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# Morlais Project
# Environmental Statement

## Chapter 15: Shipping and Navigation

## Volume I

Applicant: Menter Môn Morlais Limited
Document Reference: PB5034-ES-015
Chapter 15: Shipping and Navigation
Author: Marine Space

MarineSpace
Making Sense of the Marine Environment ™

| Morlais Document No.: | Status: | Version No: | Date: |
|---|---|---|---|
| MOR/RHDHV/DOC/0029 | Final | F3.0 | July 2019 |

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## GLOSSARY OF ABBREVIATIONS

| | |
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| AIS | Automatic Identification System |
| ALARP | As Low as Reasonably Practicable |
| ASD | Admiralty Sailing Directions |
| ATBA | Area To Be Avoided |
| CD | Chart Datum |
| COLREGS | International Regulations for Preventing Collisions at Sea |
| DCO | Development Consent Order |
| DECC | Department of Energy and Climate Change |
| EIA | Environmental Impact Assessment |
| ERCoP | Emergency Response Co-operation Plan |
| ES | Environmental Statement |
| FSA | Formal Safety Assessment |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| HMCG | Her Majesty's Coast Guard |
| HSE | Health and Safety Executive |
| IALA AISM | International Association of Marine Aids to Navigation and Lighthouse Authorities |
| ICW | In Collision With |
| IMO | International Maritime Organisation |
| JLDP | Joint Local Development Plan |
| kWh | Kilowatt Hour |
| LOA | Length Over All |
| m | Metre |
| MAIB | Maritime Accident Investigation Branch |
| Marico or Marico Marine | Marine and Risk Consultants Ltd |
| MCA | Maritime and Coastguard Agency |
| MGN | Marine Guidance Note |
| MMO | Marine Management Organisation |
| MDZ | Morlais Demonstration Zone |
| nm | Nautical Mile |
| NPS | National Policy Statement |
| NRA | Navigation Risk Assessment |
| NSIP | Nationally Significant Infrastructure Project |
| NTM | Notice To Mariners |
| O&M | Operation and Maintenance |
| OREI | Offshore Renewable Energy Infrastructure |
| PHA | Preliminary Hazard Analysis |
| PINS | Planning Inspectorate |
| PPE | Personal Protective Equipment |
| RACONS | Radar and Beacon |

| | |
|---|---|
| RHIB | Rigid Hull Inflatable Boat |
| RNLI | Royal National Lifeboat Institution |
| ROI | Republic of Ireland |
| RYA | Royal Yachting Association |
| SAR | Search and Rescue |
| SCADA | Supervisory Control and Data Acquisition |
| SMS | Safety Management System |
| SOLAS | Safety Of Life At Sea |
| TSS | Traffic Separation Schemes |
| UK | United Kingdom |
| UKC | Under Keel Clearance |
| VMS | Vessel Monitoring System |

# 15. SHIPPING AND NAVIGATION

## 15.1. INTRODUCTION

1. Menter Môn Morlais Limited (Menter Môn) proposes the development of 240 MW of tidal generating capacity within the Morlais Demonstration Zone (MDZ). The development of the Morlais Project (the Project) will support the development of renewable energy technology objectives of the Anglesey and Gwynedd Joint Local Development Plan (JLDP), providing a consented tidal technology demonstration zone which supports installation, testing and commercial demonstrations of tidal energy devices. The Project will also provide opportunities for the local communities via direct employment and support of the local supply chain.

2. The Project will include permanent communal infrastructure for tidal technology developers which provides a shared route to a local grid connection via nine export cable tails, an onshore landfall substation, and an onshore electrical cable route to a grid connection via a grid connection substation.

3. This chapter of the Environmental Statement (ES) describes the current shipping and navigation activity in the vicinity of the MDZ. The impact of the potential interaction between the Project and vessel activity is assessed for the construction, operation and maintenance (including repowering) and decommissioning phases of the Project. Where appropriate, mitigation measures are proposed to ensure the identified effects are avoided, removed, or minimised, where possible. Potential cumulative impacts are also considered.

4. More details of the baseline data collected and the assessment undertaken are provided in **Appendix 15.1, Volume III**.

5. This chapter has links with **Chapter 2, Policy and Legislation**, **Chapter 14, Commercial Fisheries**, **Chapter 16, Marine Infrastructure and Other Users** and **Chapter 25, Socio-Economics, Tourism and Recreation**.

6. This chapter has been prepared by MarineSpace Ltd on behalf of Menter Môn.

## 15.2. POLICY, LEGISLATION AND GUIDANCE

7. The assessment within this chapter has been guided and informed by the following key relevant legislation, guidance and policy. Further detail on legislation and policy in relation to the wider Project is provided in **Chapter 2, Policy and Legislation**.

### 15.2.1. National Policy Statements

8. Although this Project is not seeking a Development Consent Order (DCO), its size (up to 240 MW) means it is representative of a Nationally Significant Infrastructure Project (NSIP). Guidance that is relevant to assessing impacts on shipping and navigation for NSIPs are set out within National Policy Statements (NPSs) which are the principal decision-making documents for NSIPs. Those relevant to shipping and navigation include:

    - NPS for Renewable Energy Infrastructure (EN-3), July 2011.

9. Details of specific policies within EN-3 used to inform this assessment are provided in **Table 15-1** below. The specific assessment requirements for shipping and navigation are detailed, together with an indication of the paragraph numbers of the chapter where each is addressed.

**Table 15-1 NPS EN-3 Assessment Requirements Relevant to Shipping and Navigation**

| NPS Requirement | NPS Reference | ES Reference |
|---|---|---|
| "Site selection should have been made with a view to avoiding or minimising disruption or economic loss to the shipping and navigation industries" | NPS EN-3 Para 2.6.162 | **Chapter 3, Site Selection and Consideration of Alternatives** and **Appendix 15.1** (**Volume III**) |
| "Negative impacts on less strategically important shipping routes should be reduced to As Low as Reasonably Practicable (ALARP)" | NPS EN-3 Para 2.6.163 | Impact assessment is provided in **Section 15.6** and a Navigation Risk Assessment is provided in **Appendix 15.1** (**Volume III**). |
| "A detailed Search and Rescue (SAR) Response Assessment should be undertaken prior to the commencement of construction" | NPS EN-3 Para 2.6.164 | See **Sections 15.6.3** and **15.6.4.** The Project will adhere to the MCA Guidance on Offshore Renewable Energy Installation: Requirements, Advice and Guidance for Search and Rescue and Emergency Response. |
| "The scheme must be designed to minimise the effects on recreational craft: The extent and nature of any obstruction of or danger to navigation which is likely to be caused by the development will be considered". | NPS EN-3 Para 2.6.166 | Impact assessment is provided in **Section 15.6** and a Navigation Risk Assessment is provided in **Appendix 15.1** (**Volume III**). |

### 15.2.2. Marine Policy Statement

10. The Marine Policy Statement (MPS) adopted by all UK administrations in March 2011 provides the policy framework for the preparation of marine plans and establishes how decisions affecting the marine area should be made in order to enable sustainable development. The MPS sets out a vision of having 'clean, healthy, safe, productive and biologically diverse oceans and seas' by supporting the development of Marine Plans. It also sets out the framework for environmental, social and economic considerations that need to be considered in marine planning.

### 15.2.3. Wales National Marine Plan

11. By adopting the MPS, the Welsh Government committed to the requirement to introduce Marine Plans for Wales.

12. The Welsh Government is currently developing the first marine plan for Welsh inshore and offshore waters, the Welsh National Marine Plan (WNMP). The Plan is being developed in accordance with the Marine and Coastal Access Act (MCAA) 2009, the MPS and the Maritime Spatial Planning Directive, a draft version has been issued for consultation (discussed further in **Chapter 2, Policy and Legislation**).

13. Objective 10 of the WNMP, "to maintain and enhance the resilience of marine ecosystems and the benefits they provide in order to meet the needs of present and future generations", is of relevance to this chapter as this covers policies and commitments on the wider ecosystem, as set out in the MPS including those to do with the Marine Strategy Framework Objective Directive

and the Water Framework Directive, as well as other environmental, social and economic considerations.

### 15.2.4. Relevant Guidance

14. The Environmental Impact Assessment (EIA) Regulations (see **Chapter 2, Policy and Legislation**) is the only legislation directly relevant to this assessment. However, there are a number of guidance documents available which provide further detail on the aspects of the shipping and navigation environment that should be assessed and how the assessment should be undertaken.

15. Guidance on the assessment requirement was primarily sought from the Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 543 (M+F) which replaces MGN 371. MGN 543 advises the correct methodology to evaluate navigation safety around Offshore Renewable Energy Installations (OREIs). The full list of guidance used is as follows:

- MGN 543 Guidance on UK Navigational Practice, Safety and Emergency Response Issues;
- MGN 372 Guidance to Mariners Operating in the Vicinity of UK OREIs;
- MGN 166 Guidelines for Voyage Planning;
- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139 the Marking of Man-Made Offshore Structures;
- International Maritime Organisation (IMO) Formal Safety Assessment. Revised Guidelines for Formal Safety Assessment (FSA) MSC-MEPC.2/Circ.12/Rev.2;
- Royal Yachting Association (RYA) Position on Offshore Energy Developments;
- Regulatory expectations on moorings for floating wind and marine devices – HSE and MCA 2017;
- Cumulative Impact Assessment Guidelines issued by RenewableUK in June 2013;
- Planning Inspectorate (PINS) ‘Advice Note 9: Rochdale Approach’; and
- International Regulations for Preventing Collisions at Sea 1972 (as amended) (COLREGS).

## 15.3. CONSULTATION

16. Stakeholder consultation has been undertaken via the EIA scoping process undertaken in April 2018 as well as targeted consultation with local and national consultees, as part of the Preliminary Hazard Analysis (PHA) (Phase 1 - National) and the Navigational Risk Assessment (NRA) (Phase 2 – Local and National). The PHA and NRA consultations were undertaken in accordance with guidance set out in MGN 543.

17. **Table 15-2** presents a summary of the key issues raised in the 2018 Scoping Opinion and in the consultation carried out as part of the NRA, with reference to the ES sections relevant to the specific comment.

