.

7.12.8 The cumulative Project Design Envelope is described in **Table 7-21**.

Table 7-20 Developments considered as part of the OMU CEA

ID	Development type	Development name	Status	Confidence in assessment	Tier[4]	Distance to Rampion 2 (km)
C2	Cable	Interconnexion France-Angleterre 2 – IFA2 HVDC	Active (since January 2021)	High - Third party project details published in the public domain and confirmed as being 'accurate' by the developer.	1	0.9
C1	Cable	AQUIND (UK to France)	Proposed[5]	High – Third party project details published in the public domain and confirmed as being 'accurate' by the developer.	1	0
W10	Offshore wind farm	Dieppe – Le Treport (France)	Under construction (2019-2023)	Medium – Third party project details published in the public domain but not confirmed as being 'accurate'.	1	95.6
W23	Offshore wind farm	Fécamp (France)	Under construction (2020 – 2023)	High – Third party project details published in the public domain and	1	76.9

[4] **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference 6.2.5) sets out the full definitions of the tiers. Tier 1: high level of certainty or information availability (including under construction or where a planning application has been approved or is awaiting decision). Tier 2: medium level of certainty or information (such as developments on PINS Programme of Projects where a Scoping Report has been submitted). Tier 3: low level of certainty or information available (no planning applications submitted or identified for potential future development only).
[5] Note: The AQUIND project is currently being redetermined by the Secretary of State for the DESNZ and the construction programme is not known. A worst-case scenario of overlapping construction has been assumed.

ID	Development type	Development name	Status	Confidence in assessment	Tier[4]	Distance to Rampion 2 (km)
				confirmed as being ‘accurate’ by the developer.		
T1	Tidal Energy	Perpetuus Tidal Energy Centre (PTEC)	Proposed (Offshore plans approved 2016, plan to be operational 2025. Onshore planning application to be submitted 2021.)	Medium – Third-party project details published in the public domain but not confirmed as being 'accurate'	1	14.6
A395/1	Aggregates	395/1 Off Selsey Bill – Aggregates Industries UK Ltd	Active (end date 05/03/2028)	High – Third-party project details published in the public domain and confirmed as being ‘accurate’ by the developer.	1	15.0
A396/1	Aggregates	396/1 Inner Owers – Tarmac Marine Ltd	Active (end date 07/07/2030)	High – Third-party project details published in the public domain and confirmed as being ‘accurate’ by the developer.	1	0.1
A396/2	Aggregates	396/2 Inner Owers – Tarmac Marine Ltd	Active (end date 07/07/2030)	High – Third-party project details published in the public domain and confirmed as being ‘accurate’ by the developer.	1	2.0
A435/1	Aggregates	435/1 Inner Owers – Hanson	Active (end date 07/07/2030)	High – Third-party project details published in the public domain and	1	0.7

ID	Development type	Development name	Status	Confidence in assessment	Tier[4]	Distance to Rampion 2 (km)
		Aggregates Marine Ltd		confirmed as being 'accurate' by the developer.		
A435/2	Aggregates	435/2 Inner Owers – Hanson Aggregates Marine Ltd	Active (end date 07/07/2030)	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	1	1.5
A453	Aggregates	453 Owers Extension – CEMEX UK Marine Ltd.	Active (end date 31/03/2032)	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	1	0.5
A488	Aggregates	488 Inner Owers North – Tarmac Marine Ltd.	Active (end date 07/07/2030)	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	1	0.6
A351	Aggregates	351 South East IOW Area – Volker Dredging Ltd / CEMX UK Marine Ltd.	Active	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	1	15.8
C3	Cable	CrossChannel Fibre	Active (since December 2022)	Low – ES not available	1	4.9

ID	Development type	Development name	Status	Confidence in assessment	Tier[4]	Distance to Rampion 2 (km)
D1	Open disposal site	Newhaven	Open	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	1	17.0
D2	Open disposal site	Rampion 1	Open	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	1	0
D3	Open disposal site	Shoreham	Open	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	1	12.4
D4	Open disposal site	Brighton/ Rottingdean	Open	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	1	13.3
D5	Open disposal site	Nab Tower	Open	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	1	20.2
D6	Open disposal site	AQUIND Cable Site A	Open	High – Third-party project details published in the public domain and	1	0

ID	Development type	Development name	Status	Confidence in assessment	Tier[4]	Distance to Rampion 2 (km)
				confirmed as being ‘accurate’ by the developer.		
D7	Open disposal site -	AQUIND Cable Site B	Open	High – Third-party project details published in the public domain and confirmed as being ‘accurate’ by the developer.	1	16.7

