gwerth mewn gwahaniaeth
delivering on distinction

Morlais Project
Environmental Statement

Chapter 26: Cumulative, Transboundary and In-Combination Impact Assessment

Volume I

Applicant: Menter Môn Morlais Limited

Document Reference: PB5034-ES-026

Chapter 26: Cumulative, Transboundary and In-Combination Impact Assessment

Author: Royal HaskoningDHV

Morlais Document No.:	Status:	Version No:	Date:
MOR/RHDHV/DOC/0063	Final	F3.0	July 2019

TABLE OF CONTENTS

TABLE OF TABLES

TABLE OF FIGURES (VOLUME II)

TABLE OF APPENDICES (VOLUME III)

GLOSSARY OF ABBREVIATIONS

CEMP	Construction Environmental Management Plan
CIA	Cumulative Impact Assessment
DCO	Development Consent Order
EEA	European Economic Area
ECC	Export Cable Corridor
ES	Environmental Statement
EU	European Union
HRA	Habitats Regulations Assessment
INNS	Invasive Non-Native Species
MCAA	Marine and Coastal Access Act
MDZ	Morlais Demonstration Zone
MPS	Marine Policy Statement
MSPD	Marine Spatial Planning Directive
MU	Management Unit
NSIP	Nationally Significant Infrastructure Project
ODA	Onshore Development Area
TTS	Temporary Threshold Shift
TWA	Transport and Works Act
TWAO	Transport and Works Act Order
UNECE	United Nations Economic Commission for Europe
WNMP	Welsh National Marine Plan

26. CUMULATIVE IMPACTS AND IN-COMBINATION EFFECTS

26.1. INTRODUCTION

1. This chapter of the Environmental Statement (ES) provides a summary of the Cumulative Impact Assessment (CIA) for the onshore and offshore topics, for the Morlais Project (herein 'the Project').

2. Whilst each technical assessment chapter within the ES provides its own cumulative impact assessment section in relation to that topic, the purpose of this chapter is to present an overview of the potential cumulative impacts of the Project.

3. This chapter draws information from and should be read in conjunction with each of the technical chapters from Chapter 7 to Chapter 25.

4. This chapter is also provided to meet the requirement to consider transboundary impacts required by The Convention on Environmental Impact Assessment in a Transboundary Context, UN treaty No. 34028 (termed the Espoo Convention) which was signed 10 September 1997. The Espoo Convention is implemented by the EIA Directive and transposed into UK law by way of the Environmental Impact Assessment (EIA) Regulations.

5. It should be noted that an in-combination assessment has been undertaken as part of the Habitats Regulations Assessment (HRA) process. There are elements of the approach to CIA that are mirrored by the in-combination HRA process, in particular the method used to identify other plans, projects and activities that are taken forward in each assessment. Information to Support the HRA Report is submitted as part of the Transport and Works Act Order (TWAO) application (**Document MOR/RHDHV/DOC/0067, Information to Support HRA**).

26.2. POLICY, LEGISLATION AND GUIDANCE

6. A full description of all policy and legislation relevant to the Project are included in **Chapter 2, Policy and Legislation** of this ES.

26.2.1. Legislation

7. The Transport and Works Act (TWA) 1992 sets out information that must be included in the ES, as outlined within The Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006. This includes "*a description of the likely significant effects of the project on the environment, including direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects*".

8. This is also reflected in Schedule 3 of the Marine Works (EIA) Regulations 2010 (as amended).

9. The Project is subject to EIA under European Union (EU) EIA Directive 85/337/EEC (as amended). In 2011, the original EIA Directive and amendments were translated into EIA Directive 2011/92/EU. Directive 2014/52/EU amending Directive 2011/92/EU on the

assessment of the effects of certain public and private projects on the environment was published in the European Union's Official Journal in April 2014.

10. In line with this requirement, a description of likely significant cumulative and transboundary effects is provided in each technical chapter of the ES and summarised in this chapter.

11. The United Nations Economic Commission for Europe (UNECE) Convention on Environmental Impact Assessment in a Transboundary Context (the Espoo Convention) requires that assessments are extended across borders between Parties of the Convention when a planned activity may cause significant adverse transboundary impacts.

12. Regulation 32 of the EIA regulations sets out procedures to address issues associated with a development that might have a significant impact on the environment in another European Member State. The procedures involve providing information to the Member State and for the Planning Inspectorate to enter into consultation with that State regarding the significant impacts of the development and the associated mitigation measures. Further advice on transboundary issues, in particular with regard to timing, process and consultation is given in the Planning Inspectorate (2018) Advice Note Twelve.

26.2.2. National Policy

13. The Welsh Government is currently developing the first marine plan for Welsh inshore and offshore waters, the Welsh National Marine Plan (WNMP). The WNMP is being developed in accordance with the Marine and Coastal Access Act (MCAA) 2009, the Marine Policy Statement (MPS) and the Marine Spatial Planning Directive (EU Directive 2014/89) (MSPD). A draft version has been issued for consultation.

14. The draft WNMP contains the following policy (GOV_01) which is particularly relevant to this chapter:

"Proposals should demonstrate that they have assessed potential cumulative effects and, in order of preference:

a) avoid adverse effects; and/or

b) minimise effects where they cannot be avoided; and/or

c) mitigate effects where they cannot be minimised.

If significant adverse effects cannot be adequately addressed, proposals should present a clear and convincing justification for proceeding. Proposals that contribute to positive cumulative effects are encouraged."

15. **Table 26-1** sets out the national and regional policies that are relevant to cumulative impact assessments.

Table 26-1 National and Regional Policy Requirements Relevant to Cumulative and In-combination

Policy Description	Reference	ES Reference
Draft WNMP		
Proposals should demonstrate that they have assessed potential cumulative effects and, in order of preference: a) avoid adverse effects; and/or b) minimise effects where they cannot be avoided; and/or c) mitigate effects where they cannot be minimised. If significant adverse effects cannot be adequately addressed, proposals should present a clear and convincing justification for proceeding. Proposals that contribute to positive cumulative effects are encouraged.	GOV_01	An assessment of cumulative, transboundary and in-combination impacts is presented in **Chapter 26**.
Proposals that consider opportunities for coexistence with other compatible sectors are encouraged in order to optimise the value and use of the marine area and marine natural resources	ECON_02:	An assessment of cumulative, transboundary and in-combination impacts is presented in **Chapter 26**.

26.2.3. Guidance

16. In preparing this ES, consideration has been given to relevant guidance issued by a of Governmental, statutory and industry bodies, including:

    - Department of Energy and Climate Change: Guidelines on the Assessment of Transboundary Impacts of Energy Developments on Natura 2000 Sites outside the UK;
    - Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission 1999); and
    - Cumulative Impact Assessment Guidelines – Guiding Principles for Cumulative Impacts Assessment in Offshore Wind Farms (RenewableUK 2013).

17. Guidance that is applicable to a specific assessment is identified in the relevant chapters of this ES.

18. Although this project is not seeking a Development Consent Order (DCO), its size (240 MW) means it is of equivalent scale and magnitude as a Nationally Significant Infrastructure Project (NSIP). The requirements of Directive 2014/52/EU have been formally implemented in England insofar as relevant to NSIPs in the form of a revised set of regulations entitled 'The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017' (the EIA Regulations 2017). Therefore, in accordance with best practice, Menter Môn has given consideration to the EIA Regulations 2017 within this chapter, in terms of the CIA guidance published by the Planning Inspectorate.

19. The Planning Inspectorate (2018) published Advice Note Twelve regarding the Transboundary Impacts and Process and Advice Note Seventeen (Planning Inspectorate, 2015) which provides guidance on the plans and projects that should be considered in the CIA.

26.2.3.1. The Planning Inspectorate Advice Note Twelve: Transboundary Impacts and Process (Planning Inspectorate, 2018)

20. Advice Note Twelve sets out the procedures for consultation in association with an application for a DCO to the Planning Inspectorate, where such development may have significant transboundary impacts. The Advice Note sets out the roles of the Planning Inspectorate, UK Government departments and developers. Developers are advised to identify the possible significant transboundary effects or alternatively, state why they consider that there would not be any significant effects on another European Economic Area (EEA) State.

26.2.3.2. The Planning Inspectorate Advice Note Seventeen: Cumulative Effects Assessment (The Planning Inspectorate, 2015)

21. Advice Note Seventeen outlines the following staged process for the consistent assessment of cumulative impacts:

- Stage 1: Establish the project's zone of influence and identify a long list of other developments within this zone;
- Stage 2: Identify shortlist of other developments by applying inclusion/exclusion criteria to the Stage 1 list for CIA;
- Stage 3: Information Gathering regarding the shortlisted 'other development' to inform the CIA; and
- Stage 4: Assessment.

26.3. CONSULTATION

22. Consultation with stakeholders has been ongoing during the Project development (**Table 26-2**), through comments obtained from Scoping Opinion documents (2015, 2017 and 2018).

23. A request for scoping opinion for the Project was issued to the Welsh Government Planning Inspectorate under different consenting regimes in 2015 and 2017, with a final scoping opinion requested in April 2018 from Natural Resources Wales (NRW) and the Welsh Government Planning Inspectorate. All comments relevant to CIA received in these scoping opinions have been compiled in **Table 26-2** and have been responded to in this Chapter.

Table 26-2 Consultation Responses

Consultee	Date/Document	Comment	Response
Planning Inspectorate	2018 Scoping Comments	The Applicant intends for the supporting infrastructure of the Proposed Works to be developed with sufficient capacity to support the grid connection of the Minesto Holyhead Deep project (located northwest of the offshore scoping area). However, the Minesto Holyhead Deep project does not form part of the Proposed Works. It is recommended that the ES assesses the potential cumulative effects of the Minesto Holyhead	The Minesto Holyhead Deep Project has been assessed in the CIA for the relevant topics (**Section 26.5**). Note that although the potential for sharing a cable with the Minesto project has been suggested and has been included as part of previous EIA scoping exercises, it is not the proposal subject to the Morlais TWAO and Marine Licence applications.