**Table 15-2 Consultation Responses**

| Date/Document | Comment | Response |
|---|---|---|
| **Planning Inspectorate** | | |
| Scoping Report 2018 | "Vessel movements:<br>The ES should detail the anticipated vessel movements during all phases of the Proposed Works. These should be presented on a worst case basis." | Noted and assessed in **Chapter 15, Shipping and Navigation, Sections 15.6.3, 15.6.4** and **Appendix 15.1** (**Volume III**) |
| | "Search and rescue:<br>The ES should also assess the implications of the Proposed Works on search and rescue operations." | Noted and assessed in **Chapter 15, Shipping and Navigation, Section 15.6.3** and **Appendix 15.1** (**Volume III**).<br>**The Project will adhere to the MCA Guidance on Offshore Renewable Energy Installation: Requirements, Advice and Guidance for Search and Rescue and Emergency Response.** |
| **Trinity House Lighthouse Service** | | |
| Scoping Report 2018 | Within section 9.4 Shipping, Navigation and Marine Infrastructure, I advise that the navigation risk assessment should be undertaken in accordance with MGN 543 (which supersedes MGN 371). | The NRA has been completed in accordance with MGN 543 as specified. |
| | The applicant should also note that separate risk assessments are likely to be required for each deployment of TEC/arrays, in due course, as this project progresses. | Noted. |
| **NRW** | | |
| Scoping Report 2018 | There is concern about the impact the proposed Array may have on the safety of navigation. In particular, the changes to vessel routing with the reduction in navigable depth, the constriction placed on recreational, commercial and fishing vessels operating in or transiting the area and accessing ports and harbours, and the resulting increase in the frequency of encounters. The Environmental Statement must provide details of the possible impact on navigational issues for both commercial and recreational craft, specifically:<br>• Collision Risk,<br>• Navigational Safety,<br>• Visual intrusion and noise,<br>• Risk Management and Emergency response,<br>• Marking and lighting of site and information to mariners, | Noted and assessed in **Chapter 15, Shipping and Navigation** and **Appendix 15.1** (**Volume III**). |

| Date/Document | Comment | Response |
|---|---|---|
| | • Effect on small craft navigational and communication equipment,<br>• The risk to drifting recreational craft in adverse weather or tidal conditions,<br>• The likely squeeze of small craft into the routes of larger commercial vessels | |
| Scoping Report 2018 | The EIA must assess the safety of navigational channels and obstacles to navigation from Tidal Energy Converters (TEC's)/supporting infrastructure and support vessels. Avoiding any potential for collision during any stage of the project is of absolute importance. | Noted and assessed in **Chapter 15, Shipping and Navigation, Sections 15.6.3, 15.6.4** and **Appendix 15.1** (**Volume III**). |
| Scoping Report 2018 | A Navigational Risk Assessment (NRA) will need to be submitted in accordance with MGN 543 (and MGN 372) and the MCA Methodology for Assessing the Marine Navigation Safety & Emergency Response Risks of Offshore Renewable Energy Installations (OREI). This NRA should be accompanied by a detailed MGN 543 Checklist which can be downloaded from the MCA website. We note that the Scoping currently refers to MGN 371 which has been superseded by MGN 543. | The NRA has been completed in accordance with MGN 543 as specified. The MGN 543 checklist is included as an Annex to **Appendix 15.1** (**Volume III**). Please note, however, some of the listed requirements are to be covered at the device specific NRA stage given the lack of available information (such as a device specific layout) at this stage. |
| Scoping Report 2018 | It should be noted that separate risk assessments are likely to be required for each deployment of TEC/arrays, in due course, as this project progresses. | Noted. Final mitigation plans will be agreed prior to the construction once the final details are known. |
| Scoping Report 2018 | The shipping and navigation study should include radar and manual observations in addition to AIS data to ensure vessels of less than 300gt are captured and should be completed within 24 months prior to the Environmental Statement submission. Casualty information from the MAIB and RNLI would also be good data sources, in establishing the risk profile for the area. We note that the Scoping report currently states 'existing AIS and vessel data collected previously in the study area will be | See **Chapter 15, Shipping and Navigation, Section 15.4.3**.<br>AIS data were collected over a two week period in the summer during 2017 and two week period in the winter during 2019 to better understand the traffic profile of vessels transiting the project area and any potential impacts the Project may have upon navigation.<br>Six months of AIS data from between October 2017 and March 2018 were additionally sourced to account for any |

| Date/Document | Comment | Response |
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| | undertaken, utilising existing data sets where available'. | seasonal variances in ferry activity and usage of the poor weather routes.<br>To overcome the limitations posed by utilisation of AIS alone and in line with MGN 543 requirements, winter and summer radar surveys were undertaken for representative summer and winter periods.<br>On the advice of the MCA, an additional project-specific marine traffic survey (winter #2) was undertaken in April 2019. This was to remove the risk of the original winter #1 data being invalidated due it being collected greater than two years from the date of ES submission.<br>Casualty information from the MAIB was obtained and is reviewed in **Section 15.5.3.1** and **Appendix 15.1** (**Volume III**). |
| Scoping Report 2018 | AIS data should not be used as an absolute measure of recreational traffic, as the substantial volume of yachts without AIS are not accounted for. The UK Coastal Atlas of Recreational Boating, available on licence from the RYA, or via the Marine Management Organisation's Marine Information System, provides relative AIS intensity data, general boating areas, and locations of clubs and training centres. | See **Chapter 15, Shipping and Navigation, Section 15.4.3**<br>Noted. Boating density within the Coastal Atlas is based on AIS data only and, therefore, includes primarily large racing yachts and does not reflect the activity of small, non-AIS carrying coastal recreational vessels that represent a considerable proportion of recreational traffic. The combination of AIS and radar collected for the NRA is therefore, considered to provide greater accuracy and therefore, the data provided within the Coastal Atlas was not deemed necessary. |
| Scoping Report 2018 | The NRA should address safe Under Keel Clearance (UKC) for the maximum drafts of vessel both observed and anticipated, from which a realistic UKC assessment should be undertaken. The MCA's Under Keel Clearance Policy paper can be found on their website. | Under Keel Clearance is assessed in the **Appendix 15.1** (**Volume III**) in accordance with MCA - Guidance to Developers in Assessing Minimum Water Depth over Tidal Devices (2014) |
| Scoping Report 2018 | The marking of offshore wave and tidal energy installations should be based on recommendations of the IALA, and the offshore structures marking can be found on the IALA website. | All marking and lighting will be in accordance with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139 the Marking of Man-Made Offshore Structures and will be determined through consultation with Trinity House. |
| Scoping Report 2018 | Consideration will need to be given to the implications of the site size and location on SAR resources and Emergency Response Co-operation Plans (ERCOP) for both construction and operation phases. Any additional Search and Rescue requirements, as per MGN 543 Annex 5, will be discussed | See **Chapter 15, Shipping and Navigation, Sections 15.6.3** and **15.6.4.**<br>The Project will adhere to the MCA Guidance on Offshore Renewable Energy Installation: Requirements, Advice and Guidance for Search and Rescue and Emergency Response. |

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| | and agreed at the approval stage and recorded in a SAR checklist. | |
| Scoping Report 2018 | Particular attention should be paid to cabling routes and where appropriate burial depth for which a Burial Protection Index study should be completed and, subject to the traffic volumes, an anchor penetration study may be necessary. If cable protection is required e.g. rock bags, concrete mattresses, a 5 % reduction in surrounding depths referenced to Chart Datum is acceptable. This will be particularly relevant where depths are decreasing towards shore and potential impacts on navigable water increase. | Cable burial and changes to charted depth arising from tidal turbines and the burial depth of cabling, where applicable, should be surveyed and marked on navigational charts. |
| Scoping Report 2018 | Cable Corridor 4 runs to the south of the major shipping route of the Holyhead to Dublin ferry route by 5 km. The ES will need to appropriately assess this in relation to maintaining safe navigation and provide reassurance that this can be undertaken with suitable protection and the absolute minimal level of disruption. | Please refer to **Chapter 4, Project Description** for details of the proposed cable route and landfall in Abraham's Bosom which succeed the Scoping Report. Final mitigation plans will be agreed prior to the construction once the final details are known. This will include a Communications and Liaison Plan, Aids to Navigation Plan, Emergency response Co-operation Plan and array specific Navigation Risk Assessment Plan which will be submitted prior to construction and device deployments. |
| Scoping Report 2018 | All cable laying should be charted with the data freely available to marine users and suitable protection in the form of burial or rock placement must be implemented to prevent cable snag which through abrasion will damage the cable and potentially cause damage to the vessel or crew and potentially vessel obstruction. | Noted. Final mitigation plans will be agreed prior to the construction once the final details are known. This will include a Communications and Liaison Plan, Aids to Navigation Plan, Emergency Response Co-operation Plan and array specific Navigation Risk Assessment Plan which will be submitted prior to construction and device deployments. |
| Scoping Report 2018 | The assessment in the ES should incorporate the effects of tidal arrays, associated infrastructure, and any proposed exclusion zones on recreational routes, general sailing areas, racing areas, and access to boating facilities and anchorages. | Noted and assessed in **Chapter 15, Shipping and Navigation Section 15.6** and **Appendix 15.1** (**Volume III**). |
| Scoping Report 2018 | MCA, UKHO, and GLAs guidance on charting, marking, and lighting of tidal infrastructure should be followed. | All marking and lighting will be in accordance with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139 the Marking of Man-Made Offshore Structures and will be determined through consultation with Trinity House. |
| Scoping Report 2018 | MGN 543 Annex 2 requires that hydrographic surveys should fulfil the requirements of the International Hydrographic Organisation (IHO) Order 1a standard, with the final data supplied as a digital full density data set, and survey reports to the MCA Hydrography | Noted. |

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| | Manager. Failure to report the survey or conduct it to Order 1a might invalidate the Navigational Risk Assessment if it was deemed not fit for purpose. | |
| Scoping Report 2018 | Any application for safety zones will need to be carefully assessed and additionally supported by experience from the development and construction stages | Noted. Safety Zones are assessed in **Chapter 15, Shipping and Navigation Section 15.6.**<br>Safety Zones would be monitored and enforced through active monitoring arrangements such as guard vessels and control centre. Final mitigation plans will be agreed prior to the construction once the final details are known. |
| **MCA** | | |
| October 2018<br>(PHA) | Concerns on:<br>1. Size of the project area – a Safety Zone would result in a large area that will be unavailable for navigation; | Noted. Safety Zones are assessed in **Chapter 15, Shipping and Navigation Section 15.6.**<br>Safety Zones would be monitored and enforced through active monitoring arrangements such as guard vessels and control centre. Final mitigation plans will be agreed prior to the construction once the final details are known. |
| | 2. Cutting an established inshore navigation route; | The Project does not "cut" any established inshore navigation route although the NRA does consider the impact of narrowing the available sea space within the inshore route and pinch points.<br>See **Chapter 15, Shipping and Navigation Sections 15.6.3.6** and **15.6.4.6** and **Appendix 15.1** (**Volume III**). |
| | 3. Access through site; | Noted. Passage through the area is assessed in **Chapter 15, Shipping and Navigation Section 15.6** and **Appendix 15.1** (**Volume III**). |
| | 4. Impacts on SAR activities; and | See **Chapter 15, Shipping and Navigation, Sections 15.6.3, 15.6.4.**<br>The Project will adhere to the MCA Guidance on Offshore Renewable Energy Installation: Requirements, Advice and Guidance for Search and Rescue and Emergency Response. |
| | 5. Need to collect site-specific radar data to inform EIA | See **Chapter 15, Shipping and Navigation, Section 15.4.3**<br>AIS data were collected over a two week period in the summer during 2017 and two week period in the winter during 2019 to better understand the traffic profile of vessels transiting the project area and any potential impacts the Project may have upon navigation. |