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Table 7-21 Cumulative Project Design Envelope for OMU

Project phase and activity/impact	Scenario	Justification
Cumulative temporary increases in SSC and associated sediment deposition	Tier 1: Planned AQUIND interconnector (construction phase) Active cables, Cross Channel Fibre and IFA2 (operation and maintenance phase) Rampion 1 offshore wind farm (operation and maintenance) Active aggregates (operation and maintenance) Tier 2: No Tier 2 projects identified Tier 3: No Tier 3 projects identified	The AQUIND Interconnector cable may require localised reburial or maintenance activities temporarily causing localised sediment disturbance. Activities that interact directly with the seafloor and cable have potential to cause increase in SSC and deposition. The use of the disposal sites (at Shoreham etc) is primarily for the placement of sediment removed during maintenance dredging at the port. The use of these sites is intermittent and the volumes used are unknown in advance and therefore it is not possible to determine if the use of the sites will overlap with impacts from the construction of Rampion 2. However, while the volumes are likely to be greater, the impacts are likely to be similar to those for the deposition of the arisings predicted for Rampion 2.
Temporary increases in subsea noise	Tier 1: Planned AQUIND interconnector (construction phase) Offshore wind farm under construction (Dieppe – Le Treport and Fécamp) Planned PTEC (construction phase) Tier 2: No Tier 2 projects identified Tier 3: No Tier 3 projects identified	Maximum potential for interactive effects from subsea noise associated with construction and offshore wind farm piling activities is considered within a representative 100km buffer of the Rampion 2 array area. This buffer was chosen as underwater noise effects are expected to occur over a wider area.

7.12.9 A description of the significance of cumulative effects upon OMU receptors arising from each identified impact is given below. The cumulative effects assessment has been based off information publicly available in the ESs for the other developments. It is noted that the maximum assessment assumptions quoted within these ESs are often refined during the determination period and in the post-consent phase such that the final schemes built out may have a reduced impact when compared to what has previously been assessed.

Cumulative temporary increases in SSC and deposition

7.12.10 There is potential for cumulative increases in SSC and deposition as a result of the construction activities associated with Rampion 2 and the other developments identified (see **Table 7-21**). For the purpose of this preliminary assessment, the additive impact has been assessed within the OMU ZOI which extends 16km around the array boundary and export cable corridor, representing the maximum tidal excursion in the area, and therefore the furthest distance sediments may travel from the site. The other developments identified in Tier 1 are the AQUIND Interconnector cables and aggregate licence areas 395/1, 396/1, 396/2, 435/1, 435/2, 453 and 488. There are no Tier 2 or Tier 3 projects.

7.12.11 The proposed AQUIND interconnector cable would be located within the south west of the Proposed Development array area and it is assumed, if the project is granted consent, that construction would coincide with the construction of Rampion 2. The worst-case scenario for increased SSC is considered to be surface release of up to 1,754,000m^3 of sediment (AQUIND Limited, 2019). Cumulatively with Rampion 2 construction this may result in the disturbance and deposition of up to 4,616,000m^3 of sediment. However, only a small proportion (approximately 6%) of the AQUIND interconnector cable intersects with the Rampion 2 OMU study area, and therefore, the maximum amount of sediment released cumulatively with Rampion 2 will be considerably less than this estimated total. Any cable maintenance repairs for IFA2, CrossChannel Fibre or AQUIND, undertaken within the operational phase of the developments, will be short term, intermittent and localised to the site and therefore cumulative impacts are expected to be minimal. Additionally, due to the naturally dynamic environment of the site, any sediment released from these operations during the construction and operational phases of the development will likely be dispersed in the faster flows. Therefore, taking this into consideration, there are not predicted to be any significant cumulative impacts from the construction of AQUIND nor the operation of IFA2, CrossChannel Fibre or AQUIND cables.

7.12.12 Aggregate licence areas 351, 395/1, 396/1, 396/2, 435/1, 435/2, 453 and 488 will be operational during the construction of Rampion 2 and therefore there is potential for cumulative temporary increases in SSC and deposition from these active dredging operations. The target material at these marine aggregate areas is sands and gravels and, characteristically, the aggregate deposits in the Marine Aggregate Regional Environmental Assessment (MAREA) region contain 1 to 3% mud (silt and clay) *in situ* and therefore the suspended sediment concentrations in the overflow from dredging vessels are relatively low compared to other regions of the UK (EMU Limited, 2012).