Consultee	Date/Document	Comment	Response
		deep project and the Proposed Works.	
Planning Inspectorate	2018 Scoping Comments	In accordance with Rule 16 of the EIA Regulations, the ES should provide a description of the likely significant transboundary effects, where relevant.	An assessment of transboundary effects where relevant is provided in **Section 26.6**.
Planning Inspectorate	2018 Scoping Comments	Aspects to be considered: Table 10-1 identifies potential cumulative impacts for some, but not all, aspects to be assessed in the ES. There is no justification for the exclusion of aspects such as terrestrial ecology, land use and quality, air quality, noise and vibration (and this list is not exhaustive). Cumulative impacts should be assessed for all aspect chapters where significant effects are likely to occur.	Cumulative impacts have been assessed for all aspect chapters where significant effects are likely to occur. A summary is provided in **Section 26.5** with further details in each topic Chapter.
Planning Inspectorate	2018 Scoping Comments	Projects for consideration: It is recommended that the other projects to be included within the cumulative assessment are discussed, and ideally agreed, with relevant consultees. It would be useful for their locations to be identified on a figure included within the ES. Section 10.3.1 states that 'relevant' other projects will be included in the cumulative impacts assessment; the ES should clearly explain what is considered to be 'relevant'. It is understood that the Horizon Nuclear Power Plant comprises elements to be consented through the Town and Country Planning Act 1990 and elements to be consented through the Planning Act 2008. The Applicant should ensure all elements of Horizon's proposed works are considered in the cumulative assessment, including the offshore elements.	Offshore and onshore projects are shown within **Figure 26-1** (**Volume II**) and **Figure 26-2** (**Volume II**) respectively. It is understood that the Horizon Nuclear Power Plant project has been suspended. However, as a precautionary approach, this has been included in the CIA where relevant.
Planning Inspectorate	2018 Scoping Comments	Assessment methodology: The Scoping Report contains little detail on how the assessment will be undertaken. Although produced for Nationally Significant Infrastructure Projects, the Applicant is advised to utilise the approach set out in Planning Inspectorate Advice Note	Although this project is not seeking a DCO, its size (240MW) means it is of equivalent scale and magnitude as a NSIP. Therefore, in accordance with the Planning Inspectorate advice, Menter Môn has given consideration to Planning Inspectorate Advice Note

Consultee	Date/Document	Comment	Response
		Seventeen: Cumulative effects assessment.	Seventeen: Cumulative effects assessment within this chapter, as outlined in **Section 26.4.**
Planning Inspectorate	2018 Scoping Comments	The chapter of the Scoping Report is entitled 'Cumulative impacts and in-combination effects' however has only made further reference to 'cumulative impacts'. The Applicant should ensure terminology is defined and utilised consistently in the ES.	It should be noted that an in-combination assessment has been undertaken as part of the HRA process (**Document MOR/RHDHV/DOC/0067, Information to Support HRA**)
NRW (for PINS)	2018 Scoping Comments	The new power station at Wylfa is mentioned in relation to potential onshore cumulative impacts (see section 10.1.2). We advise that offshore aspects of the power station also need to be considered, including HNP's plans for sediment and rock disposal at Holyhead Deep (this is in addition to the existing use of the disposal ground from Holyhead Port), increased boat traffic / shipping movements and biosecurity. It should also be noted that the HNP Wylfa Newydd development will mostly sit adjacent to the existing power plant rather than use the same site footprint.	The Wylfa project has been suspended indefinitely, however, this project has been considered where relevant in **Section 26.5** and the relevant topic chapters.
NRW (for PINS)	2018 Scoping Comments	It's important to note that, in addition to inter project effects outlined in Section 10, intra-development effects, where multiple development elements have the potential to impact the same receptor, need to be considered throughout the relevant ES chapters and wider EIA process.	Intra-development effects have been considered in the topic-specific chapters (**Chapter 7-25**).
IACC 2018	2018 Scoping Comments	The application strategy should be aligned with other significant projects identified within the scope of the cumulative impacts assessment.	Noted.
IACC 2017	2018 Scoping Comments	The list of projects to be assessed in terms of cumulative and in-combination impacts appears limited. The EIA should consider an agreed list of proposals at an agreed cut-off date before submission of the planning application.	Following the submission of the Scoping Report a full review of the projects to be assessment in the CIA and HRA have been reviewed. Those relevant to the Onshore Development Area were reviewed during the EIA process and the list of projects is correct at the time of writing in June 2019, prior to submission of the TWAO

Consultee	Date/Document	Comment	Response
			application. As part of the TWAO the submission of the Preliminary Environmental Information Report is not required, therefore the list of projects relevant to the Onshore Development Area incorporates the full list of pre-application, pre-determined and determined projects on the IoACC planning portal. Key projects relevant to the Offshore Development Area have been discussed with NRW and IoACC in Technical Working Group meetings.
NRW	2018 Scoping Comments	We draw your attention to the requirement of Article 6 of Schedule 3 of the MWR which requires you to consider the potential transboundary effects of the project.	An assessment of transboundary effects where relevant is provided in **Section 26.6**.
NRW	2018 Scoping Comments	The scope of the Cumulative Impact Assessment is project focused, although the temporal or 'time frame' boundary is not clearly defined. Please note the European Commission guidance regarding temporal boundaries, which suggests: 'Setting the time boundary in terms of future developments can be based on information provided from the relevant planning authorities during consultation and from information contained within development plans produced by local or perhaps national authorities. In setting the future time boundary it is suggested that in general, beyond 5 years there is too much uncertainty associated with most development proposals. It is therefore recommended that in the majority of cases the limit does not exceed 5 years into the future.'	Noted.
NRW	2018 Scoping Comments	The cumulative assessment should include other proposed and existing Marine Licence applications such as disposal at Holyhead North disposal site. Information on marine licence applications can be found on the Welsh Government Marine Planning Portal or downloaded from Lle. The assessment should also include developments	Noted, other proposed and existing Marine Licence applications have been considered.

Consultee	Date/Document	Comment	Response
		allocated within the statutory development plan, proposals in the AONB management plan and in the draft Wales National Marine Plan (each of which is supported by an Environmental Report and Habitats Regulations Assessment). Regard should also be given to Natural Resources Wales' emerging Area Statements (Marine and North-West Wales Areas), when published.	
NRW	2018 Scoping Comments	The cumulative and in combination effects of shipping and navigation require consideration, in particular regarding shipping routes, and the proximity of other activity or proposed developments in the area will require a detailed assessment.	Noted, a detailed cumulative assessment has been undertaken in **Chapter 15, Shipping and Navigation** (**Section 15.6.6**).
NRW	2018 Scoping Comments	The consideration of underwater noise cumulative effects should include activities in the wider are, such as navigation and fishing, as well as any other project developments.	The consideration of underwater noise has been assessed where relevant in **Section 26.5**.
NRW	2018 Scoping Comments	It should be noted that the Habitats Regulations Assessment for the Draft Welsh National Marine Plan, which was published in December 2017, was unable to rule out Adverse Effect on Integrity for multiple SPA, SAC and Ramsar sites and features. These conclusions should be taken into account when screening relevant plans or projects under the Habitats Regulations that could have an in-combination effect on those sites and when considering cumulative and synergistic effects under the Environmental Impact Assessment and Strategic Environmental Assessment Regulations.	It should be noted that an in-combination assessment has been undertaken as part of the HRA process (**Document MOR/RHDHV/DOC/0067, Information to Support HRA**)
IoACC	2017 Scoping Comments	Agrees projects to be assessed are limited.	Noted.
NRW	2015 Scoping Comments	Cumulative effects are likely to be significant in such a busy area and the EIA must address the implications that additional activities in the area will have on environmental resources e.g. bird displacement.	Noted, cumulative impacts are summarised within **Section 26.5**. For more detail see topic specific chapters (**Chapters 7-25**).

Consultee	Date/Document	Comment	Response
NRW	2015 Scoping Comments	Other Projects and activities in addition to those considered within section of the scoping report will need to be considered when assessing the cumulative impacts and in-combination effects of Morlais. Clearly identifying the key impact pathway / receptor combinations of relevance to Morlais, once the Project design envelope has been agreed will help to identify other activities which will need to be considered. It is important to note that for wide ranging marine species such as mammals or widely foraging seabirds, this may include Projects or activities located some distance from Morlais.	Noted, numerous offshore developments have been considered within the full foraging range of the receptors where relevant.
NRW	2015 Scoping Comments	In-combination effects with other developments/proposals will also need to be assessed for HRA and WFD. These include Lateral Power and Wylfa Newydd nuclear power station.	In-combination effects for internationally designated nature conservation sites are considered in the HRA (**Document MOR/RHDHV/DOC/0067, Information to Support HRA**). In-combination effects for the WFD are scoped out within **Section 26.5.3** and **Section 26.5.12**.
NRW	2015 Scoping Comments	Section 10.1.3 – the types of Projects considered for cumulative impact assessment should include, in addition to those listed in the scoping report; > disposal of dredged material at Holyhead deep disposal site; and > cables and pipelines	Noted, the list of projects considered within the CIA is outlined in **Section 26.4**.

26.4. METHODOLOGY

26.4.1. Cumulative Impact Assessment

24. The key aim of the CIA is to assess whether impacts on a receptor may occur on a cumulative basis between the Project and other projects, activities and plans (either consented or forthcoming) in the study area.

25. The Planning Inspectorate Advice Note 17 provides guidance on plans and projects that should be considered in the CIA based on a tiered approach with decreasing levels of likely available detail:

- Projects that are under construction;
- Permitted applications, not yet implemented;
- Submitted applications not yet determined;

- Projects on the Planning Inspectorate's Programme of Projects;
- Development identified in relevant Development Plans, with weight being given as they move closer to adoption and recognising that much information on any relevant proposals will be limited; and
- Sites identified in other policy documents as development reasonably likely to come forward.

26. The CIA is a two part process in which an initial list of projects with the potential to interact with the Project is identified, based on the potential mechanism of interaction. All receptors that are to be considered as part of the EIA will initially be considered as part of the CIA, with the aim of removing receptors from the scope where no pathway to an impact can be predicted. Once relevant sources and receptors have been identified, possible pathways will be identified. Where no pathways exist, cumulative impacts can be ruled out. The spatial extent and refinement of projects will be informed through this 'screening' process.

27. Only projects which are reasonably well described and sufficiently advanced to provide information on which to base a meaningful and robust assessment have been included in the CIA.

28. Projects which are sufficiently implemented during the site characterisation for the Project are considered as part of the baseline for the EIA. Onshore plans or projects to be taken into consideration include (but not limited to):

- Building/housing developments;
- Installation or upgrade of roads;
- Installation or upgrade of cables and pipelines;
- Other energy generation infrastructure;
- Coastal protection works; and
- National Grid works.

29. Additionally, for the offshore topics, cumulative impacts may arise from interactions with the following activities and industries:

- Other tidal energy projects;
- Wave energy projects;
- Offshore wind energy projects;
- Aggregate extraction and dredging;
- Licensed disposal sites;
- Sub-sea cables and pipelines;
- Coastal protection schemes;
- Potential port/harbour development; and
- Oil and gas activities.

30. In line with the RenewableUK CIA Guidelines for offshore wind farms (RenewableUK, 2013), the approach to CIA attempts to incorporate an appropriate level of pragmatism. This is demonstrated in the confidence levels applied to various developments, particularly those that are known but currently lack detailed project application documentation, such as those projects at the scoping stage only.