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| | | Six months of AIS data from between October 2017 and March 2018 were additionally sourced to account for any seasonal variances in ferry activity and usage of the poor weather routes.<br>To overcome the limitations posed by utilisation of AIS alone and in line with MGN 543 requirements, winter and summer radar surveys were undertaken for representative summer and winter periods. |
| **Chamber of Shipping** | | |
| October 2018 (PHA) | Primary Concerns:<br>1. Proximity to the Dublin/ Holyhead ferry route and the impact it may have upon adverse weather routing. | Noted. The northern boundary of the Project has been designed to minimise impact to the ferry routes and adverse weather routes and ferry routes and adverse weather routing are assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3.3, 15.6.3.4, 15.6.4.1** and **15.6.4.2**. |
| | 2. Under Keel Clearances (UKC) particularly in the northern most zones. | Under Keel Clearance is assessed in the **Appendix 15.1** (**Volume III**) in accordance with MCA - Guidance to Developers in Assessing Minimum Water Depth over Tidal Devices (2014). |
| | 3. Site layout uncertainty (distribution of devices of varying depth). | Noted. Final mitigation plans will be agreed prior to the construction once the final details are known. This will include a Communications and Liaison Plan, Aids to Navigation Plan, Emergency Response Co-operation Plan and array specific Navigation Risk Assessment Plan which will be submitted prior to construction and device deployments. |
| | 4. Potential for the adoption of a full site Exclusion Zone. | Noted. Final mitigation plans will be agreed prior to the construction once the final details are known. This will include a Communications and Liaison Plan, Aids to Navigation Plan, Emergency Response Co-operation Plan and array specific Navigation Risk Assessment Plan which will be submitted prior to construction and device deployments. |
| | 5. Need for NRA to consider cruise ships in this region | Noted. Cruise Ships are assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3.2** and **15.6.4.1**. |
| | 6. Impact on local anchorages. | Local anchorages are assessed in **Appendix 15.1** (**Volume III**). |
| | 7. Noted that the eastern boundary is highly utilised and there needs to be adequate clearance for the inshore route. Pointed out that no-one will sail at the site boundary rather, sailing will occur at a safe distance | The NRA does consider the impact of narrowing the available sea space within the inshore passage and pinch points. |

| Date/Document | Comment | Response |
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| | from the eastern boundary, resulting in a very narrow navigable channel. | See **Chapter 15, Shipping and Navigation Sections 15.6.3.6** and **15.6.4.6** and **Appendix 15.1** (**Volume III**). |
| | 8. If cables are not to be buried then sufficient protection needs to be in place e.g. gabions. | Noted. The impacts of the export cables are assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3.9** and **15.6.4.9**. |
| | 9. Questioned whether the top zone could be re-located to the south of the current extent.<br>Minimum 20m UKC should be maintained in Northern extent of the site. | Due to the availability of the tidal resource re-locating the northern most zone to the south of the Project has not been considered. However, the proposed site layout now outlines no devices with an UKC of less than 20m will be deployed in the northern most zone. |
| | 10. Concern that level of activity attributed to installation and major maintenance may be far greater than that of a normal offshore renewable project and hence may cause increased activity and safety zone necessity in the area. | Noted. Safety Zones are assessed in **Chapter 15, Shipping and Navigation Section 15.6.**<br>Safety Zones would be monitored and enforced through active monitoring arrangements such as guard vessels and control centre. Final mitigation plans will be agreed prior to the construction once the final details are known. |
| **Trinity House** | | |
| October 2018<br>(PHA) | Marking and lighting will be fundamental to the project. | All marking and lighting will be in accordance with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139 the Marking of Man-Made Offshore Structures and will be determined through consultation with Trinity House. |
| | As much of the area should be left open for navigation as possible. | Noted. |
| | Would not like to see a site wide Safety Zone. Commented that at Minesto, a 12m UKC was proposed which is unacceptable. A 20m minimum UKC has been agreed at Minesto. | Noted. Safety Zones are assessed in **Chapter 15, Shipping and Navigation Section 15.6.**<br>Under Keel Clearance is assessed in the **Appendix 15.1** (**Volume III**) in accordance with MCA - Guidance to Developers in Assessing Minimum Water Depth over Tidal Devices (2014). |
| | Restricted areas could be put in place but as much of the area should remain open for navigation as possible. | Noted. |
| | Policed Safety Zones should only be in place during construction and maintenance. | Safety Zones would be monitored and enforced through active monitoring arrangements such as guard vessels and control centre. Final mitigation plans will be agreed prior to the construction once the final details are known. |

| Date/Document | Comment | Response |
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| | Considered that all devices should be charted, even seabed devices – either as individual devices or as whole areas. | Devices will be charted and marked in accordance with MCA guidelines and following review of the final design layout with the MCA, Trinity House and Chamber of Shipping. |
| | The operator is to ensure that the devices remain at the stated depths and in the state agreed. | Noted. It is anticipated that devices will be fitted with depth monitoring systems and be subject to periodic maintenance surveys. |
| | Buoyage should be monitored by the control centre (and guard vessel) and defects reported by the operators to TH. | All marking and lighting will be in accordance with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139 the Marking of Man-Made Offshore Structures and will be determined through consultation with Trinity House.<br>Buoyage will be maintained and defects reported. |
| **Welsh Fishermen's Association** | | |
| November 2018<br>(NRA) | Fishing vessel traffic on plot appears to be light. There is a plethora of under 10s that operate within the area.<br>Abrahams Bosom should be more populated. Pot buoys – head ropes inshore within 10m contour.<br>July is a very active month and therefore, there should be more traffic than demonstrated on the plot. There is very little traffic at the end of February / start of March. | Noted. There are limitations with AIS in that many fishing vessels under 10m are not equipped with AIS which is why radar surveys were also undertaken and this supplemented by fishing intensity data as recorded by the MMO using the Vessel Monitoring System (VMS).<br>Fishing vessel activity and the impact of the Project on fishing vessels is discussed in **Chapter 15, Shipping and Navigation Sections 15.5.3.1.1, 15.6.3.5** and **15.6.4.5**. |
| | The MDZ is not very fishing friendly due to the tidal conditions, except for at slack water. | Noted. |
| | If the project were to go ahead fishing in the area would be sterilised due to snagging and gear loss issues – may get some fishermen attempting to set pots as lobsters will hide within devices which will create a new habitat. | Fishing vessel activity and the impact of the Project on fishing vessels is discussed in **Chapter 15, Shipping and Navigation Sections 15.5.3.1.1, 15.6.3.5** and **15.6.4.5**. |
| | Vessels will not be able to anchor in the zone if they run into difficulties. | Noted. |
| | At maximum capacity, a fishing boat would not attempt to navigate through the zones, even if they were lit.<br>There is a risk of loss of power and drifting in to the devices | Noted. |
| | It appears that vessels will have to navigate around the outside of the Zone. | There will still be an inshore passage route available and the NRA does consider the impact of narrowing the available sea space and pinch points particularly for recreational and smaller fishing vessels. |

| Date/Document | Comment | Response |
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| | | See **Chapter 15, Shipping and Navigation Sections 15.6.3, 15.6.4** and **Appendix 15.1** (**Volume III**). |
| | Inshore passage is a manageable gap, however, the current makes it difficult to navigate.<br>The inshore passage would not be navigable for a coaster.<br>Normal passage planning would allow 1-2 miles offing from a steep-to danger. | The NRA does consider the impact of narrowing the available sea space and pinch points.<br>See **Chapter 15, Shipping and Navigation Sections 15.6.3, 15.6.4** and **Appendix 15.1** (**Volume III**). |
| | Collision risk will likely increase, however, WFA does not consider increase will be appreciable. However, may be of concern for yachts/ powerboats in summer. | Collision and allision for fishing vessels are assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3, 15.6.4** and **Appendix 15.1** (**Volume III**). |
| | Required UKC should allow for worst case wave height and vessel draught.<br>8m minimum UKC required for fishing vessels to navigate over devices. | An UKC of 8m has been used for fishing vessel impact assessment. Under Keel Clearance is assessed in the **Appendix 15.1** (**Volume III**) in accordance with MCA - Guidance to Developers in Assessing Minimum Water Depth over Tidal Devices (2014). |
| | The separation between / spread of devices will be of highest concern. | Noted. Final mitigation plans will be agreed prior to the construction once the final details are known. This will include a Communications and Liaison Plan, Aids to Navigation Plan, Emergency Response Co-operation Plan and array specific Navigation Risk Assessment Plan which will be submitted prior to construction and device deployments. |
| | To navigate through windfarms a skipper requires parallel index lines on the radar to navigate safely through the devices. This would be more difficult with tidal devices. | Noted. Final mitigation plans will be agreed prior to the construction once the final details are known. This will include a Communications and Liaison Plan, Aids to Navigation Plan, Emergency Response Co-operation Plan and array specific Navigation Risk Assessment Plan which will be submitted prior to construction and device deployments. |
| | Cardinal mark the whole zone. | All marking and lighting will be in accordance with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139 the Marking of Man-Made Offshore Structures and will be determined through consultation with Trinity House. |
| | One of the rights of navigation is that you should be able to run to a safe haven if you get caught. Holyhead is the only close safe-haven. If this option were to be lost, then vessels would be very stuck. | Noted. Final mitigation plans will be agreed prior to the construction once the final details are known. This will include a Communications and Liaison Plan, Aids to Navigation Plan, Emergency Response Co-operation Plan and array specific Navigation Risk Assessment Plan which |

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| | | will be submitted prior to construction and device deployments. |
| **Harbour Master** | | |
| November 2018 (NRA) | Confirmed that the traffic plots were similar to what he would have anticipated other than the fishing vessel activity shown in the inshore area was less than he would have expected. | Noted. There are limitations with AIS in that many fishing vessels under 10m are not equipped with AIS which is why radar surveys were also undertaken and this supplemented by fishing intensity data as recorded by the MMO using the Vessel Monitoring System (VMS). |
| | Considered that the width of the inshore passage between Holy Island and the zone is too narrow for small vessel navigation except during clement weather conditions. | The NRA does consider the impact of narrowing of the inshore route, the available sea space and pinch points for recreational vessels.<br>See **Chapter 15, Shipping and Navigation Sections 15.6.3.6** and **15.6.4.6** and **Appendix 15.1**(**Volume III**). |
| | Suggested an additional hazard to be considered of a vessel losing power and then being swept/blown down on to the devices. | This has been considered and would result in allision of a vessel with a tidal device which is considered in the Hazard Risk Assessment in the NRA and the impacts to all vessel types. See **Chapter 15, Shipping and Navigation Sections 15.6.3** and **15.6.4** and **Appendix 15.1** (**Volume III**). |
| | Considered that the current Stena and Irish Ferries vessels require approximately 20m to safely navigate at all states of tide and in all weather conditions. | The proposed site layout now outlines no devices with an UKC of less than 20m will be deployed in the northern most zone. |
| **Local Recreation and RYA** | | |
| November 2018 (NRA) | Recreational traffic under-represented within plot. Last weekend of July to bank holiday weekend of August represents busiest period. | Noted. There are limitations with AIS in that many vessels under 10m are not equipped with AIS which is why radar surveys were also undertaken.<br>Vessel traffic surveys have been conducted in accordance with MCA guidelines. See **Appendix 15.1** (**Volume III**).<br>It is acknowledged that the vessel traffic data may not show peak periods of activity but it is still felt to be representative and suitable for impact assessment. |
| | The inshore passage is widely used by recreational vessels, particularly areas around Abrahams Bosom, South Stack and North Stack. | Noted. |
| | There are many kayakers active in the area that follow the coast line around Holyhead and utilise the inshore passage. | Noted. |