7.12.13 As part of the Rampion 1 offshore wind farm ES assessment work, potential changes to seabed sediment thickness as a result of combined foundation

installation and aggregate extraction works were modelled to inform the impact assessment (ABPmer, 2012). The modelling predicted that bed level changes of up to around 1mm could occur; however, it was expected that this sediment will be widely remobilised. Such negligible deposition will not be anticipated to cause any significant impacts to OMU receptors. ABPmer (2012) also considered that there was only a minimal potential for any interaction between suspended sediment from export cable installation and aggregate extraction. Overall, it is therefore considered that there will be limited scope for cumulative impacts on OMU receptors.

7.12.14 Cumulative effects can also be considered in terms of duration of exposure from multiple projects, which do not overlap but happen consecutively. However, as the effects from the majority of the other developments will be temporary, there are likely to be significant temporal gaps between the discrete construction and maintenance events, which will limit the potential for cumulative effects. As aggregate activities are not considered to cause a significant cumulative increase to SSC and deposition and as a result, cumulative effects in terms of duration of exposure are not expected.

7.12.15 The sensitivity of OMU receptors to increase SSC and deposition is detailed in **paragraph 7.9.117 *et seq***. which concludes that OMU receptors have **low** sensitivity to increased SSC and deposition, with a **low** magnitude of impact. Taking into consideration the localised, short-term nature of the impacts it is concluded that the significance of effect from temporary disturbance of the Proposed Development cumulatively with Tier 1 projects/developments is **minor adverse significance**, which is **Not Significant** in EIA terms.

Cumulative increases in subsea noise

7.12.16 There is potential for impacts arising from noise and vibration as a result of construction activities associated with Rampion 2 and other projects (**Table 7-21**). For the purposes of this ES, this additive impact has been assessed within 100km of Rampion 2, which is considered an appropriate ‘buffer’ area within which to consider other sources of anthropogenic noise emissions.

7.12.17 The only Tier 1 projects identified within the 100km buffer that may be under construction at the same time as Rampion 2, is PTEC (see **Table 7-20**). As PTEC is a tidal energy demonstration facility, to date no known tidal turbine construction is detailed. Both French offshore wind farm Dieppe – Le Treport and Fécamp will be operation by 2023 with no temporal overlap or piling or drilling activities with Rampion 2. No Tier 2 or 3 projects have been identified.

7.12.18 The greatest risk of cumulative impacts of underwater noise on OMU receptors such as divers has been identified as being that produced by impact piling during the construction phase at other offshore wind farm sites in the wider study area. Impacts will not be expected to occur cumulatively due to the small range within which potential effects will be expected (i.e. predicted to occur within tens of kilometres of piling activity within each of the offshore wind farm developments).

7.12.19 Due to the lack of temporal overlap (construction to be completed for both Dieppe – Le Treport and Fécamp by 2023), there is not considered to be a cumulative impact of these three other developments on OMU receptors. The cumulative

impact of underwater noise on OMU receptors is predicted to be of regional spatial extent, short-term duration, intermittent and temporary. It is predicted that the impact will affect the receptor directly. The magnitude of the cumulative impact is therefore considered to be low.

7.12.20 The sensitivities of OMU receptors to underwater noise are discussed in **paragraphs 7.9.161 *et seq*** and are assessed to be of low-medium sensitivity.

7.12.21 Overall, it is predicted that the sensitivity of OMU receptors is **low to medium** and the magnitude is deemed to be **low**. The effect will therefore be of **minor adverse significance**, which is **Not Significant** in EIA terms. The CEA for OMU is set out in **Table 7-22**.

Table 7-22 Cumulative effects assessment for OMU

ID	Development name	Application reference	Assessment discussion	Environmental measures
W10	Dieppe – Le Treport (France)	Offshore Windfarm	Medium – Third-party project details published in the public domain but not confirmed as being 'accurate'.	Due to the lack of temporal overlap (construction to be completed for Dieppe – Le Treport by 2023), there is not considered to be a cumulative impact on OMU receptors.
W20	Fécamp (France)	Offshore Wind farm	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	Due to the lack of temporal overlap (construction to be completed for Fécamp by 2023), there is not considered to be a cumulative impact on OMU receptors.
T1	Perpetuus Tidal Energy Centre (PTEC)	Tidal Energy	Medium – Third-party project details published in the public domain but not confirmed as being 'accurate'	As PTEC is a tidal energy demonstration facility, to date no known tidal turbine construction is detailed.
C1	AQUIND (UK to France)	Cable	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	The maximum amount of sediment released cumulatively with Rampion 2 will be considerably less than this estimated total (up to 1,754,100m^3). Any