31. These projects have been considered for CIA only in those chapters where it is considered that the Scoping Reports contain sufficient detail with which to undertake a meaningful assessment. Where there is a lack of specific information in the public domain, such as how and when (or if) projects will be built, it is not always possible to undertake a meaningful CIA.

26.4.2. Transboundary Impact Assessment

32. Potential transboundary impacts have been approached in a similar way to other cumulative impacts, with a clear audit trail provided to demonstrate why projects have been included or excluded.

26.5. CUMULATIVE IMPACT ASSESSMENT

26.5.1. Introduction

33. The list of all plans and projects that were scoped in for the consideration of each technical assessment can be found in **Appendix 26.1** (**Volume III**) and are illustrated in **Figure 26-1** (**Volume II**) for offshore projects and **Figure 26-2** (**Volume II**) for onshore projects.

34. The sections below lists the plans and projects from **Appendix 26.1** (**Volume III**) which were included in the CIA for each technical assessment and summarise the cumulative impacts identified for each chapter of the ES. The tables below provide the impact, a rationale of how cumulative impacts could occur and a CIA. All mitigation measures and further detail around the CIA are included in each relevant technical chapter.

26.5.2. Metocean Conditions and Coastal Processes

35. Of the projects listed in **Appendix 26.1** (**Volume III**), the only one which could potentially have a cumulative or in-combination effect with the Project in respect of coastal processes is Minesto's Holyhead Deep project. All other projects are either too remote from the Project or onshore and thus do not affect coastal processes.

    Minesto's Holyhead Deep project will be an 80 MW installation of tidal energy devices, delivered in a phased manner, and located a short distance due west of the MDZ Project. The predicted impacts of Minesto's Holyhead Deep project on coastal processes have been assessed as being not significant in their own right (Minesto, 2016), and this conclusion is considered equally valid when both projects are considered in combination.

    Table 26-3 provides a summary of the CIA outcomes for metocean and coastal processes.

36. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout

the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

Table 26-3 Potential Cumulative Impacts Identified for Metocean Conditions and Coastal Processes

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Changes in suspended sediment concentrations due to foundation installation in the Project	Based upon the geographical configuration of the Minesto Project Development Area (PDA) with respect to the MDZ Project, there is no possibility of changes in tidal flow interacting between projects, due to the alignment of flood and ebb flows off the coast of Anglesey (i.e. the two projects are not upstream/downstream of each other). Similarly, any (minor) sediment plumes arising from construction from either project will not coalesce because of: (i) the alignment of principal tidal flows; and (ii) likely different construction programmes (note that phase 1 of the Holyhead Deep project is already installed). The predicted impacts of Minesto's Holyhead Deep project on coastal processes have been assessed as being not significant in their own right (Minesto, 2016), and this conclusion is considered equally valid when both projects are considered in combination.	Scoped out of CIA
Changes in sea bed level (morphology) due to deposition during foundation installation in the Project		Scoped out of CIA
Changes in suspended sediment concentrations during offshore export cable installation (including nearshore)		Scoped out of CIA
Changes in sea bed level due to offshore export cable installation		Scoped out of CIA
Changes in suspended sediment concentrations during inter-array cable installation		Scoped out of CIA
Changes in sea bed level due to inter-array cable installation		Scoped out of CIA
Changes in sea bed level (morphology) due to indentations during installation in the Project		Scoped out of CIA
Operation		
Changes to the tidal regime due to the presence of structures in the Project	Based upon the geographical configuration of the Minesto Project Development Area (PDA) with respect to the MDZ Project, there is no possibility of changes in tidal flow interacting between projects, due to the alignment of flood and ebb flows off the coast of Anglesey (i.e. the two projects are not upstream/downstream of each other). Similarly, any (minor) sediment plumes arising from construction from either project will not coalesce because of: (i) the alignment of principal tidal flows; and (ii) likely different construction programmes (note that phase 1 of the Holyhead Deep project is already installed). The predicted impacts of Minesto's Holyhead Deep project on coastal processes have been assessed as being not significant in their own right (Minesto, 2016), and this conclusion is considered equally valid when both projects are considered in combination.	Scoped out of CIA
Changes to the wave regime due to the presence of structures in the Project		Scoped out of CIA
Changes to the sediment transport regime due to the presence of structures in the Project		Scoped out of CIA
Loss of sea bed morphology due to the footprint of structures in the Project		Scoped out of CIA
Morphological and sediment transport effects due to cable protection measures for offshore export cables (including nearshore and at the coastal landfall)		Scoped out of CIA
Morphological and sediment transport effects due to cable protection measures for inter-array cables		Scoped out of CIA

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Changes in sea bed level (morphology) due to maintenance during maintenance in the Project		Scoped out of CIA
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.		

26.5.3. Marine Water and Sediment Quality

37. The only project which could potentially have a cumulative or in-combination effect with the MDZ Project in respect of marine water and sediment quality is judged to be Minesto's Holyhead Deep project. All other projects listed are either too remote from the Project for interactions between water/sediment quality impacts or onshore and do not affect the marine environment.

38. **Table 26-4** provides a summary of the CIA outcomes for marine water and sediment quality.

39. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

Table 26-4 Potential Cumulative Impacts Identified for Marine Water and Sediment Quality

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Change in water quality due to sediment plume generated via foundation installation	Based upon the geographical configuration of the Minesto PDA with respect to the Project, there is no possibility of changes in tidal flow interacting between projects, due to the alignment of flood and ebb flows off the coast of Anglesey (i.e. the two projects are not upstream/downstream of each other). Similarly, any (minor) sediment plumes arising from construction from either project will not coalesce because of: (i) the alignment of principal tidal flows; and (ii) likely different construction programmes (note that phase 1 of the Holyhead Deep project is already installed).	Scoped out of CIA
Change in water quality due to sediment plume generated via cable installation		Scoped out of CIA
Change in water quality due to release of contaminated sediments		Scoped out of CIA
Deterioration in status of WFD waterbodies and/or local designated bathing waters		Scoped out of CIA
Change in water quality due to discharge of construction material and/or chemicals	If construction activities were to occur simultaneously on both projects, which could produce a cumulative impact via spill events and accidental discharges of liquids/materials. If this cumulative impact occurred, a significant adverse impact on local marine water quality could be produced. However, both projects would independently adopt standard best practice measures with respect to spill prevention and response and as such, the	Scoped out of CIA

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
	significance of this potential cumulative impact would be reduced to a negligible level.	
Operation		
Change in water and/or sediment quality due to accidental spillages/leaks from operational devices	There is no possibility of changes interacting between projects, due to the alignment of flood and ebb flows off the coast of Anglesey (i.e. the two projects are not upstream/downstream of each other).	Scoped out of CIA
Change in water sediment quality due to sediment plumes generated by repowering and/or cable repair works		Scoped out of CIA
Change in water sediment quality due to sediment plumes produced via scour around seabed mounted project infrastructure		Scoped out of CIA
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.		

26.5.4. Benthic and Intertidal Ecology

40. As observed within **Chapter 9, Benthic and Intertidal Ecology**, the majority of impacts which are associated with benthic ecology are restricted to the immediate footprint of the Project. Therefore, it is only projects that will affect the same area of seabed, or more generally, the same local resource of benthic habitats that require consideration. The only identified project is Minesto's Holyhead Deep project.

41. **Table 26-5** provides a summary of the CIA outcomes for benthic and intertidal ecology.

42. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

Table 26-5 Potential Cumulative Impacts Identified for Benthic and Intertidal Ecology

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Physical disturbance to habitats and species and temporary habitat loss	Construction activities of the Project with the Minesto project may overlap on a temporal scale as the construction and installation of the Minesto project is following a phased approach and their seabed footprints should be considered in the overall footprint of habitat loss in the region. In comparison to the amount of comparable habitat identified in the survey area, the overall area of habitat that will be impacted	Scoped out of CIA

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
	by the Minesto project and the Project is small and it is predicted that no significant impacts should occur.	
Increased suspended sediment concentration and sediment deposition	The combined impact of the construction activities from the two projects presents a greater risk of elevated suspended sediment concentrations beyond what has been predicted for each individual project. However, there is no possibility of changes in tidal flow interacting between projects, due to the alignment of flood and ebb flows off the coast of Anglesey (i.e. the two projects are not upstream/downstream of each other). The predicted impacts of Minesto's Holyhead Deep project on coastal processes have been assessed as being not significant in their own right (Minesto, 2016), and this conclusion is considered equally valid when both projects are considered in combination.	Scoped out of CIA
Pollution of water and sediment through accidental events	If this cumulative impact occurred, a major adverse impact on local benthic and intertidal ecology could be produced. However, both projects would independently adopt standard best practice measures with respect to spill prevention and response and as such, the significance of this potential cumulative impact would be reduced to a negligible level.	Scoped out of CIA
Physical disturbance to intertidal habitats and species during landfall works	As described above, in comparison to the amount of comparable habitat identified in the survey area, the overall area of habitat that will be impacted by the Minesto project and the Project is small and it is predicted that no significant impacts should occur. Further, Minesto and Morlais may in future investigate options to share the landfall infrastructure; which could reduce the combined footprint of both projects and ensure that any habitat loss associated is kept to a minimum.	Scoped out of CIA
Potential spread of non-native	Although there is an increased risk of the introduction of Invasive Non-Native Species (INNS) to the marine environment due to an increased amount of vessel traffic in the area and thus an increased window of opportunity, if all projects abide to similar mitigation measures and follow relevant guidelines then the probability should remain low. Therefore, the likelihood of simultaneous construction cumulatively impacting vulnerable benthic communities and receptors within the wider area is extremely low and is considered not significant.	Scoped out of CIA
Operation		

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Long term loss of benthic habitat via placement of project infrastructure	In comparison to the amount of comparable habitat identified in the survey area, the overall area of habitat that will be impacted by the Minesto project and the Project is small and it is predicted that no significant impacts should occur. Further, Minesto and Menter Môn may in future investigate options to share the future export cable; which could reduce the combined footprint of both projects and ensure that any habitat loss associated is kept to a minimum.	Scoped out of CIA
Changes in hydrodynamic and inter-related effects on benthic ecology	It is unlikely that there will be a significant alteration to the hydrodynamics in a regional context. Due to both of these projects being situated within areas of hard substrate and low levels of soft sediments, it is unlikely that scour pits will form around either projects infrastructure, and thus unlikely for an interaction to occur between the two projects.	Scoped out of CIA
Introduction of new habitat in the form of project infrastructure	Both the Project and the Minesto project involve introduction of hard substrate into a marine environment, which presents a risk of colonisation, inward migration and the settlement of species. Further, this hard substrate presents a substrate which could be utilised by INNS. However, as both of these projects are located within predominately hard substrate areas, the effects of possible colonisation of the infrastructure will not be as pronounced as those which would occur if the infrastructure was to be placed within soft sediments, as this would lead to the colonisation of an environment by species which are not typically found in this area. Further, due to the large level of available natural hard substrate (stony reef, bedrock etc), a large sink will occur to these readily available habitats. The current dominance of hard substrates within the MDZ and the wider region suggests additional hard substrate through infrastructure will not present a vastly different environment for INNS than already within the region. Therefore, it is unlikely that the new infrastructure and additional hard substrates within the region will lead to a significant impact.	Scoped out of CIA
Temporary physical disturbance of seabed caused by maintenance and repowering activities	The small scale of impact that this has on the environment within the MDZ and the Minesto project makes them unlikely to interact with each other.	Scoped out of CIA
Decommissioning		

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.		