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| | Holyhead Sailing Club participates in racing around Anglesey. They race out of Holyhead harbour and will cross the northern portion of the site. | Noted. |
| | TBSC races around the stacks and can travel around 1 km off the South Stack when racing to and from Holyhead. | Noted. |
| | The proposed zone has the potential to have a long-term impact on the recreational use around the island. | The impacts on recreational users is assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3.6 15.6.4.6** and **Appendix 15.1** (**Volume III**). |
| | The primary concern is the restriction of the inshore passage which is essential to recreational vessels. | The NRA does consider the impact of narrowing of the inshore route, the available sea space and pinch points for recreational vessels.<br>See **Chapter 15, Shipping and Navigation Sections 15.6.3.6** and **15.6.4.6** and **Appendix 15.1** (**Volume III**). |
| | Concerned about the visual impact surface devices may have on tourism. | Visual impacts discussed in **Chapter 24, Seascape, Landscape and Visual Impact Assessment**. |
| | If vessels transit too close to the shore, then there is a risk of wash deflecting off of the shore which is hazardous to small vessels.<br>At least a 2-mile offing would be required to clear the over-falls.<br>It is considered that there is an increased risk of collision due to navigating within a reduced area.<br>Questioned whether the increase in survey vessels will increase traffic density in the inshore passage | The NRA does consider the impact of narrowing of the inshore route, the available sea space and pinch points for recreational vessels.<br>See **Chapter 15, Shipping and Navigation Sections 15.6.3.6** and **15.6.4.6** and **Appendix 15.1** (**Volume III**). |
| | Large racing yachts have a draught of <2.5m. Therefore, in good weather if devices are >3m below CD then most would be able to transit above them.<br>In poor weather safe UKC will increase to allow for wave heights. In this case a minimum of 6-7m is recommended. | Under Keel Clearance is assessed in the **Appendix 15.1** (**Volume III**) in accordance with MCA - Guidance to Developers in Assessing Minimum Water Depth over Tidal Devices (2014). |
| | Holyhead is the only nearby safe-haven for running for shelter. Caernarvon is not accessible during poor weather. | Noted. |
| | Surface mounted devices would represent a considerable hazard to a yacht making for Holyhead in a gale and it is, therefore, the preference of TBSC, not to have surface mounted devices within the project.<br>Recreational vessels would be taking a severe risk attempting to transit through the site at night should it be populated with surface and near surface devices. | The impacts on recreational users is assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3.6 15.6.4.6** and **Appendix 15.1** (**Volume III**). |

| Date/Document | Comment | Response |
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| | If the devices are under water with a sufficient UKC preference would be that there is no buoy at the surface to maintain navigation. Anything at the surface with the potential to break free should be avoided. | Under Keel Clearance is assessed in the **Appendix 15.1** (**Volume III**) in accordance with MCA - Guidance to Developers in Assessing Minimum Water Depth over Tidal Devices (2014). |
| | It was commented that buoys are hazardous in themselves and are difficult to maintain. | All marking and lighting will be in accordance with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139 the Marking of Man-Made Offshore Structures and will be determined through consultation with Trinity House. |
| | Swept depth should be given on chart. | Noted. Changes to charted depth arising from tidal turbines and the burial depth of cabling should be surveyed and marked on navigational charts. Devices will be monitored during operations. |
| **RNLI** | | |
| November 2018 (NRA) | AIS/Radar plots showed less fishing activity in the area than they would have expected though the other plots appeared representative. | Noted. There are limitations with AIS in that many fishing vessels under 10m are not equipped with AIS which is why radar surveys were also undertaken and this supplemented by fishing intensity data as recorded by the MMO using the Vessel Monitoring System (VMS).<br>Fishing vessel activity and the impact of the Project on fishing vessels is discussed in **Chapter 15, Shipping and Navigation Sections 15.5.3.1.1, 15.6.3.5** and **15.6.4.5**. |
| | Whelkers attempt to fish in the deep -water area however the tidal race makes it difficult except at neap tides. | Noted. |
| | SS Waverley comes close to shore when it visits. | Noted. Cruise Ships are assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3.2** and **15.6.4.1**. |
| | If blowing hard from the north, some of the larger vessels shelter at Caernarvon Bay/ behind Anglesey. | Noted. |
| | Stated that if he were making a passage through inshore passage, he does not believe that there would be sufficient spacing between the devices and the cliffs to navigate safely except in benign conditions.<br>3-4 cables off South Stack should normally be required with windage around the stack as, if engine was to fail during a westerly, then the vessel would be too close to shore.<br>Fishing vessels would struggle in an inshore passage of this size. | The NRA does consider the impact of narrowing of the inshore route, the available sea space and pinch points for recreational vessels.<br>See **Chapter 15, Shipping and Navigation Sections 15.6.3.6** and **15.6.4.6** and **Appendix 15.1** (**Volume III**). |

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| | RNLI considers 6-8m under keel clearance is necessary for small vessels (<2.5m draught) to navigate safely over submerged devices in all states of tide and weather conditions. | |
| | Vessels from south – west Ireland will definitely transit through the zone when running for shelter. Vessels will no longer be able to do this if the area is fully populated with surface devices and instead will have to go around the site. In which case it should be properly marked.<br>South Stack is the beacon used as a waypoint for vessels coming in (vessels from Ireland etc). | Traffic surveys did not indicate significant transits through the development site but collision and allision for all vessel types is assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3** and **15.6.4** and **Appendix 15.1** (**Volume III**).<br>All marking and lighting will be in accordance with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139 the Marking of Man-Made Offshore Structures and will be determined through consultation with Trinity House. |
| | RNLI questioned what the spacing of the devices will be. RNLI believe having them close may be a good thing as they will be clearly visible and vessels are not left wondering where the other devices are and it will encourage vessels to go around the entire site rather than attempting to get through. | Noted. Final design and layout is yet to be finalised. This will include a Communications and Liaison Plan, Aids to Navigation Plan, Emergency Response Co-operation Plan and array specific Navigation Risk Assessment Plan which will be submitted prior to construction and device deployments. |
| | Radar reflectors / RACONS on all four corners.<br>Consider AIS on all four corners. | All marking and lighting will be in accordance with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139 the Marking of Man-Made Offshore Structures and will be determined through consultation with Trinity House.<br>In consultation with Trinity House they advised “It is Trinity House’s preference that devices and buoys not be marked with AIS as the over proliferation of AIS can cause confusion on ships’ radar and ECDIS displays.” |
| | The RNLI has already responded to an incident involving a recreational vessel colliding with a Minesto Buoy. The radar reflector on the buoy was lost and the mast of the yacht broke.<br>Vessels commonly break-down to the south of the proposed zone close to Careg Hen and drift northwards into the proposed project zone.<br>Searches have been undertaken within the project area. For example, a multivessel search line approach was undertaken for a missing fisherman within the area. | Noted. |

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| **Stena Line** | | |
| November 2018<br>(NRA) | The presence of surface devices at the northern boundary may impact ferry operations. | Noted. Ferry Routes and adverse weather routing are assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3.3, 15.6.3.4, 15.6.4.1** and **15.6.4.2**. |
| | Device breakout and stated device depth not being maintained would be of concern. | Noted. Changes to charted depth arising from tidal turbines and the burial depth of cabling should be surveyed and marked on navigational charts. Devices will be monitored during operations. |
| | Visibility of surface devices due to low height above water surface is a concern.<br>Mark project zone on charts and ensure ECDIS is up to date.<br>Ensure surface devices are clearly visible – however, if the zone is densely populated with surface devices which are all lit, run the risk of the whole zone being lit. | All marking and lighting will be in accordance with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139 the Marking of Man-Made Offshore Structures and will be determined through consultation with Trinity House. |
| | Consider devices >15m below CD in the northern most sub-zones | The final design layout is yet to be determined but suitable mitigations measures will be implemented. Under Keel Clearance is assessed in the **Appendix 15.1** (**Volume III**) in accordance with MCA - Guidance to Developers in Assessing Minimum Water Depth over Tidal Devices (2014). |
| **Irish Ferries** | | |
| November 2018<br>(NRA) | The northern most two sub-zones and the top of the western sub-zone would clip the SW poor weather route.<br>Normal weather route would be restricted. Adequate space must be left to allow Irish Ferries and Stena to cross. | Noted. Ferry Routes and adverse weather routing are assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3.3, 15.6.3.4, 15.6.4.1** and **15.6.4.2**. |
| | The route south to the “waiting area” passes directly through the MDZs. An adequate UKC to allow continued navigation would be 2 x draughts below the keel (total 3 draughts). This would result in a 20m minimum clearance as with Minesto.<br>Devices with >20m clearance only in northern most zones. | Suitable UKC for Ferries has been set at 20m for the purpose of Impact Assessment.<br>Under Keel Clearance is assessed in the **Appendix 15.1** (**Volume III**) in accordance with MCA - Guidance to Developers in Assessing Minimum Water Depth over Tidal Devices (2014). |
| | Consideration should be given to virtual buoys – they do not require a physical object to be present within the water, however, are detectable by vessel’s AIS.<br>If surface devices were to be deployed then the northern most zone boundary should be clearly marked. | All marking and lighting will be in accordance with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139 the Marking of Man-Made Offshore Structures and will be determined through consultation with Trinity House.<br>In consultation with Trinity House they advised “It is Trinity House’s preference that devices and buoys not be marked with AIS as the over proliferation of AIS |

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| | | can cause confusion on ships' radar and ECDIS displays." |
| | Ensure that for all seabed devices that all supporting equipment (e.g.: cables and hubs) are on the seabed to maintain navigability.<br>Also that they believe that the impact of the project to ferries will be less than to other vessel types such as recreational vessels. | Noted. All devices will be surveyed and monitored to ensure they maintain their specified depth.<br>Changes to charted depth arising from tidal turbines and the burial depth of cabling should be surveyed and marked on navigational charts. Devices will be monitored during operations. |
| | The presence of the Morlais Project will prevent vessels approaching the ferry route from the south. | Noted. |
| | Noted that in terms of diversions - a Traffic Separation Scheme (TSS) may be implemented in a day and would likely cause much greater diversions than those that would result from the Morlais Project. | Noted. |
| **RYA** | | |
| December 2018<br>(NRA) | Considered the inshore route to be too narrow and that navigation in the inshore route will be restricted.<br>Small recreational vessels rely on this route and there is a risk of these vessels being forced into the over-falls.<br>During fine weather and in the daytime this route may be navigable, however, it would be difficult /unsafe to navigate in poor weather and at night. | The NRA does consider the impact of narrowing of the inshore route, the available sea space and pinch points for recreational vessels.<br>See **Chapter 15, Shipping and Navigation Sections 15.6.3.6** and **15.6.4.6** and **Appendix 15.1** (**Volume III**). |
| | Deploying a mixture of device types will be a concern as this would cause confusion. In this case at full capacity it would likely have to be an Area To Be Avoided (ATBA) forcing vessels to take the inshore or outshore route. | Noted. Final mitigation plans will be agreed prior to the construction once the final details are known. |
| | 90 % of recreational vessels have a draught of 3m or less.<br>A recreational vessel should not go through a swell greater than 3m. At all states of weather / tide 8m (from CD) of UKC would be required as a minimum to maintain navigation.<br>Recommends that the MCA UKC methodology is utilised for the assessment of UKC. | Suitable UKC for Recreational users has generally been set at 8m for the purpose of Impact Assessment.<br>Under Keel Clearance is assessed in the **Appendix 15.1** (**Volume III**) in accordance with MCA - Guidance to Developers in Assessing Minimum Water Depth over Tidal Devices (2014). |
| | Devices to be appropriately marked and lit - Trinity House to advise on this.<br>Zone boundary to be marked on navigation charts and lit.<br>Sub-surface devices not to be marked with buoys to maintain navigation. | All marking and lighting will be in accordance with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139 the Marking of Man-Made Offshore Structures and will be determined through consultation with Trinity House. |