ID	Development name	Application reference	Assessment discussion	Environmental measures
				cable maintenance repairs undertaken within the operational phase of the developments will be short term, intermittent and localised to the site and therefore cumulative impacts are expected to be minimal
A395/1	395/1 Off Selsey Bill – Aggregates Industries UK Ltd / Kendall Bros (Portsmouth) Ltd / Tarmac Marine Ltd	Aggregates	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	The target material at these marine aggregate areas is sands and gravels and, characteristically, the aggregate deposits in the Marine Aggregate Regional Environmental Assessment (MAREA) region contain 1 to 3% mud (silt and clay) *in situ* and therefore the suspended sediment concentrations in the overflow from dredging vessels are relatively low compared to other regions of the UK (EMU Limited, 2012).
A396/1	396/1 Inner Owers – Tarmac Marine Ltd	Aggregates	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	The target material at these marine aggregate areas is sands and gravels and characteristically, the aggregate deposits in the Marine Aggregate Regional Environmental Assessment (MAREA) region contain 1 to 3% mud (silt and clay) *in situ* and therefore the suspended sediment concentrations in the

ID	Development name	Application reference	Assessment discussion	Environmental measures
				overflow from dredging vessels are relatively low compared to other regions of the UK (EMU Limited, 2012).
A396/2	396/2 Inner Owers – Tarmac Marine Ltd	Aggregates	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	The target material at these marine aggregate areas is sands and gravels and, characteristically, the aggregate deposits in the Marine Aggregate Regional Environmental Assessment (MAREA) region contain 1 to 3% mud (silt and clay) *in situ* and therefore the suspended sediment concentrations in the overflow from dredging vessels are relatively low compared to other regions of the UK (EMU Limited, 2012).
A435/1	435/1 Inner Owers – Hanson Aggregates Marine Ltd	Aggregates	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	The target material at these marine aggregate areas is sands and gravels and, characteristically, the aggregate deposits in the Marine Aggregate Regional Environmental Assessment (MAREA) region contain 1 to 3% mud (silt and clay) *in situ* and therefore the suspended sediment concentrations in the overflow from dredging vessels are relatively low compared to other regions of the UK (EMU Limited, 2012).

ID	Development name	Application reference	Assessment discussion	Environmental measures
A435/2	435/2 Inner Owers – Hanson Aggregates Marine Ltd	Aggregates	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	The target material at these marine aggregate areas is sands and gravels and, characteristically, the aggregate deposits in the Marine Aggregate Regional Environmental Assessment (MAREA) region contain 1 to 3% mud (silt and clay) *in situ* and therefore the suspended sediment concentrations in the overflow from dredging vessels are relatively low compared to other regions of the UK (EMU Limited, 2012).
A453	453 Owers Extension – CEMEX UK Marine Ltd.	Aggregates	High – Third-party project details published in the public domain and confirmed as being 'accurate' by the developer.	The target material at these marine aggregate areas is sands and gravels and, characteristically, the aggregate deposits in the Marine Aggregate Regional Environmental Assessment (MAREA) region contain 1 to 3% mud (silt and clay) *in situ* and therefore the suspended sediment concentrations in the overflow from dredging vessels are relatively low compared to other regions of the UK (EMU Limited, 2012).
A488	488 Inner Owers North – Tarmac Marine Ltd.	Aggregates	High – Third-party project details published in the public domain and confirmed	The target material at these marine aggregate areas is sands and gravels and, characteristically,

ID	Development name	Application reference	Assessment discussion	Environmental measures
			as being ‘accurate’ by the developer.	the aggregate deposits in the Marine Aggregate Regional Environmental Assessment (MAREA) region contain 1 to 3% mud (silt and clay) *in situ* and therefore the suspended sediment concentrations in the overflow from dredging vessels are relatively low compared to other regions of the UK (EMU Limited, 2012).
A351	351 South East IOW Area – Volker Dredging Ltd / CEMX UK Marine Ltd.	Aggregates	High – Third-party project details published in the public domain and confirmed as being ‘accurate’ by the developer.	The target material at these marine aggregate areas is sands and gravels and, characteristically, the aggregate deposits in the Marine Aggregate Regional Environmental Assessment (MAREA) region contain 1 to 3% mud (silt and clay) *in situ* and therefore the suspended sediment concentrations in the overflow from dredging vessels are relatively low compared to other regions of the UK (EMU Limited, 2012).