26.5.5. Fish and Shellfish Ecology

43. The majority of impacts on fish and shellfish associated with the Project have a spatial extent that is limited to the site and the immediate surroundings. As such it is only projects that will affect the immediate local environment that shall be screened in for consideration. A nominal buffer of ~20 km has been chosen as a worst case maximum extent over which impacts may overlap i.e. accumulate. Any projects beyond 20 km are screened out of this CIA on the basis that they are beyond the spatial extent of impacts from the Project. In addition, any projects that do not involve any construction in the marine environment have also been screened out.

44. Migratory fish have the potential to be impacted at distances greater than non-migratory fish. However, as the cumulative impacts on Annex II migratory fish are assessed as part of the HRA and presented in the Information to Support HRA (see **Document MOR/RHDHV/DOC/0067, Information to Support HRA**) they are not included here.

45. The projects taken forward for this CIA are presented in **Chapter 10, Fish and Shellfish Ecology**. **Table 26-6** provides a summary of the CIA outcomes for fish and shellfish ecology.

46. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

Table 26-6 Potential Cumulative Impacts Identified for Fish and Shellfish Ecology

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Underwater noise	The production of underwater noise from the Wylfa decommissioning project will only arise during the potential explosive decommissioning of the cooling water jetty and associated infrastructure. The underwater noise produced by explosive detonations is typically of high intensity and short duration (<1 second). The noise from underwater explosions in itself can cause mortality in the immediate area and effects at a range of up to 350 m. There is little information on the sub-lethal impacts in fish from explosions. Due to the short temporal scale (single explosion per piece of infrastructure) of the underwater noise produced during the Wylfa decommissioning it is considered unlikely to cause any added impact	Negligible

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
	above the level of impact that may arise during the Project. Marine works associated with the construction of Wylfa Nuclear Power Plant will include both permanent and temporary works. The Project Description states that "*the majority of works will be undertaken within the first two years of the Project's construction phase, though certain works may take up to five years to complete*". As the project is in suspension it is uncertain when or if these works will occur. The Project Description has identified the activities that may generate underwater noise as including drilling, piling (vibratory piling hammer), dredging, rock breaking, vessel noise. Of these, it can be expected that piling using the hydraulic drop hammer would produce the greatest amount of underwater noise. It has not been possible to ascertain any ranges of underwater noise impacts from the construction activities from Wylfa Nuclear Power Plant. If it can be assumed that the piling will produce underwater noise of a similar level to that produced by the current Project, then there is no pathway for overlap of the zone of influence of underwater noise. Indeed, even if the noise levels were higher, it is deemed highly unlikely that the zone of influence would exceed the 17.5 km distance between the two projects. Furthermore, the deposition of dredge material at the Holyhead North dredge site as part of the Wylfa Newydd project will also produce underwater noise. Little is known about the underwater noise generated from deposition at sea therefore as a worst-case scenario the sound levels from cutter suction dredging were used in the Horizon Nuclear Disposal site characterisation report. For the sound levels produced by cutter suction dredging, the maximum range for injury to fish was modelled to be 2 m, and the maximum range of Temporary Threshold Shift (TTS) was 13 m. Based on these distances there is no spatial overlap of the acoustic zones of influence produced by the two projects. It is not known when the activities creating underwater noise from the other Projects will occur. Therefore, for the purpose of this assessment, the worst-case scenario of complete temporal overlap between the noise-producing activities of the identified projects and each phase of the Project has been assumed. Following the measurements given above and taking into account the maximum impact range	

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
	of worst-case noise produced during the Project activities (50 m, during construction; see Table 10.21), it can be concluded that there will be no overlap between the acoustic footprints of the Project with other projects and plans in the area. Furthermore, the footprint over which there will be elevated noise levels is small and represents only a small portion of the greater area available to fish and shellfish species. Therefore, the cumulative impacts from the underwater noise pathway are considered not significant.	
Physical disturbance of habitats and temporary habitat loss	The current Project represents 2,184,932 m^2 (2.18 km^2) of permanent subtidal habitat loss during the lifetime of the Project in addition to temporary habitat loss which is anticipated to have a maximum total of 423,499 m^2 (0.42 km^2) during each of the construction and decommissioning phase, and 127,000 m^2 (0.12 km^2) during the operational phase. The seabed footprint of marine infrastructure associated with the existing Power Station at Wylfa is very small as it comprises a single jetty not more than 150 m long. The marine works as part of the construction of the Wylfa Newydd project are in a similar location, adjacent to the coast at Wylfa on the north Anglesey coast, and are also considered small (extending a maximum of 3 km into the marine zone). Due to the small area and distance from the site it is considered that the cumulative impact of habitat disturbance and loss from these project activities on north Anglesey will have a negligible effect. In addition to construction the Wylfa Newydd project involves dredge disposal at a large site nearer to the MDZ. As part of the plume dispersion modelling, a worst-case scenario of maximum extent of deposition on the seabed (at a thickness of 1 cm) was a total area of 1.8 km^2. This value can also be utilised to represent the maximum habitat loss in the area. In comparison to the amount of comparable habitat identified in the survey area, the overall area of habitat that will be impacted by the additional seabed activities will be small and it is predicted that no significant cumulative impacts should occur.	Negligible
Increased suspended sediment concentration and sediment deposition	The decommissioning work of the existing Wylfa Power Station that are in the marine environment, i.e. the explosive demolition of the jetty, has been identified as having the potential to result in "*substantially elevated levels of suspended sediment in the water column,*	Negligible

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
	possibly resulting in smothering of sensitive habitats and species". NRW requested that sediment transport modelling be conducted to predict effects, although it is uncertain if this was undertaken and no evidence of this has been found online. As part of the Environmental Statement produced for the application for the Wylfa Newydd Project a detailed assessment of the sediment regime in the area was undertaken. The results can be used to inform the potential extent of impacts from the decommissioning activity of the existing Wylfa Power Station as they are in the same location. The Environmental Statement details that, despite the high amount of wave energy, "*sediment movement is essentially limited to individual bays as rock platforms and headlands provide barriers (natural groynes)*" this prevents the movement of sediment. On this basis it is possible to infer that any increased sediment suspension as a result of marine activities in the Wylfa area will not extend as far as the Project, which is situated 17.5 km away. Dredge disposal at the Holyhead North/Deep site as part of the Wylfa Newydd project also has the potential to cause localised increase in sediment concentrations and deposition. Modelling of the environmental change and effects on fish and shellfish lead to a conclusion of negligible magnitude, a worst-case medium sensitivity of the receptor (due to commercial fish), and therefore an overall negligible impact due to increased suspended sediment concentration. Similarly, the report concluded a negligible effect on fish and shellfish receptors from smothering due to the negligible magnitude of effect (due to mortality or displacement) and the medium value/sensitivity of the receptor. It was expected that all resuspended sediment would remain wholly contained within the disposal site. Due to the minor adverse impact of increased sediment resulting from the Project, coupled with the negligible effect of the sediment pathways on fish and shellfish concluded from the only nearby project, and the lack of spatial overlap of effects, it can be concluded that the cumulative impacts from increased sediment will not be significant.	
Operation		
Underwater Noise	As per construction	Negligible

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Long-term habitat loss via placement of project infrastructure (project footprint)	As per construction	Negligible
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.		

26.5.6. Marine Ornithology

47. The potential effects from the project that were screened in for assessment for the Project alone were further screened for the potential for cumulative effects with other projects. This process is outlined in **Table 26-7.**

Table 26-7 Potential Cumulative Impacts Identified for Marine Ornithology

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Airborne noise and visual disturbance	The likelihood that there would be a cumulative impact is low because the impact as a result of the project occurs on a small spatial scale and it is dependent on a spatial coincidence of disturbance / displacement from other plans or projects. However, one such project has been identified, therefore a more detailed assessment will be carried out for construction and operational impacts.	Negligible
Disturbance at breeding sites	The likelihood that there would be a cumulative impact is very low because it would be dependent on a spatial co-incidence of disturbance / displacement from other plans or projects during either construction or operation of the project, of which none have not been identified.	Scoped out of CIA
Other impacts	The likelihood that there would be a cumulative impact is very low because the impact as a result of the project occurs on a small spatial scale and it is dependent on a temporal and spatial co-incidence of similar impacts from other plans or projects, of which none have not been identified or are considered likely.	Scoped out of CIA
Operation		
Collision risk with tidal devices	There is a sufficient likelihood of a cumulative impact to justify a quantitative cumulative impact assessment during the operational period of the project. Cumulative impact due to collision risk from offshore wind farms has been screened out, as the collision risk to species as a result of the	Minor Adverse, not significant

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
	project that are also susceptible to collision with wind turbines (i.e. gannet) is very low (<3 birds per year under all deployment scenarios). All other species assessed as being at risk of collision during the operation of the project are known not to be susceptible to collision with wind turbines.	
Entanglement with tidal devices	The likelihood that there would be a cumulative impact is very low because the impact as a result of the project is small in scale and magnitude, especially when compared to the wider issue of seabird bycatch.	Scoped out of CIA
Other impacts	The likelihood that there would be a cumulative impact is very low because the impact as a result of the project occurs on a small spatial scale and it is dependent on a temporal and spatial co-incidence of similar impacts from other plans or projects, of which none have not been identified or are considered likely.	Scoped out of CIA
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.		

48. Two potential effects, airborne noise and visual disturbance, and collision risk (excluding offshore wind farms), were screened in for cumulative assessment.

49. For airborne noise and visual disturbance, only projects occurring locally that involve activities in subtidal habitat are considered to have the potential to cause cumulative impacts in conjunction with the Project (**Table 26-8**). Any projects which have been ongoing since the collection of baseline data (e.g. Holyhead Harbour Maintenance Dredging) are not considered on the basis that they form part of the baseline.