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| | Locate surface devices / devices <8m below CD away from the eastern boundary. | Noted. This has been proposed as an additional mitigation measure. Final mitigation plans will be agreed prior to the construction once the final details are known. |
| | Relocate the eastern boundary to allow 4 cables of space for the inshore passage/ to accommodate the spread of the existing tracks. | Noted. This could be an additional mitigation measure. Final mitigation plans will be agreed prior to the construction once the final details are known. |
| | Explained that the RYA holds recreational vessel density data. | Noted. Similarly to the data held within the coastal atlas, this density data is based on AIS data and as such provides a less accurate picture than the combined radar and AIS data utilised within the assessment as a large proportion of recreational users do not carry AIS. The combination of summer and winter RADAR surveys and AIS data utilised within the NRA meets the requirements of MGN 543 and as such the use of RYA density data was not deemed necessary. |
| | Pointed out that wind farms are more visible and require around 1 km spacing between turbines. | Noted. |
| **Chamber of Shipping** | | |
| December 2018<br>(NRA) | Commented that the two weeks' summer and two weeks' winter ferry data did not cover any period when the ferries were using their "Foul Weather Route" in SW gales.<br>Additionally commented that March/April did not reflect what was understood to be winter.<br>The standard ferry tracks overlap the northern two E/W zones;<br>The "Foul Weather Route" passes through the northern two E/W zones plus through the northers half of the N/S zone;<br>Commented that the northern E/W was more of a hazard to inbound (east going) ferries as, if having to alter course to starboard IAW the ColReg, it will force them close or into the northern E/W zone. | The data acquired is in accordance with the requirements MGN 543 but a further six-months of winter AIS data has also been included for analysis within the NRA.<br>Noted. Ferry Routes and adverse weather routing are assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3.3, 15.6.3.4, 15.6.4.1** and **15.6.4.2**.<br>The proposed site layout now outlines no devices with an UKC of less than 20m will be deployed in the northern most zone. |
| | Requested that a mitigation measure of only devices below 20m CD are deployed in the northern two E/W zones and the northern half of the N/S zone be considered. | UKC of 20m has been considered for Ferries and additional mitigation measures of excluding devices to deployed less than 20m below CD have been considered. |
| | Considered that Cruise ship routing was discretionary and could navigate to the west of the zones. The draught of larger cruise ships can be greater than for ferries. | Noted. Cruise Ships are assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3.2** and **15.6.4.1**. |

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| | Surprised about how few fishing vessels were contained in the radar/AIS data and expected to see more inshore activity. | Noted. There are limitations with AIS in that many fishing vessels under 10m are not equipped with AIS which is why radar surveys were also undertaken and this supplemented by fishing intensity data as recorded by the MMO using the Vessel Monitoring System (VMS).<br>Fishing vessel activity and the impact of the Project on fishing vessels is discussed in **Chapter 15, Shipping and Navigation Sections 15.5.3.1.1, 15.6.3.5** and **15.6.4.5**. |
| | Considered that inshore route is not practical for coastal shipping and they would navigate to the West of the MDZs. Commented that the inshore route appeared to be narrow for recreational and fishing vessels which may cause them to deviate onto other routes should surface devices be used. Should submerged devices be used, small vessels could safely navigate over. | The NRA does consider the impact of narrowing of the inshore route, the available sea space and pinch points for recreational and fishing vessels.<br>See **Chapter 15, Shipping and Navigation Sections 15.6.3.1, 15.6.4** and **Appendix 15.1** (**Volume III**). |
| | Understood the need for the Rochdale approach but would prefer to have more detail on the device deployment plan. | Device deployment plans are not known at this stage but will be provided as they are finalised. |
| | Considered that the proposed Morlais site would increase Navigation Risk of:<br>Collision – squeezing traffic into a smaller area.<br>Contact (Allision) – The devices introduce new surface and submerged objects in the area. | Collision and allision for all vessel types is assessed in **Chapter 15, Shipping and Navigation Sections 15.6.3, 15.6.4** and **Appendix 15.1** (**Volume III**). |
| | SAR restrictions / access difficulties if surface devices are utilised and a sufficient distance for navigation is not maintained between devices. | See **Chapter 15, Shipping and Navigation, Sections 15.6.3, 15.6.4.**<br>The Project will adhere to the MCA Guidance on Offshore Renewable Energy Installation: Requirements, Advice and Guidance for Search and Rescue and Emergency Response. |
| | Stated that the CoS supported the proposed Morlais site in principle provided that suitable navigational safety compromises and mitigation measures are agreed. | Noted. |
| **MCA and Trinity House** | | |
| January 2019<br>(NRA consultation on the PHA and approach to NRA document) | The initial concern is the size of the project area.<br>Reiterated that the layout once agreed will need to ensure clear lines of sight and navigational channels between devices to maintain search and rescue access especially at night, in poor visibility and high sea states. | Noted.<br>See **Chapter 15, Shipping and Navigation, Sections 15.6.3, 15.6.4.**<br>The Project will adhere to the MCA Guidance on Offshore Renewable Energy Installation: Requirements, Advice and |

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| | Reiterated that while the MCA is supportive of Offshore Renewable Energy development, its remit is to ensure that the safety of navigation is preserved, and Search and Rescue capability is maintained.<br>Surface and surface breaking devices should, therefore, be aligned in straight rows that allow RNLI vessels to have continued access. | Guidance for Search and Rescue and Emergency Response.<br>Final mitigation plans will be agreed prior to the construction once the final details are known. |
| | Concerns over restricting the inshore route. | The NRA does consider the impact of narrowing of the inshore route, the available sea space and pinch points for recreational and fishing vessels.<br>See **Chapter 15, Shipping and Navigation Sections 15.6.3.1, 15.6.4** and **Appendix 15.1** (**Volume III**). |
| | Explained that Trinity House often has a vessel with a heli-pad working off South Stack lighthouse which typically would be located at a distance of up to 1.5 miles off of South Stack. Should Trinity House's access to South Stack lighthouse be restricted, this would be of significant operational concern. | During consultation it was noted by Trinity House that once per year it has a vessel with a heli-pad located up to 1.5 nm off of South Stack in order to carry out routine maintenance. Additionally, approximately every 7 years the vessel would be present for an extended time to support major maintenance activities such as; painting, battery change or modernisation. This information has been included in the NRA. |
| | Pointed out that there are no adequate examples of the alternative poor weather ferry routes within the passenger vessel plot. | An additional six months of winter AIS data has been purchased which contained examples of poor weather routes including a ferry anchoring at Abraham's Bosom. |
| | Pointed out that the fishing vessel traffic looked light with only examples of vessels en-transit passing through the MDZ. | Noted. There are limitations with AIS in that many fishing vessels under 10m are not equipped with AIS which is why radar surveys were also undertaken and this supplemented by fishing intensity data as recorded by the MMO using the Vessel Monitoring System (VMS). |
| | Questioned why the hazard 'Impact to Fishing' was scored as high for both the baseline and residual risk score. | This was due to the risk of gear catching on the devices causing both a hazard to the fishing gear and the project. It is considered, therefore, that this hazard cannot be mitigated to a level that would reduce the risk of fishing to acceptable levels and as such it is recommended that fishing be excluded within the MDZ. |
| | Pointed out that Safety Zones are only really effective if there are monitoring arrangements i.e. a guard vessel on site. | Noted. Safety Zones are assessed in **Chapter 15, Shipping and Navigation Section 15.6.**<br>Safety Zones would be monitored and enforced through active monitoring arrangements such as guard vessels and |

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| | | control centre. Final mitigation plans will be agreed prior to the construction once the final details are known. |
| | Questioned where the requirement for an ERCoP will be addressed. | This had been included as an embedded mitigation measure and is included within the NRA. See **Appendix 15.1** (**Volume III**). |
| | Questioned how C&IC impacts had been addressed within the PHA. | A high-level assessment had been undertaken and that Cumulative impacts are addressed. See **Chapter 15, Shipping and Navigation Section 15.6.6** and **Appendix 15.1** (**Volume III**). |
| | Enquired after the feedback received from local stakeholder consultation, particularly fishing and recreational users. | See Consultation Meeting Notes in **Appendix 15.1** (**Volume III**). |
| | Pointed out that there had been some updates to existing legislation / guidance:<br>Annex 5 of MGN 543 – Revised ERCoP / SAR guidance<br>IMO circular in relation to updated FSA Guidance (with reference to MGN 543) | Noted. The NRA was undertaken in accordance with this updated guidance/legislation. |

## 15.4. METHODOLOGY

### 15.4.1. Study Area

18. The location of the MDZ is given within **Figure 15-1** (**Volume II**). The MDZ is located to the west of Holy Island, Anglesey, 500 m off South Stack and occupies a total area of 35 km$^2$ and has been nominally sub-divided in to eight indicative subzones (see **Figure 4-1, Volume II**).

### 15.4.2. Data Sources – Desk Study

19. The main data sources used to identify the baseline navigational features and activity in the vicinity of the Project were:

- Automatic Identification System (AIS) data;
- Radar data;
- GIS shapefiles;
- Maritime Incident Data (Maritime Accident Investigation Branch (MAIB) 1997-2017;
- Admiralty Sailing Directions – West Coast of England and Wales Pilot, NP37, 19th Edition, 2014; and
- UK Admiralty Charts: 1970, 1413 (All cartography in this report, unless otherwise stated, is to WGS84 UTM Zone 30N standard. All marine charts are in a Mercator projection. Charts are not suitable for navigational purposes).

### 15.4.3. Data Sources – Site-Specific Surveys and Reports

20. Project-specific marine traffic surveys which collected AIS, radar and visual data were undertaken as per **Table 15-3**. These surveys collected data over two week periods in the summer and winter, in line with MGN543 recommendations.

21. The following were assessed through the analysis of these marine traffic data:

- Location of the MDZ relative to areas used by any type of marine craft;
- Numbers, types and sizes of vessels presently using the MDZ including; course, name, IMO Number and nationality where possible;
- Non-transit uses of the areas, e.g. fishing, recreation, racing or military purposes;
- Presence of transit routes used by coastal or deep-draught vessel on passage; and
- Alignment and proximity of the development site relative to adjacent shipping lanes.

22. Further information was gathered through consultation with key stakeholders including representatives of recreational and fishing organisations, and the local harbour master.