7.13 Transboundary effects

7.13.1 Transboundary effects arise when impacts from a development has the potential to give rise to significant effects on the environment in a European Economic Area (EEA). The consideration of effects of a transboundary nature is required under the EIA Regulations 2017. A screening of transboundary effects has been carried out and is presented in Appendix B of the Scoping Report (RED, 2020).

7.13.2 The potential transboundary impacts screened into the assessment for OMU were:

- Direct displacement impacts from construction and the physical presence of infrastructure on recreational boat users transiting to and from UK harbours/marinas during all phases.

7.13.3 Effects on recreational boat users are predicted to be limited to within the close vicinity of the proposed DCO Order Limits, however recreational boat users from EEA states (principally France) could be transiting to and from UK harbours and/or marinas on the Sussex coast. Overall, the sensitivity of recreational boating and sailing users to displacement was predicted to be **medium** and the magnitude was predicted to be **low**. The effect was therefore considered to be a **minor adverse significance**, which is **Not Significant** in EIA terms.

7.14 Inter-related effects

7.14.1 The inter-related effects assessment considers likely significant effects from multiple impacts and activities from the construction, operation and maintenance and decommissioning phases of Rampion 2 on the same receptor, or group of receptors.

7.14.2 Inter-related effects could potentially arise in one of two ways. The first type of inter-related effect is a Proposed Development lifetime effect, where multiple phases of the Proposed Development interact to create a potentially more significant effect on a receptor than in one phase alone. The phases for Rampion 2 are construction, operation and maintenance, and decommissioning. All Proposed Development lifetime effects are assessed in **Chapter 30: Inter-related effects, Volume 2** of the ES (Document Reference 6.2.30).

7.14.3 The second type of inter-related effect is receptor-led effects. Receptor-led effects are where effects from different environmental aspects combine spatially and temporally on a receptor. These effects may be short-term, temporary, transient or longer-term.

7.14.4 Receptor-led effects have been considered, where relevant, in this chapter for potential interactions between OMU and the following environmental aspects:

- **Chapter 13: Shipping and navigation, Volume 2** of the ES (Document Reference 6.2.13);
- **Chapter 8: Fish and shellfish ecology, Volume 2** of the ES (Document Reference 6.2.8);
- **Chapter 10: Commercial fisheries, Volume 2** of the ES (Document Reference 6.2.10); and
- **Chapter 17: Socio-economics, Volume 2** of the ES (Document Reference 6.2.17).

7.14.5 Full results of the receptor-led effects assessment can be found in **Chapter 30: Inter-related effects, Volume 2** of the ES (Document Reference 6.2.30).

7.15 Summary of residual effects

7.15.1 **Table 7-23** presents a summary of the assessment of significant impacts, any relevant embedded environmental measures and residual effects on OMU receptors.

Table 7-23 Summary of assessment of residual effects

Activity and impact	Magnitude of impact	Receptor and sensitivity or value	Embedded environmental measures	Assessment of residual effect (significance)
Construction				
Increased vessel movements on aggregates	Low	Medium	C-46, C-51, C-56, C-85, C-267	**Minor (Not Significant)**
Increased vessel movements on disposal sites	Low	Medium	C-46, C-51, C-56, C-85	**Minor (Not Significant)**
Increased vessel movements on offshore wind	Low	Low	C-46, C-51, C-56, C-85	**Minor (Not Significant)**
Increased vessel movements on military activity and munitions	Low	Medium	C-46, C-51, C-56, C-85	**Minor (Not Significant)**
Increased vessel movements on subsea cables and pipelines	Low (AQUIND and IFA2); Negligible all others	Low	C-46, C-51, C-56, C-85	**Minor (Not Significant)**

Activity and impact	Magnitude of impact	Receptor and sensitivity or value	Embedded environmental measures	Assessment of residual effect (significance)
Increased vessel movements on recreational boating and sailing	Low	Medium	C-46, C-51, C-56, C-85	**Minor (Not Significant)**
Increased vessel movements on diving and water sports (including surfing)	Diving Low; All others Negligible	Diving Low; All others Negligible	C-46, C-51, C-56, C-85	**Minor (Not Significant)**
Increased vessel movements on recreational fishing	Boat Low; Shore Negligible	Boat Low; Shore Negligible	C-46, C-51, C-56, C-85	**Minor (Not Significant)**
Displacement from the use of safety zones (500m) on aggregates	Low	Medium	C-46, C-56, C-267	**Minor (Not Significant)**
Displacement from the use of safety zones (500m) on disposal sites	Low (AQUIND and Rampion 1); Negligible all others	Medium	C-46, C-56	**Minor (Not Significant)**
Displacement from the use of safety zones on offshore wind	Low	Low	C-46, C-56	**Minor (Not Significant)**