50. Only other marine energy projects (i.e. those with contributions to underwater collision risk) are considered to have potential to contribute to cumulative collision risk (**Table 26-8**). Cumulative impact due to collision risk from offshore wind farms has been screened out, as the collision risk to species as a result of the Project that are also susceptible to collision with wind turbines (i.e. gannet) is very low (approximately zero to three birds per year based on a 240 MW deployment), and the reference population very large (**Chapter 11, Marine Ornithology**).

Table 26-8 Summary of Projects Considered in CIA for Airborne Noise and Visual Disturbance Impact Pathway and Underwater Collision Risk Impact Pathway

Project	Status	Impact Pathway	Data Status	Justification for Inclusion
Holyhead Deep Phase I	Marine Licence was granted for the first 0.5 MW installation of the 10MW project	Airborne noise and visual disturbance	Complete for marine ornithology receptors	Consented project that does not yet form part of the baseline

Project	Status	Impact Pathway	Data Status	Justification for Inclusion
		Collision risk with tidal devices		
Holyhead Deep Phase II (80MW)	Scoping Report submitted in 2017	Airborne noise and visual disturbance Collision risk with tidal devices	No information available	Possible project that does not yet form part of the baseline
Holyhead Port Expansion	Scoping Report submitted 28/04/17	Airborne noise and visual disturbance	Draft, unpublished assessment available	Possible project that does not yet form part of the baseline
Bardsey Sound	An Agreement for Lease was awarded pre-May 2018. The project would include ten 100 kW turbines	Collision risk with tidal devices	None available	Possible project that does not yet form part of the baseline
Argyll Tidal Demonstration	Marine licence secured in 2015, status of works unknown	Collision risk with tidal devices	Complete for marine ornithology receptors	Consented project that does not yet form part of the baseline
Fair Head Marine Renewable Tidal Array	Environmental Statement presented. Target to be operational by 2021	Collision risk with tidal devices	Complete for marine ornithology receptors	Consented project that does not yet form part of the baseline
Sound of Islay Demonstration Site	Consented – construction programme not known	Collision risk with tidal devices	Complete for marine ornithology receptors	Consented project that does not yet form part of the baseline
West Islay Tidal Energy Farm	Consented – construction programme not known but scheduled for completion by 2022	Collision risk with tidal devices	Complete for marine ornithology receptors	Consented project that does not yet form part of the baseline

51. Potential cumulative effects are predicted for airborne noise and visual disturbance, and collision risk (excluding offshore wind farms) for the projects included in **Table 26-8**, but as summarised in **Table 26-7,** these are anticipated to be **negligible** to **minor adverse**, respectively.

52. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

26.5.7. Marine Mammals

53. The potential effects from the project that were screened in for assessment for the project alone were further screened for the potential for cumulative effects with other projects. This process is detailed in **Table 26-9.**

Table 26-9 Potential Cumulative Impacts Identified for Marine Mammals

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Underwater noise and disturbance	There is the potential for cumulative impacts from underwater noise, such as construction activities and vessels from other projects which could have a cumulative impact on marine mammals. There is no potential for cumulative impacts for auditory injury as MMMPs for each project will reduce the risk of PTS and therefore any potential cumulative impacts. Changes in prey availability as a result of any potential disturbance from underwater noise would be less that areas of potential impact assessed for marine mammals and would therefore have no further potential cumulative impacts.	Negligible for all species except for grey seal where CIA impact significance is Minor Adverse, not significant.
Potential barrier effects	It has been identified that there is no potential for cumulative barrier impacts with other projects, based on the location and distances of the projects.	Scoped out of CIA
Disturbance at seal haul-out sites	No projects have been identified that have the potential for cumulative impacts on the seal haul-out site near the MDZ and ECC.	Scoped out of CIA
Increased collision risk with vessels	There is the potential for an increased risk of collision with vessels from a number of different projects, and therefore a more detailed assessment will be carried out for construction, operation and decommissioning impacts of other projects.	Minor Adverse, not significant
Potential changes in water quality	There is no potential for any changes to water quality to impact on marine mammal species in and around the MDZ and ECC, therefore there is no potential for cumulative impacts with other projects.	Scoped out of CIA
Potential changes in prey availability from habitat loss	There is the potential for changes to prey availability to impact on marine mammal species from a number of other projects, therefore a more detailed assessment will be carried out for construction, operation and decommissioning impacts of other projects.	Negligible to Minor Adverse, not significant
Collision risk with tidal devices	It has been identified that there is the potential for collision risk from tidal devices from at least one other project, and therefore a more detailed assessment will be carried out for the operational impacts of other projects.	Minor Adverse, not significant

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Potential entanglement with moorings for floating devices	As no instances of entanglement with the mooring systems of renewable energy have been recorded, and the constant tension of the mooring line for the Holyhead Deep Phase I, the impact was concluded to be negligible for harbour porpoise, bottlenose dolphin, Risso's dolphin, common dolphin and grey seal, and low for minke whale. Taking into account the assessment of potential entanglement at MDZ there is no predicted cumulative effects	Scoped out of CIA
Potential EMF impacts	It has been identified that there is no potential for EMF impacts to marine mammal species.	Scoped out of CIA
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.		

54. Any projects which have been ongoing since the collection of baseline data (e.g. Holyhead Harbour Maintenance Dredging) are considered part of the baseline.

55. The projects identified have only been assessed for those species that are within the identified Management Unit that is included in the assessments. An indication has been made as to which marine mammal species each Project with the potential for cumulative impact has been included for within **Chapter 12, Marine Mammals**.

56. A summary of projects considered for CIA and their potential for cumulative impacts is presented in **Table 26-10**.

57. A summary of the impact significance for potential cumulative impacts on each species is presented in **Table 26-11**.

Table 26-10 Summary of Projects Considered in CIA and Potential for Cumulative Impacts

Project	Status	Species MU area	Distance from OfDA (km)	Potential for Cumulative Impacts			
				Underwater noise and disturbance	Collision risk from vessels	Collision risk from tidal devices	Changes to prey availability
Holyhead Deep Phase I	In April 2017, a Marine Licence was granted for the first 0.5 MW installation.	All	2	Yes	Yes	Yes	No
Holyhead Deep Tidal Array	In 2017, scoping report submitted for an 80MW extension to the Holyhead Deep tidal array.	All	2	Yes	Yes	Yes	Yes
Holyhead Port Expansion	ES currently being prepared	All	2	Yes	Yes	N/A	Yes
Holyhead Waterfront Regeneration	Awarded Outline Planning Permission in 2014, with Reserved Matters.	All	2	Yes	Yes	N/A	No
Wylfa Nuclear Power Plant	Project Suspended	All	17	Yes	Yes	N/A	Yes
Wylfa Decommissioning	Ongoing (most work on land)	All	17	Yes	Yes	N/A	Yes
Amlwch LNG	The existing consent was renewed in 2013, but future plans are unclear and timescales undefined.	All	20.5	Yes	Yes	N/A	No
North Hoyle Offshore Wind Farm	Operation and Maintenance Activities only.	All	81	Yes	No	N/A	No
Rhyl Flats Offshore Windfarm	Operation and Maintenance Activities only.	All	59	Yes	Yes	N/A	No
Gwynt y Môr Offshore Wind Farm	Operations and Maintenance activities only.	All	65	Yes	Yes	N/A	No
Barrow Offshore Wind Farm	Operations and Maintenance activities only.	All	116	Yes	Yes	N/A	No
West of Duddon Sands Offshore Wind Farm	Operations and Maintenance activities only.	All	114	Yes	Yes	N/A	No

Project	Status	Species MU area	Distance from OfDA (km)	Potential for Cumulative Impacts			
				Underwater noise and disturbance	Collision risk from vessels	Collision risk from tidal devices	Changes to prey availability
Ormonde Offshore Wind Farm	Operations and Maintenance activities only.	All	117	Yes	Yes	N/A	No
Walney Extension Offshore Wind Farm	Operations and Maintenance activities only.	All	114	Yes	No	N/A	No
Burbo Bank Extension Offshore Wind Farm	Operations and Maintenance activities only.	All	95	Yes	Yes	N/A	No
Codling Wind Park	Consented.	All	75	Yes	Yes	N/A	No
Codling Wind Park Extension.	Application submitted.	All	75	Yes	Yes	N/A	No
Alexandra Basin Redevelopment.	Current status unknown, but the project has been consented.	All	96	Yes	No	N/A	No
Isle of Man Ferry Terminal.	MLA/2018/00536. Marine Licence App submitted Dec 2018.	All	92	Yes	Yes	N/A	No
Milford Haven, Maintenance Dredge Pembrokeshire	Application submitted.	All	175	Yes	Yes	N/A	Yes
Afon Dysynni outfall gravel removal and relocation	Marine Licences issued and valid until 17/10/2021.	All	81	Yes	Yes	N/A	Yes
Belfast Harbour D3 terminal cruise ship facility	Application submitted, awaiting a decision.	All	163	Yes	Yes	N/A	No
Disposal of dredge material from the D3 approach channel	Application submitted, awaiting a decision.	All	163	Yes	Yes	N/A	No
Marine Energy Wales marine testing area	Scoping – Issued Nov 2018	All	175	Yes	Yes	Yes	No
Argyll Tidal Demonstration	Marine licence secured in 2015, status of works unknown	Grey and harbour seal	225	Yes	Yes	Yes	No

Project	Status	Species MU area	Distance from OfDA (km)	Potential for Cumulative Impacts			
				Underwater noise and disturbance	Collision risk from vessels	Collision risk from tidal devices	Changes to prey availability
		OSPAR MU only					
Sound of Islay Demonstration Site	Consented – construction programme not known	Grey and harbour seal OSPAR MU only	268	Yes	Yes	Yes	No
West of Islay Tidal Energy Park	Consented – construction programme not known	Grey and harbour seal OSPAR MU only	265	Yes	Yes	Yes	No
Enlli Tidal Energy Scheme, Bardsley Island	Scoping – Issued Nov 2018	All	53	Yes	Yes	Yes	Yes

Table 26-11 Assessment of Impact Significance for Potential Cumulative Impacts

Potential Cumulative Impact	Receptor	Mitigation	Residual Impact
Underwater noise and disturbance	Harbour porpoise	No further mitigation proposed	Negligible
	Bottlenose dolphin		Negligible
	Risso's dolphin		Negligible
	Common dolphin		Negligible
	Minke whale		Negligible
	Grey seal		Negligible
	Harbour seal		Negligible
Collision risk with tidal devices and vessels	Harbour porpoise	Phased deployment, monitoring and mitigation	Minor adverse
	Bottlenose dolphin		Minor adverse
	Risso's dolphin		Minor adverse
	Common dolphin		Minor adverse
	Minke whale		Minor adverse
	Grey seal		Minor adverse
	Harbour seal		Minor adverse
Displacement due to changes in prey availability as a result of habitat loss	Harbour porpoise	No mitigation required or proposed	Negligible to Minor adverse
	Bottlenose dolphin		Minor adverse
	Risso's dolphin		Minor adverse
	Common dolphin		Negligible
	Minke whale		Minor adverse
	Grey seal		Minor adverse
	Harbour seal		Negligible

58. In summary, significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

26.5.8. Offshore Archaeology

59. The only project which could potentially have a cumulative or in-combination effect with the Project in respect of offshore archaeology is judged to be Minesto's Holyhead Deep project. All other projects listed are either too remote from the Project for interactions between direct or indirect impacts or are located on land and thus do not affect the marine cultural heritage

60. **Table 26-12** provides a summary of the CIA outcomes for offshore archaeology.