23. Six months of AIS data from between October 2017 and March 2018 were additionally sourced to account for any seasonal variances in ferry activity and usage of the poor weather routes.

24. To overcome the limitations posed by utilisation of AIS alone and in line with MGN 543 requirements, winter and summer RADAR surveys were undertaken for representative summer and winter periods.

25. The data collected for utilisation within the NRA is summarised within **Table 15-3**.

**Table 15-3 Project-Specific Marine Traffic Data Collection**

| Data Type | Season | Duration | Time Period |
|---|---|---|---|
| AIS | Summer | 2 weeks | 26th August to 9th September 2017 |
| RADAR | Summer | 2 weeks | 26th August to 9th September 2017 |
| AIS | Winter | 2 weeks | 05th April to 19th April 2019 |
| RADAR | Winter | 2 weeks | 05th April to 19th April 2019 |
| AIS | Winter* | 6 Months | 1st October 2017 to 31st March 2018 |
| * AIS data purchased from Marine Traffic, not from survey. | | | |

### 15.4.4. Impact Assessment Methodology

26. **Chapter 5, EIA Methodology** outlines the Impact Assessment Methodology used for other Chapters. The Navigation Risk Assessment Methodology for the impact assessment in this chapter is detailed within **Appendix 15.1** (**Volume III**).

27. The approach is similar to that outlined in **Chapter 5, EIA Methodology** in that it seeks to make a balanced assessment and is based on the 'source-pathway-receptor' conceptual model process used to provide a systematic and auditable approach to understanding the potential for

effects to arise, the spatial extents of the effect-receptor interactions, impact pathways, and potential impact significance.

28. The difference is that for the impact assessment methodology used in this chapter the outcomes are expressed as a Hazard Risk Score which is then translated into different terminology to that used in **Chapter 5, EIA Methodology** such as Negligible, Low Risk, As Low as Reasonably Practical (ALARP), Significant or High.

29. The objective is to use embedded mitigation and additional mitigations measures to reduce the risk to ALARP or better. This would be equivalent in the EIA Methodology outlined in **Chapter 5, EIA Methodology** to introducing mitigation measure to reduce Major and Moderate impacts to Minor or better.

### 15.4.5. Formal Risk Assessment Methodology

30. A shipping and navigation receptor can only be sensitive if there is a pathway through which an impact can be transmitted between the source activity and the receptor. This risk assessment was conducted in accordance with the International Maritime Organisation (IMO) Formal Safety Assessment (FSA) methodology for risk assessments.

31. Hazard identification is the first fundamental step in the risk assessment process and was informed by analysis and feedback from stakeholders. Key navigation hazards were identified and grouped with the identified vessel types operational in the vicinity of the MDZ to form the list of potential impacts for assessment. The hazards were then assessed as a factor of likelihood (frequency) and consequence. This approach considered two scenarios; “most likely” and the “worst credible”. The quantified values of frequency and consequence were then combined using the Marico HAZMAN ll software to produce a risk score for each hazard and collated into a “Ranked Hazard List”. Risk control measures were then suggested that may reduce the hazard to ALARP.

32. Risk is the product of a combination of consequence of an event and the frequency with which it might be expected to occur. In order to determine navigation risk a Formal Safety Assessment (FSA) approach to risk management is used. International Maritime Organisation (IMO) Guidelines define a hazard as “something with the potential to cause harm, loss or injury”, the realisation of which results in an accident. The potential for a hazard to be realised can be combined with an estimated or known consequence of outcome. This combination is termed “risk”. Risk is therefore a measure of the frequency and consequence of a particular hazard.

#### 15.4.5.1.1. General Risk Matrix

33. The combination of consequence and frequency of occurrence of a hazard is combined using a risk matrix which enables hazards to be ranked and a risk score assigned. The resulting scale can be divided into three general categories:

    1. Acceptable;
    2. As Low as Reasonably Practicable (ALARP); and
    3. Intolerable.

34. At the low end of the scale, frequency is extremely remote and consequence minor, and as such the risk can be said to be "acceptable", whilst at the high end of the matrix, where hazards are defined as frequent and the consequence catastrophic, then risk is termed "intolerable". Every effort should be made to mitigate all risks such that they lie in the "acceptable" range.

35. Where this is not possible, they should be reduced to the level where further reduction is not practicable. This region, at the centre of the matrix is described as the ALARP region. It is possible that some risks will lie in the "intolerable" region, but can be mitigated by measures, which reduce their risk score and move them into the ALARP region, where they can be tolerated, albeit efforts should continue to be made when opportunity presents itself to further reduce their risk score.

36. The FSA methodology used determines where to prioritise risk control options for the navigational aspects of a project site. The outcome of this risk assessment process should then act as the basis for a Navigation Safety Management System, which can be used to manage navigational risk.

15.4.5.1.2. Hazard Identification

37. Hazard identification is the first and fundamental step in the risk assessment process and was undertaken using the results of the analysis and feedback from local stakeholders.

38. The project phases were assessed individually due to their different navigational risk exposure and magnitude, i.e. the different nature of the operations, the vessels involved, and the potential cost of any consequences.

15.4.5.1.3. Risk Matrix Criteria

39. Frequency of occurrence and likely consequence are both to be assessed for the "most likely" and "worst case" scenario. It should be noted that within the NRA (**Appendix 15.1, Volume III**) reference is made to "worst credible scenarios" which is equivalent to "worst case scenario". Frequencies were assessed according to the levels set out in **Table 15-4** below.

**Table 15-4 Frequency Criteria**

| Scale | Description | Definition | Operational Interpretation |
|---|---|---|---|
| F5 | Frequent | An event occurring in the range once a week to once an operating year. | One or more times in 1 year |
| F4 | Likely | An event occurring in the range once a year to once every 10 operating years. | One or more times in 10 years<br>1 - 9 years |
| F3 | Possible | An event occurring in the range once every 10 operating years to once in 100 operating years. | One or more times in 100 years<br>10 – 99 years |
| F2 | Unlikely | An event occurring in the range less than once in 100 operating years. | One or more times in 1,000 years<br>100 – 999 years |
| F1 | Remote | Considered to occur less than once in 1,000 operating years (e.g. it may have occurred at a similar site, elsewhere in the world). | Less than once in 1,000 years<br>>1,000 years |

40. Using the assessed notional frequency for the "most likely" and "worst case" scenarios for each hazard, the probable consequence associated with each hazard was assessed in terms of damage to:

- People - Personal injury, fatality etc.;
- Property – Project and third party;
- Environment - Oil pollution etc.; and
- Business - Reputation, financial loss, public relations etc.

41. Consequences were assessed according to the levels set out in **Table 15-5**.

**Table 15-5 Consequence Categories and Criteria**

| Category | People | Property | Environment | Business |
|---|---|---|---|---|
| C1 | **Negligible**<br>Possible very minor injury (e.g. bruising) | **Negligible**<br>Costs <£10k | **Negligible**<br>No effect of note. Tier1 may be declared but criteria not necessarily met.<br>Costs <£10k | **Negligible**<br>Costs <£10k |
| C2 | **Minor**<br>(single minor injury) | **Minor**<br>Minor damage<br>Costs £10k – £100k | **Minor**<br>Tier 1 – Tier 2 criteria reached.<br>Small operational (oil) spill with little effect on environmental amenity.<br>Costs £10K–£100k | **Minor**<br>Bad local publicity and/or short-term loss of revenue<br>Costs £10k – £100k |
| C3 | **Moderate**<br>Multiple minor or single major injury | **Moderate**<br>Moderate damage<br>Costs £100k - £1M | **Moderate**<br>Tier 2 spill criteria reached but capable of being limited to immediate area within site<br>Costs £100k -£1M | **Moderate**<br>Bad widespread publicity<br>Temporary suspension of operations or prolonged restrictions to project<br>Costs £100k - £1M |
| C4 | **Major**<br>Multiple major injuries or single fatality | **Major**<br>Major damage<br>Costs £1M -£10M | **Major**<br>Tier 3 criteria reached with pollution requiring national support.<br>Chemical spillage or small gas release<br>Costs £1M - £10M | **Major**<br>National publicity,<br>Temporary closure or prolonged restrictions on project operations<br>Costs £1M -£10M |
| C5 | **Catastrophic**<br>Multiple fatalities | **Catastrophic**<br>Catastrophic damage<br>Costs >£10M | **Catastrophic**<br>Tier 3 oil spill criteria reached. | **Catastrophic**<br>International media publicity. Project site closes. Operations |

| Category | People | Property | Environment | Business |
|---|---|---|---|---|
| | | | International support required.<br>Widespread shoreline contamination.<br>Serious chemical or gas release.<br>Significant threat to environmental amenity.<br>Costs >£10M | and revenue seriously disrupted for more than two days. Ensuing loss of revenue.<br>Costs >£10M |

15.4.5.1.4. Hazard Data Review Process

42. Frequency and consequence data were assessed for each hazard. This was subsequently influenced by the views and experience of the many stakeholders, whose contribution was greatly appreciated, as well as historic incidents where available.

43. It should be noted that the hazards were scored on the basis of the "status quo" i.e. with all existing embedded mitigation measures taken into consideration. The outcome of this process was then checked for consistency against the assessments made in previous and similar risk assessments.

44. Having decided in respect of each hazard which frequency and consequence criteria are appropriate for the five consequence categories in both the "most likely" and "worst case" scenarios, eleven risk scores were obtained using the following matrix **Table 15-6**.

**Table 15-6 Risk Factor Matrix Used for Hazard Assessment**

| | | | | | | |
|---|---|---|---|---|---|---|
| **Consequences** | **C5 (catastrophic)** | 5 | 6 | 7 | 8 | 10 |
| | **C4 (major)** | 4 | 5 | 6 | 7 | 9 |
| | **C3 (moderate)** | 3 | 3 | 4 | 6 | 8 |
| | **C2 (minor)** | 1 | 2 | 2 | 3 | 6 |
| | **C1 (negligible)** | 0 | 0 | 0 | 0 | 0 |
| | **Frequency** | **F1: Remote (>1,000 years)** | **F2: Unlikely (100-1,000 years)** | **F3: Possible (10-100 years)** | **F4: Likely (1 to 10 years)** | **F5: Frequent (Yearly)** |

45. Where:

| Risk Number | Risk |
|---|---|
| **0 to 1.9** | **Negligible** |
| **2 to 3.9** | **Low Risk** |
| **4 to 6.9** | **As Low as Reasonably Practical (ALARP)** |
| **7 to 8.9** | **Significant Risk** |
| **9 to 10.0** | **High Risk** |

46. It should be noted that occasionally, a "most likely" scenario will generate a higher risk score than the equivalent "worst case" scenario; this is due to the increased frequency often

associated with a "most likely" event. For example, in the case of a large number of small contact events, the total damage might be of greater significance than a single heavy contact at a much lesser frequency.

15.4.5.1.5. Hazard Ranking

47. The risk scores obtained from the above process were then analysed further to obtain four indices for each hazard as follows:

- The average risk score of the four categories in the "most likely" set;
- The average risk score of the four categories in the "worst case" set;
- The maximum risk score of the four categories in the "most likely" set; and
- The maximum risk score of the four categories in the "worst case" set.