Activity and impact	Magnitude of impact	Receptor and sensitivity or value	Embedded environmental measures	Assessment of residual effect (significance)
Displacement from the use of safety zones (500m) on military activity and munitions	Low	Low	C-46, C-56	**Minor** **(Not Significant)**
Displacement from the use of safety zones (500m) on subsea cables and pipelines	Low (AQUIND and IFA2); Negligible all others	Low	C-46, C-50, C-56	**Minor** **(Not Significant)**
Displacement from the use of safety zones (500m) on recreational boating and sailing	Low	Medium	C-46, C-56	**Minor** **(Not Significant)**
Displacement from the use of safety zones (500m) on diving and water sports (including surfing)	Diving Low; All others Negligible	Diving Low; All others Negligible	C-46, C-56	**Minor** **(Not Significant)**
Displacement from the use of safety zones (500m) on recreational fishing	Boat Low; Shore Negligible	Boat Low; Shore Negligible	C-46, C-51, C-56	**Minor** **(Not Significant)**

Activity and impact	Magnitude of impact	Receptor and sensitivity or value	Embedded environmental measures	Assessment of residual effect (significance)
Temporary increases in SSC and associated deposition on aggregates	Low	Low	None	**Minor (Not Significant)**
Temporary increases in SSC and associated deposition on disposal sites	Low	Medium	None	**Minor (Not Significant)**
Temporary increases in SSC and associated deposition on recreational boating and sailing	Low	Medium	None	**Minor (Not Significant)**
Temporary increases in SSC and associated deposition on diving and water sports (including surfing)	Low	low	None	**Minor (Not Significant)**
Temporary increases in SSC and associated deposition on recreational fishing	Low	Medium-low	None	**Minor (Not Significant)**

Activity and impact	Magnitude of impact	Receptor and sensitivity or value	Embedded environmental measures	Assessment of residual effect (significance)
Temporary increases in subsea noise on diving and water sports	Diving Low; All others Negligible	Diving Medium; All others Low	C-46, C-52, C-56, C-99, C-100, C-101, C-265	**Minor** **(Not Significant)**
Temporary increases in subsea noise on recreational fishing	Low	Low to Medium	C-46, C-56, C-99, C-100, C-101, C-265	**Minor** **(Not Significant)**
Operation and maintenance				
Increased vessel movements on aggregates	Low	Medium	C-46, C-51	**Minor** **(Not Significant)**
Increased vessel movements on disposal sites	Low	Medium	C-46, C-51	**Minor** **(Not Significant)**
Increased vessel movements on offshore wind	Low	Low	C-46, C-51	**Minor** **(Not Significant)**
Increased vessel movements on military activity and munitions	Low	Medium	C-46, C-51	**Minor** **(Not Significant)**

Activity and impact	Magnitude of impact	Receptor and sensitivity or value	Embedded environmental measures	Assessment of residual effect (significance)
Increased vessel movements on subsea cables and pipelines	Low (AQUIND and IFA2); Negligible all others	Low	C-46, C-51	**Minor** **(Not Significant)**
Increased vessel movements on recreational boating and sailing	Low	Medium	C-46, C-51	**Minor** **(Not Significant)**
Increased vessel movements on diving and water sports (including surfing)	Diving Low; All others Negligible	Diving Low; All others Negligible	C-46, C-51	**Minor** **(Not Significant)**
Increased vessel movements on recreational fishing	Boat Low; Shore Negligible	Boat Low; Shore Negligible	C-46, C-51	**Minor** **(Not Significant)**
Physical presence of infrastructure on aggregates	Low	Medium	C-46, C-56, C-85, C-267, C-284, C-288	**Minor** **(Not Significant)**
Physical presence of infrastructure on disposal sites	Negligible	Medium	C-46, C-56, C-85, C-288	**Minor** **(Not Significant)**