Table 26-12 Potential cumulative impacts identified for Offshore Archaeology

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Direct physical impact on known and unknown maritime, aviation and submerged prehistoric cultural heritage assets	Based upon the geographical configuration of the Minesto PDA with respect to the Project, there is no cumulative direct impact on the known archaeological sites within the MDZ.	Scoped out of CIA
Indirect physical impacts on known and unknown maritime, aviation and submerged prehistoric cultural heritage assets	Following mitigation, there are no significant impacts posed to this potential receptor by the Project. The Minesto development also identified potential palaeogeographic features, which may be impacted by development. Following mitigation advised in the Minesto ES, the impacts upon these features were considered to be not significant.	Scoped out of CIA
Operation		
Direct physical impact on known and unknown maritime, aviation and submerged prehistoric cultural heritage assets	Based upon the geographical configuration of the Minesto PDA with respect to the Project, there is no cumulative direct impact on the known archaeological sites within the Project.	Scoped out of CIA
Indirect physical impacts on known and unknown maritime, aviation and submerged prehistoric cultural heritage assets	Following mitigation, there are no significant impacts posed to this potential receptor by the Project. The Minesto development likewise identified potential palaeogeographic features, which may be impacted by development. Following mitigation advised in the Minesto ES, the impacts upon these features were considered to be not significant.	Scoped out of CIA
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.		

26.5.9. Commercial Fisheries

61. The majority of impacts on commercial fisheries receptors associated with the Project have a spatial extent that is limited to the site and the immediate surroundings. As such it is only projects that will affect the immediate local environment that shall be screened in for consideration in the cumulative assessment. A buffer of 20 km has been chosen as a worst case maximum extent

over which impacts may overlap i.e. accumulate. Any projects beyond 20 km are screened out of this CIA on the basis that they are beyond the spatial extent of impacts from the Project. In addition, any projects that do not involve any construction in the marine environment have also been screened out.

62. On this basis, the only identified project considered within this cumulative assessment is Minesto's Holyhead Deep project which is located less than 1 km from the western boundary of the Project.

63. The main receptor groups that will potentially be affected by cumulative impacts are the <10m and >10m static gear vessels in MDZ area and the >10m mobile gear vessels in/around MDZ area.

64. The Project impact assessment along concluded that these receptor groups would be impacted during the construction phase of the MDZ, via the impacts listed above. It is assumed that the same type of impacts (disruption/loss of access to fishing grounds/collision risk etc.) will occur cumulatively if construction is carried out at the same time on the MDZ and Minesto sites.

65. **Table 26-13** provides a summary of the CIA outcomes for commercial fisheries.

Table 26-13 Potential Cumulative Impacts Identified for Commercial Fisheries

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Loss of access to fishing grounds due to construction activity	When considered in detail, even with the adverse impacts occurring at the same time, the magnitude of effect is not judged to increase to a degree that would alter the overall impact significance. This is based on the fact that the criteria for a high magnitude effect to arise on any of these receptors is an effect "that affects an area from which the majority of a commercial fishing receptor's annual value of landings is caught". Even when the MDZ and Minesto projects are considered together, any disruption/loss of access/damage to gear, will not be focused on an area that represents where the majority of a vessels annual catches are made.	Minor Adverse
Collision risk between commercial fishing vessels and construction vessels		Minor Adverse,
Obstruction to regular fishing vessel transit routes		Minor Adverse
Interference with static fishing gear due to additional vessel traffic		Minor Adverse
Supply chain opportunities for local fishing vessels	Even with two potential sources of supply chain support from the two projects, the conclusions on impact significance presented for the MDZ project alone are judged to remain valid, i.e. there will be a beneficial impact ranging from minor beneficial to moderate beneficial for the main fish receptor groups, with the most benefit potentially for >10m vessels with more capacity to work in both the Project and Minesto sites. This conclusion is presented on the basis that the amount of additional supply chain opportunities from the two projects considered	Minor Beneficial

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
	together, whilst greater than for Project alone, will not be great enough to increase the significance of beneficial impact using the criteria in the impact assessment methodology, i.e. to increase the impact significance to a major beneficial impact for the >10m vessels receptor group, it would have to be assumed that the two projects together would "potentially provide a major source of revenue for a vessel and is likely to occur".	
Operation		
Collision risk between commercial fishing vessels and project infrastructure	Even with the adverse operational phase impacts occurring at the same time, the magnitude of effect is not judged to increase to a degree that would alter the overall impact significance. This is based on the fact that the criteria for a high magnitude effect to arise on any of these receptors is an effect "that affects an area from which the majority of a commercial fishing receptor's annual value of landings is caught". Even when the MDZ and Minesto projects are considered together, the area of disruption/loss of access/damage to gear from both sites combined (MDZ; 35km^2 plus Minesto leased area of 9.1 km^2 = 44.1 km^2), will not equate to the high magnitude effect criteria (an area that represents where the majority of a vessels annual catches are made).	Minor Adverse
Loss of access to fishing grounds and displacement of fishing effort onto adjacent grounds		Minor Adverse
Reduction in abundance of target species and reduced supply of catch to established local buyers		Minor Adverse
Presence of seabed fasteners		Minor Adverse
Supply chain opportunities for local fishing vessels	There will be a beneficial impact ranging from minor beneficial to moderate beneficial for the main fish receptor groups, with the most benefit potentially for >10m vessels with more capacity to work in both the Project and Minesto sites.	Minor Beneficial to Moderate Beneficial
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.		

66. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

26.5.10. Shipping and Navigation

67. The projects taken forward for this CIA are also presented within **Chapter 15, Shipping and Navigation**. The only project which could potentially have a cumulative or in-combination effect with the MDZ Project is judged to be Minesto's Holyhead Deep project. All other projects listed are either too remote from the Project for interactions between water/sediment quality impacts or onshore and do not affect the marine environment.

68. **Table 26-14** provides a summary of the CIA outcomes for shipping and navigation.

Table 26-14 Potential Cumulative Impacts Identified for Shipping and Navigation

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Cumulative Impact due to Increased Vessel Activity	Multiple offshore developments require construction and maintenance vessel activity as they transit to and from their bases of operation. Vessels associated with the Project and Holy Head Deep project may interact with one another. The level of additional vessel activity from each project will be higher during construction and decommissioning. This has the potential to increase collision risk.	Minor - Low Risk
Cumulative Impact from Cable Routes	Multiple cable routes that cross over one another may reduce the navigable depth of water. The cables are to be unburied with cable protection. Multiple cable routes are required for the project, which may result in a decrease in the charted depth in some areas and an increase in vessel activity during the construction and decommissioning phases.	Minor - Low Risk
Operation		
Cumulative Impact on Vessel Routing	Commercial shipping, fishing boats and recreational craft must all operate to avoid these developments and any works taking place. This reduces the available sea room available, concentrating them in smaller areas, potentially bringing them into conflict. The cumulative impact of these developments will result in a loss of navigable sea room which may require vessels to be rerouted which has the potential to increase the risk elsewhere. Primary cumulative impacts to routeing are the inshore passage and impact upon vessels such as ferries utilising the northern ferry route, search and rescue and Holyhead Deep maintenance vessels.	Minor - Low Risk
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.		

69. In summary, significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

26.5.11. Infrastructure and Other Users

70. Following a review of information currently available in the public domain, it can be identified that there is a potential for cumulative or in-combination impacts with the Deep Green Holyhead Deep Phase I and subsequently Phase II tidal projects, which neighbours the Project to the west.

71. It is likely that the Project and Minesto project will be operational simultaneously. As the leased areas for both projects overlap the current licenced area of the Holyhead Deep IS040 disposal site it may face cumulative impacts from the two projects.

72. The EIA for the Deep Green Holyhead Deep Project Phase I (Minesto, 2016) states that disposal site ISO40 has infrequent use across the area and identifies that the disposal site boundary is likely to be re-designated, and possibly reduced in size by 50 %. Minesto (2016) suggest that if ISO40 is reduced in size the operational phases of the two projects will not affect activities at and users of the disposal site. If this disposal site is not redesignated then there will be no pathway for a cumulative impact upon this receptor.

Table 26-15 Potential Cumulative Impacts Identified for Infrastructure and Other Users

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Disruption of ongoing Ministry of Defence (MOD) activities	It is possible that during construction of these projects, the presence of increased vessel activity in the area could result in some minor interference to vessels going to and from the disposal site, however the mitigation proposed in **Chapter 15, Shipping and Navigation** will manage vessel activity to ensure impacts are not significant.	Negligible
Interaction with UXO		Negligible to Minor Adverse
Interaction with active telecommunication cables		Negligible
Operation		
Disruption of ongoing MOD activities	It is possible that during construction of these projects, the presence of increased vessel activity in the area could result in some minor interference to vessels going to and from the disposal site, however the mitigation proposed will manage vessel activity to ensure impacts are not significant.	Negligible
Interaction with active telecommunication cables		Negligible
Decommissioning		
Disruption of ongoing MOD activities	It is possible that during construction of these projects, the presence of increased vessel activity in the area could result in some minor interference to vessels going to and from the disposal site, however the mitigation proposed will manage vessel activity to ensure impacts are not significant.	Negligible
Interaction with UXO		Negligible to Minor Adverse

26.5.12. Water Resources and Flood Risk

73. Projects taking place in the marine areas surrounding Holy Island and Anglesey have been scoped out due to the limited potential for impacts to act cumulatively between marine and terrestrial freshwater bodies. The projects screened in are presented in **Chapter 17, Water Resources and Flood Risk**.

74. **Table 26-16** provides a summary of the CIA outcomes for water resources and flood risk.

75. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

Table 26-16 Potential Cumulative Impacts Identified for Water Resources and Flood Risk

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Direct disturbance of surface water bodies	The small scale of the landfall and grid connection substation, together with the spatial overlap from projects identified in **Appendix 26.1** (**Volume III**), mitigation measures to prevent the supply of sediment and contaminants during construction mean that there are not considered to be any cumulative impacts associated with projects.	Negligible
Increased sediment supply		Negligible
Accidental release of contaminants		Negligible
Disruption of groundwater levels and flows		Negligible
Changes surface water runoff and flood risk		Negligible
Operation		
Changes to Surface Water Runoff, Groundwater Flows and Flood Risk	The small scale of the landfall and grid connection substation, together with the spatial overlap from projects identified in **Appendix 26.1** (**Volume III**), extensive mitigation measures to prevent the supply of sediment and contaminants during construction mean that there are not considered to be any cumulative impacts associated with projects.	Negligible
Supply of fine sediment and other contaminants		Negligible
Decommissioning		
Contractual details relating to decommissioning are yet to be finalised, however the ultimate responsibility for the decommissioning of the general onshore electrical infrastructure will lie with Menter Môn. At this stage, this is expected to consist primarily of removal of the onshore substation.		

26.5.13. Ground Conditions and Contamination

76. The projects screened in are presented in **Chapter 18, Ground Conditions and Contamination.**

77. **Table 26-17** provides a summary of the CIA outcomes for Ground Conditions and Contamination.

78. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

Table 26-17 Potential Cumulative Impacts Identified for Ground Conditions and Contamination

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Impacts on designated geological sites	Overlapping proposed project boundaries may result in impacts of a direct and/or indirect nature on geology, controlled waters, human health and ground conditions, however, due to incorporation of a Construction Environmental Management Plan (CEMP) and the nature of the development, there will be no cumulative impacts on geology and ground conditions Due to the distance from most projects no cumulative effects on onshore ground conditions or contamination likely. Where projects do overlap spatially it is assumed that they will be constructed with relevant mitigation measures embedded within their design. These measures should prevent significant adverse impacts on ground conditions or contamination occurring as a result, therefore it is considered that there is no pathway for cumulative impacts.	Negligible
Impacts on Groundwater Quality in the Superficial Secondary Aquifers During Earthwork Activities		Negligible
Impacts on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from HDD		Negligible
Impact on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from Piling		Negligible
Impact on Surface Waters from Contamination of Groundwaters and Subsequent Discharge		Negligible
Impacts to Human Health		Negligible
Impacts on Controlled Waters as a Result of Construction Activities		Negligible
Operation		
There are unlikely to be any significant cumulative impacts from the operation of the project.		
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be the same as those identified during the construction stage.		

26.5.14. Onshore Ecology

79. Projects taking place in the marine areas surrounding Holy Island and Anglesey have been scoped out of this chapter due to the limited potential for impacts to act cumulatively between marine and terrestrial ecology. The projects screened in are presented in **Chapter 19, Onshore Ecology**.

80. **Table 26-18** provides a summary of the CIA outcomes for onshore ecology.

81. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

Table 26-18 Potential cumulative impacts identified for Onshore Ecology

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Habitat loss or disturbance of features of statutory designated nature conservation sites	There is not anticipated to be a significant impact to ecological connectivity to and therefore there is not anticipated to be a cumulative impact. Due to the distance from the Project works area and most other projects will by default construct sympathetically with the ecological interest features of its own site and that the Project does not anticipate an impact on this site, impacts are likely to be highly localised to each project, and therefore will not act cumulatively with each other. Overlapping proposed project boundaries may result in impacts on terrestrial habitats Due to the Project being constructed on poor semi improved grassland which is not of significant ecological value or an important location for chough or notable flora or fauna species, and the project will avoid more sensitive features such as marshy grassland and woodland, there is not anticipated to be a significant cumulative impact.	Negligible
Habitat loss or disturbance of features of non-statutory designated nature conservation sites		Negligible
Habitat loss (grasslands, wetland habitat, hedgerow)		Negligible
Habitat loss, disturbance or killing of protected species		Negligible
Spread of non-native invasive species		Negligible
Operation		
Disturbance to foraging and commuting routes for bats	Impact to species due to other projects may increase the cumulative impacts to species. There is not anticipated to be a significant impact to foraging and commuting routes and therefore there is not anticipated to be a cumulative impact.	Negligible
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be the same as those identified during the construction stage.		

26.5.15. Onshore Archaeology

82. In terms of onshore archaeology and cultural heritage, any new developments within the locality of the landfall or grid connection substations could result in a cumulative indirect impact upon the setting of certain heritage assets. None of the projects identified in **Appendix 26.1** (**Volume III**) have been considered to cause this cumulative impact, as detailed in **Chapter 20, Onshore Archaeology and Cultural Heritage**.

26.5.16. Noise and Vibration

83. All offshore cumulative projects were scoped out of the noise and vibration CIA, as it was assumed that the potential for significant impacts to occur in combination with the onshore aspects considered in this assessment was minimal.

84. The projects considered in the CIA included those on Holy Island only, as due to the geography of the area is it not considered that traffic associated with projects elsewhere in North Wales would impact upon roads on Holy Island. Cumulative road traffic noise impacts may occur where the same road network will be used for multiple projects, plans or activities.

85. **Table 26-19** provides a summary of the CIA outcomes for noise and vibration.

86. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

Table 26-19 Potential Cumulative Impacts Identified for Noise and Vibration

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Construction phase Noise and vibration	Multiple projects could lead to increases in noise and vibration, human health and ecological impacts at receptors. If a temporal overlap of the construction phases were to occur, it is anticipated that the cumulative project would employ best-practice methods to minimise noise generated during construction, as recommended for the Project. With the implementation of these measures, significant cumulative noise impacts have limited potential to occur. Due to the separation distance, cumulative construction phase noise impacts would not be expected to occur.	Negligible
Construction phase road traffic noise	Multiple projects could lead to increases in traffic flows which may lead to impacts at human and ecological receptors. The Project will generate the largest amount of traffic during the construction phase, which is temporary in nature, and therefore the potential for any significant impacts to occur would be limited to a relatively short duration.	Negligible
Operation		
Operational phase noise and vibration	There are not anticipated to be any substantial noise and vibration sources or traffic movements generated during the operational phase that would give rise to significant cumulative impacts at human or ecological receptors.	Negligible
Operational phase road traffic emissions		Negligible
Decommissioning		

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Decommissioning phase noise and vibration	There are not anticipated to be any substantial noise and vibration sources, or traffic movements generated during the decommissioning phase that would give rise to significant cumulative impacts at human or ecological receptors.	Negligible
Decommissioning phase road traffic noise		Negligible

26.5.17. Air Quality

87. All offshore cumulative projects were scoped out of the air quality CIA, as it was assumed that the potential for significant impacts to occur in combination with the onshore aspects considered in this assessment was minimal.

88. The projects considered in the CIA included those on Holy Island only, as due to the geography of the area is it not considered that traffic associated with projects elsewhere in North Wales would impact upon roads on Holy Island. Cumulative road traffic emission impacts may occur where the same road network will be used for multiple projects, plans or activities.

89. Dust impacts during construction may occur within 350 m of a project boundary; therefore, cumulative impacts may occur where two or more projects are within 700 m of each other, and where there is a temporal overlap between construction phases.

90. **Table 26-20** provides a summary of the CIA outcomes for air quality.

91. Given that the predicted traffic flows associated with the construction of the Project were well below the relevant screening criteria, and the relatively low baseline (background) air pollution concentrations in the area, it is not anticipated that additional traffic associated with cumulative projects would give rise to a significant air quality impact at receptors. Furthermore, the Project will generate the largest amount of traffic during the construction phase, which is temporary in nature, and therefore the potential for any significant impacts to occur would be limited to a relatively short duration.

92. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

Table 26-20 Potential Cumulative Impacts Identified for Air Quality

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Construction phase dust emissions	Multiple projects could lead to increases in dust soiling, human health and ecological impacts at receptors. If a temporal overlap of the construction phases were to occur, it is anticipated that the cumulative project would employ best-practice methods to minimise dust generated during construction, as recommended for the Morlais project. With the	Negligible

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
	implementation of these measures, significant cumulative dust impacts have limited potential to occur.	
Construction phase road traffic emissions	Multiple projects could lead to increases in traffic flows which may lead to impacts at human and ecological receptors. The Project will generate the largest amount of traffic during the construction phase, which is temporary in nature, and therefore the potential for any significant impacts to occur would be limited to a relatively short duration.	Negligible
Operation		
Operational phase dust emissions	There are not anticipated to be any substantial dust emission sources or traffic movements generated during the operational phase that would give rise to significant cumulative impacts at human or ecological receptors.	Negligible
Operational phase road traffic emissions	There are not anticipated to be any substantial dust emission sources or traffic movements generated during the operational phase that would give rise to significant cumulative impacts at human or ecological receptors.	Negligible
Decommissioning		
Decommissioning phase dust emissions	There are not anticipated to be any substantial dust emission sources or traffic movements generated during the decommissioning phase that would give rise to significant cumulative impacts at human or ecological receptors.	
Decommissioning phase road traffic emissions	There are not anticipated to be any substantial dust emission sources or traffic movements generated during the decommissioning phase that would give rise to significant cumulative impacts at human or ecological receptors.	

26.5.18. Traffic and Transport

93. All offshore cumulative projects were scoped out of the traffic and transport CIA, as it was assumed that the potential for significant impacts to occur in combination with the onshore aspects considered in this assessment was minimal.

94. It can be noted in **Chapter 23, Traffic and Transport** that the proposed traffic flows via the road links to Holy Island (the A5 and A55) are below GEART screening thresholds and are therefore, assessed to result in no discernible or negligible environmental impacts. Therefore, all projects elsewhere in North Wales offshore are scoped out of the traffic and transport CIA. The projects considered in the CIA therefore included those on Holy Island only. **Table 26-21** provides a summary of the CIA outcomes for traffic and transport.

95. No projects were taken forward for CIA. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider

study area. This is applicable throughout the lifecycle of the Project, as the key impact pathways may arise during all phases (construction through to decommissioning).

Table 26-21 Potential Cumulative Impacts Identified for Traffic and Transport

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Road Safety	It has been demonstrated that there are no inherent safety issues within the traffic and transport study area.	Negligible
Pedestrian/ Cycle Amenity	Multiple projects could lead to increases in traffic flows which may lead to cumulative impacts upon receptors. Sub-regional growth in housing and employment has been captured within TEMPro future year growth factors for 2021. Therefore, the cumulative effect of these housing and employment projects is inherent in the traffic and transport impact assessments.	Negligible
Severance		Negligible
Driver Delay (capacity)		Negligible
Driver Delay (road closures)		Negligible
Operation		
There are not anticipated to be any disenable traffic and transport impacts during the operational phase that would give rise to significant cumulative impacts.		
Decommissioning		
It is anticipated that the decommissioning impacts would be no worse than those of construction.		