48. These scores were then be combined in Marico Marine's hazard management software "HAZMAN" to produce a single numeric value representing each of the four indices. The hazard list was then sorted in order of the aggregate of the four indices to produce a "Ranked Hazard List" with the highest risk hazards prioritised at the top.

49. Mitigation measures that could be employed to reduce the likelihood or consequence of the hazards occurring were then identified. Risk controls were reviewed and discussed, and recommendations made as to which would be suitable for the Project. Risk controls were proposed that show the greatest reduction in risk to the highest scoring identified hazards and following feedback from consultees.

## 15.5. EXISTING ENVIRONMENT

50. The following sections present a description of the existing baseline features and shipping activity recorded in the vicinity of the MDZ.

### 15.5.1. Regional Context

51. The largest ports in the area are Liverpool located on mainland UK, Dublin located on mainland Republic of Ireland (ROI) and Holyhead, situated on Anglesey. Shelter is listed within the Admiralty Sailing Directions (ASD) as available at all times in Holyhead Outer Harbour. In bad weather or at the request of the vessel, Liverpool Pilots will board vessels off Point Lynas at 53˚25'000 N; 4˚17'39 W.

52. South Stack Lighthouse is located at 53˚18'41 N; 4˚41' 98 W. The light is shown throughout 24 hours.

53. The closest Traffic Separation Scheme (TSS) is the Off Skerries TSS (53˚22'.88 N; 4˚52'27 W to 53˚32'18 N; 4˚31' 78 W). Off Skerries was established for vessels rounding the northwest coast of Anglesey. Rule 10 of The International Regulations for Preventing Collisions at Sea (COLREGS) applies. Laden tankers are to avoid the area between the southeast boundary of the TSS and the coast.

54. An un-adopted TSS is located at the entrance to Holyhead Harbour. The RNLI provides all-weather and inshore lifeboats around the coast for saving life at sea. The RNLI stations near to the MDZ are given within **Table 15-7**. At each of these stations crew and lifeboats are available on a 24-hour basis throughout the year.

55. The closest HM Coastguard SAR station to the MDZ is situated at Caernarfon Airport. The base has been operated by Bristow Helicopters Ltd on behalf of HMCG since it opened in 2015.

56. Anchorages in vicinity of the proposed MDZ are given within **Table 15-8.**

**Table 15-7 RNLI Stations near to the MDZ**

| Station | Location | Lifeboats |
|---|---|---|
| Holyhead New Harbour | 53˚19'.17N 4˚38'.56W | Christopher Pearce – Severn Class<br>Mary and Archie Hooper – D Class |
| Trearddur Bay | 53°16'.57"N 4°37'.49"W | Hereford Endeavour- B Class<br>Clive and Imelda Rawlins – D Class |

**Table 15-8 Nearby Anchorages**

| Anchorage | Description |
|---|---|
| Abraham's Bosom | 53˚17'.81N 4˚40'.97W - Anchorage in offshore winds.<br>A below water rock lies below the water surface (Pen – las rock) close to the northern entrance to the bay with foul ground extending 1 cable southwest from the rock. |
| Trearddur Bay | 53˚16'.63N 4˚37'.28W Temporary anchorage in offshore winds. |

57. For details regarding other Infrastructure and Marine Users within the area please refer to **Chapter 16, Infrastructure and Other Users**.

### 15.5.2. Physical Environment

58. Wind, wave and tidal data for the area were used as input to the NRA process. This is presented in **Chapter 7, Metocean Conditions and Coastal Processes** of the ES.

### 15.5.3. Marine Traffic Survey

59. This section presents analysis of the maritime traffic survey data within the study area and intersecting the development site. Data have been collected using AIS and radar and cover 2 x two week periods from 2017 through to 2019; one winter periods and one summer period. Further analysis of historical AIS data from a 6 month period covering from October 2017 to March 2018 was also included.

60. All vessel tracks recorded by AIS and RADAR between 26th August and 19th September 2018 and 5th April and 19th April 2019 are shown in **Figure 15-2** (**Volume II**). Immediately evident is the inshore passage utilised by smaller low-draught vessels such as; recreational craft, workboats and small fishing vessels and the ferry route to the north of the MDZ utilised by Irish Ferries and Stena Line (see **Figure 15-7, Volume II**).

#### 15.5.3.1. Density Analysis

61. Density analysis was undertaken using a fixed Cartesian grid system to count the number of vessel transits through each given 100 m² cell.

62. Vessel transit density from the summer 2017 and winter 2019 radar and AIS surveys is represented within **Figure 15-3** (**Volume II**). The inshore passage and ferry route to the north of the MDZ are clearly evident, demonstrating the highest traffic densities.

63. Vessel transit density per month across the MDZ for the winter 2017 / 2018 period (from AIS only) is depicted in **Figure 15-4** (**Volume II**). It is evident that traffic density of larger vessels carrying AIS is low within the MDZ during winter with <4 transits per month across all sub-zones, with up to 12 transits per month occurring in the northern most 200 m of the MDZ, reflecting the presence of the ferry route there.

##### 15.5.3.1.1. Analysis by Vessel Type

64. Analysis according to vessel type has been undertaken to establish existing traffic patterns within the proposed MDZ. Following assessment of the primary vessel types present within the area, vessel types were grouped in to the categories outlined in **Table 15-9** for analysis.

**Table 15-9 Vessel Categories**

| Ref | Vessel Type Category | Draught | Including |
|---|---|---|---|
| 1 | Commercial Ship | >3m | Cargo vessels, tankers, dredgers, survey vessels (draught >3m), buoy laying vessels, commercial fishing vessels/ fish carriers. |
| 2 | Passenger Vessel | >3m | Ferries, cruise ships |
| 3 | Fishing Vessel | <3m | Fishing Vessels |
| 4 | Recreational Vessel | <3m | Yachts, power boats, kayaks, canoes |
| 5 | Other Vessel | <3m | Tugs and tows, survey vessels, RNLI, construction and maintenance vessels, cable laying vessels. |

Commercial Ships

65. The tracks of commercial vessels >3 m draught (including cargo, tankers and dredgers) recorded during two-weeks of winter 2019 and two weeks of summer 2017 are shown in **Figure 5-5** (**Volume II**).

66. There was one vessel of this category within the winter dataset; the general cargo vessel *Halenic* (unladen draught 3.2 m, laden draught 5.5 m). This vessel transited 0.2 nm from the western boundary of the MDZ. There were two vessels of this category within the summer dataset; the buoy laying vessel *Patricia* (draught 4.5 m) and the dredger *DEO Gloria* (draught 3.3 m). No tankers were recorded within either dataset.

Passenger Ferries

67. Irish Ferries and Stena Line operate to the north of the proposed MDZ as shown in **Figure 15-6** (**Volume II**) and **Figure 15-7** (**Volume II**). Typically, the ferries transit clear of the northern zone boundary, however, occasionally pass within the northern two sub-zones and the western

sub-zone during poor weather conditions. A summary of poor weather routing from consultation is given within **Table 15-10**.

**Table 15-10 Consultation Feedback in Relation to Poor Weather Routing**

| Consultee | Feedback |
|---|---|
| Stena Line | ▪ During a SW gale (rare but considered to be the most difficult) 046˚ line is utilised, which takes the vessel through the MDZ.<br>▪ Alternative weather routing plus 100 % cargo lashing must be taken with a forecast of >4m waves.<br>▪ Ferries do not transit near to the tidal race. |
| Irish Ferries | ▪ The ferries will not normally operate in 5m waves. Irish Ferries has a 2.5m sea state limit.<br>▪ 7˚ Poor weather route is utilised in SW gales and when sea state is building up to 3.5m significant waves.<br>▪ Holyhead Deep is considered to be an Area to Be Avoided (ATBA) during high seas as this is the main area of wave build up.<br>▪ Irish Ferries avoid navigating too close to shore due to wave build up. Irish Ferries never transit closer than half a mile to shore.<br>▪ Usage of the alternative poor weather routes varies. For example: they were utilised for approximately 3 weeks in 2017 (mainly within November) and 3 days in 2018.<br>▪ Waiting area to the south of the MDZs rarely utilised (2 times in 13 years by the Ulysses and similar usage by Epsilon). |
| Holyhead Harbour Master | ▪ Seas in the vicinity of the Holyhead Deep can be particularly rough and the area is avoided by the ferries. |

68. Six months of AIS data from between October 2017 and March 2018 was sourced to account for any seasonal variances in ferry activity and usage of the poor weather routes. The data includes Class A and Class B vessels.

69. The ferry *Epsilon* is noted in **Figure 15-16** (**Volume II**) transiting through the proposed MDZ to anchor at Abrahams Bosom on 03rd March 2018. Although this is considered a rare event (**Table 15-10**), alternative poor weather/emergency anchor routes would likely need to be established, should devices with an UKC of <20 m be deployed within the proposed MDZ.

70. In addition to ferries, five transits were made by four unique cruise ship vessels; *Hebridean Sky* (draught 4.2 m), *Corinthian* (draught 4 m), *Variety Voyage*r (draught 3.4 m) and *Balmoral* (draught 2.1 m) within the two-week summer 2017 dataset. The cruise ships, while infrequent, are noted occupying a larger portion of the proposed MDZ and are present within all eight sub-zones. Cruise ships undertake thorough passage planning and, in contrast to ferries, cruise ships may more easily alter passage plans to accommodate offshore infrastructure.

Naval Vessels

71. Naval vessels may not broadcast AIS given the sensitive nature of their operations and, as such, may be under-represented within the datasets. **Figure 15-8** (**Volume II**) shows the tracks naval vessels recorded within the summer and winter 2017 surveys.

72. Two transits by one unique vessel, the military training vessel *Smit Don*, were recorded within the proposed MDZ within the winter dataset. One transit by *Smit Don* was recorded within the northern most sub-zone of the proposed MDZ within summer. *Smit Don* has a recorded draught of <3 m.

Other Vessels

73. **Figure 15-9** (**Volume II**) shows an assortment of other vessel types which are active near the Project, including; tugs and tows, survey vessels, RNLI vessels, construction and maintenance vessels and cable laying vessels. This vessel category is active across the entirety of the proposed MDZ and is primarily comprised of vessels with draught <3 m. *MV Seekat C* is noted undertaking Project related surveys within the summer dataset with other category vessels more prolific in summer than in winter.

Fishing Vessels

74. This section analyses the fishing vessel activity in the study area, based on the maritime traffic survey. Further information is provided in **Chapter 14, Commercial Fisheries**.

75. Holyhead is one of three main commercial fishing ports in Wales. The tracks of fishing vessels during summer and winter from radar and AIS are given in **Figure 15-10** (**Volume II**). The Admiralty Sailing Directions (ASD)[1] details that within this region, inshore trawlers *'may be encountered at any time in depths of 25 m to 35 m' and that pots may be found up to 10 miles offshore'.* The tracks within the inshore passage and those actively fishing within the eastern portion of the proposed MDZ are comprised of smaller fishing vessels that do not carry AIS while the majority of fishing vessels on transit are larger vessels carrying AIS. It is noted that vessels engaged in fishing are more prevalent within summer than winter where the majority of vessels are on transit through the proposed MDZ.