Activity and impact	Magnitude of impact	Receptor and sensitivity or value	Embedded environmental measures	Assessment of residual effect (significance)
Physical presence of infrastructure on offshore wind	Negligible	Medium	C-46, C-56, C-85, C-288	**Minor (Not Significant)**
Physical presence of infrastructure on military activity and munitions	Negligible	Negligible	C-46, C-56, C-85, C-288	**Minor (Not Significant)**
Physical presence of infrastructure on subsea cables and pipelines	Negligible	Medium	C-46, C-56, C-85, C-288	**Minor (Not Significant)**
Physical presence of infrastructure on recreational boating and sailing	Negligible	Low	C-46, C-56, C-85, C-288	**Minor (Not Significant)**
Physical presence of infrastructure on diving and water sports	Negligible	Diving Negligible; Surfing/Kite Surfing Medium	C-46, C-56, C-85, C-288	**Minor (Not Significant)**
Physical presence of infrastructure on recreational fishing	Negligible to Medium	Low	C-46, C-56, C-85, C-288	**Minor (Not Significant)**

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7.16 Glossary of terms and abbreviations

Table 7-24 Glossary of terms and abbreviations – OMU

Term (acronym)	Definition
AIS	Automatic Identification System
ALARP	As Low As Reasonable Possible
AtoN	Aids to Navigation
Baseline	Refers to existing conditions as represented by latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of development.
Baseline conditions	The environment as it appears (or would appear) immediately prior to the implementation of the Proposed Development together with any known or foreseeable future changes that will take place before completion of the Proposed Development.
BEIS	Department for Business, Energy & Industrial Strategy
BMAPA	British Marine Aggregate Production Areas
BSA	British Spearfishing Association
CCS	Carbon Capture Storage
CEA	Cumulative Effects Assessment
Cefas	Centre for Environment, Fisheries & Aquaculture Science
Construction Effects	Used to describe both temporary effects that arise during the construction phases as well as permanent existence effects that arise from the physical existence of development (for example new buildings).
CO_2	Carbon dioxide
CTV	Crew Transfer Vessel
Cumulative effects	Additional changes caused by a Proposed Development in conjunction with other similar developments or as a combined effect of a set of developments.
Cumulative Effects Assessment	Assessment of impacts as a result of the incremental changes caused by other past, present and reasonably foreseeable human activities and natural processes together with the Proposed Development.

Term (acronym)	Definition
DCO Application	An application for consent to undertake a Nationally Significant Infrastructure Project made to the Planning Inspectorate who will consider the application and make a recommendation to the Secretary of State, who will decide on whether development consent should be granted for the Proposed Development.
DECC	Department for Energy and Climate Change
Decommissioning	The period during which a development and its associated processes are removed from active operation.
Development Consent Order (DCO)	This is the means of obtaining permission for developments categorised as Nationally Significant Infrastructure Projects, under the Planning Act 2008.
DLO	Diving Liaison Officer
DML	Deemed Marine Licence
Embedded environmental measures	Equate to 'primary environmental measures' as defined by Institute of Environmental Management and Assessment (2016). They are measures to avoid or reduce environmental effects that are directly incorporated into the preferred masterplan for the Proposed Development.
Environmental Impact Assessment (EIA)	The process of evaluating the likely significant environmental effects of a proposed project or development over and above the existing circumstances (or 'baseline').
Environmental Statement (ES)	The written output presenting the full findings of the Environmental Impact Assessment.
EPP	The Evidence Plan Process
ETG	Expert Topic Group
Future baseline	Refers to the situation in future years without the Proposed Development.
HAML	Hanson Aggregates Marine Ltd
Horizontal Directional Drill (HDD)	A trenchless drilling technique avoiding open (surface excavated) trenches.
HVDC	High-Voltage Direct Current
IALA	Lighthouse Authorities
IFA2	Interconnexion France-Angleterre

Term (acronym)	Definition
IFCA	Inshore Fisheries and Conservation Authority
Impact	The changes resulting from an action.
Indirect effects	Effects that result indirectly from the Proposed Development as a consequence of the direct effects, often occurring away from the site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the source of the effects. Often used to describe effects on landscape character that are not directly impacted by the Proposed Development such as effects on perceptual characteristics and qualities of the landscape.
Non-statutory consultation	Non-statutory consultation refers to the voluntary consultation that RED undertake in addition to the statutory consultation requirements.
Likely significant effects	It is a requirement of Environmental Impact Assessment Regulations to determine the likely significant effects of the Proposed Development on the environment which should relate to the level of an effect and the type of effect.
Magnitude (of change)	A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short term or long term in duration'. Also known as the 'degree' or 'nature' of change.
MAREA	Marine Aggregate Regional Environmental Assessment
MCA	Maritime and Coastguard Agency
MCAA	Marine and Coastal Access Act
MMMP	Marine Mammal Mitigation Plan
MoD	Ministry of Defence
MOU	Memorandum of Understanding
MP	Monopile
MPCP	Marine Pollution Contingency Plan
MPS	Marine Policy Statement
MW	Megawatts
Nationally Significant	Nationally Significant Infrastructure Projects are major infrastructure developments in England and Wales which are