26.5.19. SLVIA

96. The projects taken forward for this CIA are also presented within **Chapter 24, Seascape, Landscape and Visual Assessment** (SLVIA).

97. The following are considered to be the proposed developments with which the Project has greatest potential to result in cumulative effects;

- DG Holyhead Deep Array 80 MW Project;
- Orthios development proposals, including Anglesey Eco Park Power Station;
- Holy Island Resort; and
- Huws Gray builders' merchant at Parc Cybi.

98. **Table 26-22** provides a summary of the CIA outcomes for SLVIA.

Table 26-22 Potential Cumulative Impacts Identified for SLVIA

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
Construction		
Effects on landscape character (including designations)	Direct construction effects on the seascape fabric and character as a result of the offshore site are predicted to be very limited. The relatively small extent of the disturbance to the onshore landscape, the short duration of the effects	Negligible

Potential Impact	Rationale for Cumulative Impact	Cumulative Impact Significance
	during construction and the reinstatement of working areas would ensure that the effects of the construction phase on the landscape fabric, character and visual amenity of the locality would be limited.	
Operation		
Effects on seascape character (including designations) and effects on visual amenity.	As the Agreement for Lease Area for this proposed development is located further offshore, it would typically be seen behind the Project from the terrestrial parts of the Study Area. This proposed development is currently at scoping stage and it is uncertain what, if any, surface emergent elements would be deployed. The only elements that could result in combined effects with the Project would comprise navigation markers including lighting which could result in a greater magnitude of change during daylight and night hours.	Based on the existing level of information, it is difficult to draw any specific conclusions on the potential cumulative effects and these would need further consideration when the application for the Holyhead Deep Array Project is submitted.
Effects on landscape character (including designations) and effects on visual amenity.	The Orthios and Holy Island Resort development proposals have the potential to result in cumulative effects in combination with components of the Project, would be located close to the proposed Grid Connection Substation and Switchgear Building. It has been established throughout the SLVIA that the Grid Connection Substation would be located within a visually enclosed site in the context of existing industrial structures, which forms part of the baseline. In addition, the Switchgear Building would form a relatively small structure in the context of an existing development site. The Huws Gray builders' merchant development would be positioned immediately to the north west of the Switchgear building. The principle of development within this location is established through its allocation for employment uses in the Local Development Plan. the context of the Project, including both the industrial structures within the Orthios site and the employment land allocation at Parc Cybi, together with the scale and prominence of the Switchgear Building and Grid Connection Substation will restrict its overall contribution to cumulative effects.	Negligible to minor adverse
Decommissioning		
It is anticipated that the decommissioning impacts would be no worse than those of construction.		

99. Significant cumulative impacts are not expected from the Project in combination with any other reasonably foreseeable plans or projects in the wider study area during the construction and decommissioning of the project. It is also considered that there are no significant cumulative impacts during operation for the onshore elements of the Project. There may be the potential for significant impacts to the seascape as a result of the Holyhead Deep 80 MW Array Project however, insufficient detail is available to undertake the assessment.

26.5.20. Socio-economics

100. During the scoping process, several projects were identified that should be considered with regard to onshore and offshore cumulative impacts for Socio-Economics, Tourism and Recreation. The projects taken forward for this CIA and the detailed methodology for the assessment are presented within **Chapter 25, Socio-Economics, Tourism and Recreation**.

101. In terms of the in-combination effects with other projects, the first stage in the process was to identify which impact mechanisms may be of key interest.

102. **Table 26-23** provides a summary of presents a summary of the topics and stages in the Project where individual significant effects were assessed to be likely.

Table 26-23 Assessment of Cumulative Significance of Issues Across Different Phases of Activity

Impact topic	Mechanism	Beneficial/ Adverse	Cumulative impacts across phases
Social benefits	Decentralisation of economic growth	Beneficial	Minor
Wellbeing of future generations	Green branding for locality	Beneficial	Minor
Economic impacts	Direct & secondary income	Beneficial	Moderate
Accumulation of grant support		Beneficial	Minor
Level of commerce activity	Green cluster creation	Beneficial	Moderate
Jobs opportunities	Numbers	Beneficial	Minor
Types, quality, skills areas		Beneficial	Major
Skills availability	Reduced performance in project	Adverse	Moderate
Training opportunities	New skills and competence needs	Beneficial	Minor
Tertiary BSc, Eng, PhD		Beneficial	Minor
Additional local services	New technical skills, workboats, cranes, better sea knowledge	Beneficial	Minor
New infrastructure outside project budget	New piers, storage and laydown areas	Beneficial	Minor
Energy security	More green electricity, local supply, diversity of supply	Beneficial	Moderate
Decarbonisation	Clean energy, balancing services, spin-off capacity	Beneficial	Moderate

103. The next stage in the process was to establish which of these mechanisms could interact across which of the in-combination projects that have been identified. The results of this analysis are summarised in **Table 26-24**.

104. From the assessment undertaken in **Chapter 25, Socio-Economics, Tourism and Recreation**, it was apparent that there was greatest potential for cumulative effects with the two other tidal projects that are being considered for the region and that the other onshore projects have less potential for cumulative effects. As for individual impacts, the receptors where it was considered that there was most potential for impact, were associated with jobs, skills needs and economic activity.

Table 26-24 Cumulative Effects Linked to Assessed Projects for Socio-Economics, Tourism and Recreation

Mechanisms for cumulative effects	Land and Lake resort	Parc Cybi housing	Holyhead Eco Park	Horizon Nuclear Power Plant	National Grid upgrades	Stena Line port expansion	Minesto	Nova tidal project	META	Strumble Head	Potential for cumulative effects
More workers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	High
House rental market	✓	✓	✓	✓	✓	✓	✓	✓			High
Investment opportunities			✓				✓	✓	✓	✓	Low
Worker mobility	✓	✓	✓	✓	✓	✓	✓	✓			High
Regional profile	✓		✓	✓		✓	✓	✓			Medium
Pier congestion							✓	✓			Low
Industrialisation				✓	✓		✓	✓		✓	Medium
Grid connections				✓	✓		✓	✓		✓	Medium
New vessels						✓	✓	✓			Low
Greater local GDP	✓	✓	✓	✓	✓	✓	✓	✓		✓	High
Greater grant income			✓				✓	✓	✓	✓	Low
Green cluster			✓	✓	✓		✓	✓	✓		Medium
Economic diversification	✓		✓	✓	✓	✓	✓	✓	✓	✓	High
Potential for cumulative effects	Medium	Low	Medium	Medium	Medium	Medium	High	High	Low	Low	

26.6. TRANSBOUNDARY IMPACTS

105. This section presents a summary of the potential impacts on transboundary receptors for each topic within the ES. Where transboundary impacts are scoped out, this is also noted.

106. Transboundary impacts are assessed through consideration of the extent of influence of changes or effects and their potential to impact upon receptor groups that are located within other EU member states.

26.6.1. Metocean Conditions and Coastal Processes

107. The localised nature of the potential impacts on metocean conditions and coastal processes mean that significant transboundary impacts are unlikely and therefore transboundary impacts have been scoped out of the EIA.

26.6.2. Marine Water and Sediment Quality

108. The localised nature of the potential impacts on marine water and sediment quality mean that significant transboundary impacts are unlikely and therefore transboundary impacts have been scoped out of the EIA.

26.6.3. Benthic and Intertidal Ecology

109. The localised nature of the potential impacts on benthic and intertidal ecology mean that significant transboundary impacts are unlikely and therefore transboundary impacts have been scoped out of the EIA.

26.6.4. Fish and Shellfish Ecology

110. The distribution of fish and shellfish species is independent of national geographical boundaries. The impact assessment has therefore been undertaken taking account of the distribution of fish stocks and populations irrespective of political limits. As a result, it is considered that a specific assessment of transboundary effects have been scoped out of the EIA.

26.6.5. Marine Ornithology

111. With regard to the potential for transboundary cumulative impacts, there is clearly potential for underwater collisions beyond UK territorial waters. However, any proposed marine energy development in Ireland is relatively small, and/or located on the west and north coasts. Since the spatial scale and hence seabird populations sizes for a transboundary assessment would be much larger, it is apparent that the scale of development expected would make no material difference to the assessment. For this reason, a quantitative assessment has not been carried out.

26.6.6. Marine Mammals

112. The potential for transboundary impacts has been addressed by considering the reference populations, MUs, seal telemetry and potential linkages to non-UK sites.

113. The assessment of the effect on the integrity of the transboundary European sites as a result of impacts on the designated marine mammal populations has been undertaken and presented in the Report to inform the HRA, which has been submitted as part of this application (**Document MOR/RHDHV/DOC/0067, Information to Support HRA**).

114. The highly mobile nature of marine mammal species considered in this assessment means that there are potential transboundary impacts for each receptor. These transboundary impacts are already considered in the main assessment (**Chapter 12, Marine Mammals)**, as the impacts for all species have been based on the relevant MUs and reference populations.

115. For harbour porpoise, harbour seal and grey seal, the extent of the reference population includes UK, Irish and French waters.

26.6.7. Offshore Archaeology

116. Transboundary impacts to offshore archaeology stemming from changes to metocean conditions and coastal processes have been scoped out.

117. Transboundary archaeological impacts may occur if wrecks or aircraft of non-British, European nationality are subject to impact from development. Such wrecks may fall within the jurisdiction of another country, and may include, for example, foreign warships lost in UK waters. As the implementation archaeological exclusion zones will prevent direct impacts to known archaeological receptors, transboundary impacts to known wrecks and aircraft are not expected to occur.

26.6.8. Commercial Fisheries

118. The impact assessment provided within **Chapter 14, Commercial Fisheries** takes account of the potential impacts of the Project on international fleets which are known to operate in the study area. Therefore, the assessment of potential transboundary impacts is integrated within the impact assessment carried out throughout that chapter.

26.6.9. Shipping and Navigation

119. The local vessels using the MDZ mean that significant transboundary impacts are unlikely and therefore transboundary impacts have been scoped out of the EIA.

26.6.10. Infrastructure and Other Users

120. The localised nature of the potential impacts on infrastructure and other users mean that significant transboundary impacts are unlikely and therefore transboundary impacts have been scoped out of the EIA.

26.7. SUMMARY

121. This chapter of the ES provides a summary of the CIA and transboundary impact assessment for the onshore and offshore topics considered in the EIA for the Project. Full details of the CIAs for each offshore topic are presented in the relevant chapters (7 to 25).

26.8. REFERENCES

The Planning Inspectorate (2015) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects

The Planning Inspectorate (2018) Advice Note Twelve: Development with significant transboundary impacts consultation