Term (acronym)	Definition
Infrastructure Project (NSIP)	consented by DCO. These include proposals for renewable energy projects with an installed capacity greater than 100MW.
NPS	National Policy Statement
NRA	Navigation Risk Assessment
NtM	Notice to Mariners
OFTO	Offshore Transmission Owners
OGA	Oil and Gas Authority
OMU	Other marine users
OREIs	Offshore Renewable Energy Installations
OSS	Offshore Substation
Proposed DCO Order Limits	The Proposed DCO Order Limits combine the search areas for the offshore and onshore infrastructure associated with the Proposed Development. It is defined as the area within which the Proposed Development and associated infrastructure will be located, including the temporary and permanent construction and operational work areas.
PEXAs	Practice and Exercise Areas
Planning Inspectorate	The Planning Inspectorate deals with planning appeals, national infrastructure planning applications, examinations of local plans and other planning-related and specialist casework in England and Wales.
PLG	Project Liaison Groups
PP	Pin pile
Preliminary Environmental Information Report (PEIR)	The written output of the Environmental Impact Assessment undertaken to date for the Proposed Development. It is developed to support statutory consultation and presents the preliminary findings of the assessment to allow an informed view to be developed of the Proposed Development, the assessment approach that has been undertaken, and the preliminary conclusions on the likely significant effects of the Proposed Development and environmental measures proposed.
Proposed Development	The development that is subject to the application for development consent, as described in **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference 6.2.4).

Term (acronym)	Definition
PTEC	Perpetuus Tidal Energy Centre
PTS	Permanent Threshold Shift
Receptor	These are as defined in Regulation 5(2) of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and include population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and landscape that may be at risk from exposure to pollutants which could potentially arise as a result of the Proposed Development.
RED	Rampion Extension Development Limited
RYA	Royal Yachting Association
SAS	Surfers Against Sewage
Scoping Opinion	A Scoping Opinion is adopted by the Secretary of State for a Proposed Development.
Scoping Report	A report that presents the findings of an initial stage in the Environmental Impact Assessment process.
Secretary of State	The senior minister who makes the decision to grant development consent.
Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value associated to that receptor.
Significance	A measure of the importance of the environmental effect, defined by criteria specific to the environmental aspect.
Significant effects	It is a requirement of the EIA Regulations to determine the likely significant effects of the development on the environment which should relate to the level of an effect and the type of effect. Where possible significant effects should be mitigated.
SLVIA	Seascape, Landscape and Visual Impacts
SMP	South Marine Plan
SSC	Suspended sediment concentration
Tarmac	Tarmac Marine Ltd
TCE	The Crown Estate
Temporal Scope	The temporal scope covers the time period over which changes to the environment and the resultant effects are predicted to occur and are typically defined as either being temporary or permanent.

Term (acronym)	Definition
Temporary or permanent effects	Effects may be considered as temporary or permanent. In the case of wind energy development the application is for a 30-year period after which the assessment assumes that decommissioning will occur and that the site will be restored. For these reasons the development is referred to as long term and reversible.
TH	Trinity House
The Applicant	Rampion Extension Development Limited (RED)
Tolerable	The International Maritime Organisation Formal Safety Assessment methodology (IMO, 2018) is the internationally recognised approach for assessing effects on shipping and navigation receptors, and is the approach required under the MCA methodology (MCA, 2013). This methodology is centred on risk control and assesses each effect in terms of its frequency and consequence in order that its significance can be determined as "*Broadly Acceptable*", "*Tolerable*" or "U*nacceptable*".
TSHD	Trailing Suction Hopper Dredger
TTS	Temporary Threshold Shift
UKCS	UK Continental Shelf
UNCLOS	United Nations Convention on the Law of the Sea
VHF	Very High Frequency
VMP	Vessel Management Plan
WTG	Wind Turbine Generators
Zone of Influence (ZOI)	The area surrounding the Proposed Development which could result in likely significant effects.

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