76. Fishing data from AIS and radar has been supplemented by fishing intensity data as recorded by the MMO using the Vessel Monitoring System (VMS). VMS is required on vessels greater than 15 m Length Over-All LOA and effort is presented in kW hours (kWh) (calculated by multiplying the time associated with each VMS report in hours by the engine power of the vessel concerned at the time of the activity).

77. Fishing intensity from VMS in the vicinity of the MDZ is shown within **Figure 15-11** (**Volume II**). Intensity is determined to be low at less than 20,000 kWh per year, particularly to the west of the MDZ where the intensity falls to <5,000 kWh per year.

Recreational Vessels

78. The tracks of recreational vessels are given within **Figure 15-12** (**Volume II**). Most tracks are concentrated close to shore with small recreational craft, including yachts, primarily utilising the

[1] United Kingdom Hydrographic Office - Admiralty Sailing Directions : West Coast of England Pilot (2014) , NP37, 19th Edition, Chapter 7 – North-West Coast of Wales Including The Island of Anglesey and the Menai Strait.

inshore passage to the east of the MDZ. The density of recreational vessels increases substantially in summer where the area occupied by these vessels is much greater, overlapping the eastern portion of the proposed MDZ, particularly in the vicinity of South Stack. In consultation with the recreational users and RYA in November 2018, August was described as the busiest month as a result of favourable weather conditions and the school holidays.

Analysis by Vessel Length

79. Vessel transits by LOA from AIS between 1st October 2017 and 31st March 2018 are shown in **Figure 15-13** (**Volume II**). The majority of vessels transiting through the MDZ are <21 m LOA corresponding to; recreational, fishing and other vessel categories. All vessels transiting through the proposed MDZ with a LOA >167 m transited within the northern most two sub-zones and the western-most sub-zone with the exception of *Epsilon* (see **Figure 15-6, Volume II**) which transited through the proposed MDZ to anchor at Abrahams Bosom on 3rd March 2018.

Maritime Incidents

80. **Figure 15-14** (**Volume II**) shows marine accidents investigated by the MAIB in proximity to the MDZ between 1997 and 2017. There were 14 separate MAIB incidents recorded within 1 nm, of which, one is considered navigationally significant; a collision between a fishing boat and a recreational dive boat on 31st August 2015. The incident was described by the MAIB as follows:

*'Collision between a dive RHIB and fishing vessel - A diving boat had divers in the water and was stationary displaying the appropriate flag, when a fishing vessel came towards them at speed and despite seeing the diving vessel did not slow down.'*[2]

81. It was noted during consultation with the RNLI Holyhead in November 2018 that an incident had occurred at the adjacent Minesto operated Holyhead Deep tidal energy site, whereby a yacht made contact with a project buoy resulting in loss of the radar reflector on the buoy and the mast of the yacht.

82. RNLI Callouts are shown within **Figure 15-15** (**Volume II**). A total of 125 callouts occurred within 1 nm of the proposed MDZ, or approximately 16 per year. Of these, 56 callouts (45 %) involved recreational vessels, and 10 or 8 % involved fishing vessels. 9 % of callouts were in response to a person in the water and 25 % were in response to persons stranded on the adjacent beach cliffs. One callout was in response to a military vessel that experienced a machinery failure. 23 % of callouts reported machinery failure as the cause for assistance. 50 % of callouts were answered by Holyhead Lifeboat station and 50 % by Trearddur Bay Lifeboat station.

83. A total of 21 callouts occurred within the MDZ, of which, 12 or 57 % were in response to recreational vessels. 50 % of callouts within the MDZ occurred in 2008 and 2012, the busiest years for callouts. There were two callouts per year between 2014 and 2016 within the MDZ.

[2] Marine Accident Investigation Branch (2015)

## 15.6. IMPACT ASSESSMENT

### 15.6.1. Overview of Potential Impacts

84. The main navigation effects of the MDZ are assessed as:

- Restriction of vessel navigation; and
- Increased risk of vessel allision, between vessels and the tidal devices (surface piercing superstructures and subsea elements), and collision between vessels and other vessels due to reduced sea room.

85. **Table 15-11** provides a list of the potential impacts on Shipping and Navigation that may arise during activities undertaken during each phase of the Project.

**Table 15-11 Potential Impacts of the Project Phases on Shipping and Navigation**

| Phase | Potential Impact |
|---|---|
| Construction | Impact 1: Potential Impacts on commercial vessels (safe operations)<br>Impact 2: Potential Impacts on commercial vessel routing<br>Impact 3: Potential impacts on passenger vessels (safe operations)<br>Impact 4: Potential impacts on passenger vessel routing<br>Impact 5: Potential impacts on commercial fishing vessels<br>Impact 6: Potential impacts on recreational craft<br>Impact 7: Potential impacts on other vessels<br>Impact 8: Potential impacts on emergency response operations<br>Impact 9: Subsea export cables |
| Operation and Maintenance (including Repowering) | Impact 1: Potential impacts on commercial vessels (safe operations)<br>Impact 2: Potential impacts on commercial vessel routing<br>Impact 3: Potential impacts on passenger vessels (safe operations)<br>Impact 4: Potential impacts on passenger vessel routing<br>Impact 5: Potential impacts on commercial fishing vessels<br>Impact 6: Potential impacts on recreational craft<br>Impact 7: Potential Impacts on other vessels<br>Impact 8: Potential impacts on emergency response operations<br>Impact 9: Subsea export cable |
| Decommissioning | Impact 1: Potential Impacts on commercial vessels (safe operations)<br>Impact 2: Potential Impacts on commercial vessel routing<br>Impact 3: Potential impacts on passenger vessels (safe operations)<br>Impact 4: Potential impacts on passenger vessel routing<br>Impact 5: Potential impacts on commercial fishing vessels<br>Impact 6: Potential impacts on recreational craft<br>Impact 7: Potential impacts on other vessels<br>Impact 8: Potential impacts on emergency response operations<br>Impact 9: Subsea export cables |

### 15.6.2. Worst Case Parameters

86. In order to assess the potential impact of the MDZ on shipping and navigation, a worst-case layout has been assumed throughout the Navigation Risk Assessment (both surface and sub-surface) within the NRA. As a finalised layout was not available for the assessment, the NRA assumes any combination of device types may be deployed up to a maximum 240 MW (worst-case capacity).

**Table 15-12 NRA Assumptions**

| Assumption | Description |
|---|---|
| Utilisation of worst-case maximum capacity (240 MW) | The proposed installed capacity of the Project was increased in response to industry demand. The Project is seeking consent for an array of up to 240 MW installed capacity. |
| Any device type may be deployed within any sub-zone | The Project will install multiple technology types; therefore, the consent application will be based on the Project Design Envelope (Rochdale Envelope) approach. Device types will be determined through consideration of the direction of future developments and technology. |
| Maximum 9 x 33 kV export cables | A series of seabed installed cables will be laid between individual offshore electrical hubs and the landfall location. The cable routes have not yet been determined, however, they will make landfall at Abrahams Bosom. |
| Project Design (Rochdale) Envelope Approach | No defined, device specific layout was provided prior to undertaking the NRA. The application will be based on the Project Design (Rochdale) Envelope approach to maintain maximum layout and device flexibility. |
| Embedded mitigation measures are in place prior to construction | Embedded mitigation listed within **Appendix 15.1** (**Volume III**) are assumed to be in place and as such are reflected in the scores. |

#### 15.6.2.1. Construction Programme

87. The construction of offshore works (for installation of tidal devices and associated cabling and infrastructure) would be phased over a period of several years, taking up to 15 days per device or hub and up to 1.5 days for each inter-array cable, up to 20 days for each offshore cable, and up to 12 days for each phase of cable protection. Up to nine separate cable laying and protection campaigns are possible. The HDD at the landfall would be completed over a four- to six-month period with two months for offshore cable tail installation.

#### 15.6.2.2. Repowering

88. For the purpose of defining impact assessment parameters for the repowering phase, an assumption has been made that 50 % of the tenants will undertake repowering, i.e. for 50 % of the tenants, their infrastructure will be removed and replaced (potentially with different infrastructure by a different tenant). For the other 50 % of tenants, their infrastructure will remain over the lifetime of the Project.

#### 15.6.2.3. Embedded Mitigation

89. Mitigation and safety measures will be applied to the development appropriate to the level and type of risk determined during the EIA. Possible specific additional mitigation measures to be employed will be selected in consultation with the MCA navigation safety branch and other relevant statutory stakeholders where required, dependent on the final design.

90. Embedded mitigation measures are described further in the NRA (**Appendix 15.1, Volume III**) and will be in place throughout the relevant phases of the Project. Possible additional mitigation measures are described further in the NRA (**Appendix 15.1, Volume III**).

91. These embedded mitigation measures are (see **Appendix 15.1, Volume III** for further information):

- Compliance with applicable guidance and regulations (including COLREGs and SOLAS);
- Ensuring devices marked as per International Association of Lighthouse Authorities (IALA) Guidance and Aids to Navigation and in accordance with Trinity House;
- Promulgation of information to local stakeholders via Notice to Mariners and other appropriate Maritime Safety Information dissemination methods;
- Selection of appropriate construction/decommissioning and maintenance vessels;
- Global Positioning System off station alarm / Supervisory Control and Data Acquisition (SCADA) monitoring system;
- Incidents and near misses are reported and investigated by developer and operators;
- Surveyed and charted as required by United Kingdom Hydrographic Office;
- Formulation and implementation of an Emergency Response Co-operation Plan (ERCoP);
- Passage plans for construction/decommissioning and maintenance craft; and
- Consideration of weather and sea state during construction/decommissioning planning

### 15.6.3. Potential Impacts During Construction

#### 15.6.3.1. Construction Impact 1: Potential Impacts on Commercial Vessels (Safe Operations)

92. The winter marine traffic survey only identified one commercial vessel >3 m draft and the summer marine traffic surveys only two commercial vessels >3 m draft within the study area at the time of the studies; one of which (the *MZV Equator*) was transiting within the Off Skerries TSS well clear of the MDZ.

93. Traffic is most dense offshore across the most northern part of the MDZ. The main flow of commercial vessels was southwest / northeast and vice versa transiting through all zones of the MDZ. One of the commercial vessels intersecting the MDZ was a dredger. This vessel was transiting northwest, destination Garston.

94. The impacts potentially associated with commercial vessels were raised at the consultation meetings with the Chamber of Shipping, see **Appendix 15.1** (**Volume III**).

95. Potential impacts may also affect ports or harbours utilised / in the vicinity of MDZ traffic, dependent or where staging areas are to be located.

96. During the construction phases there would be an increase in marine traffic associated with the vessels required to carry out these operations. This could increase the risk to other vessels operating within proximity of the offshore site or those vessels engaged in the construction phase. It is also possible that there could be an increased risk of vessels alliding with the tidal devices, due to the fact that either the devices are part constructed/decommissioned or navigational aids (e.g. lights and markings) may not all be present.

97. Close consultation and co-operation with ports where construction vessels or operations are to be based will reduce the potential for impacts.

98. Potential impacts identified as part of the assessment include:

- Contact: Commercial Ship with Surface Device;
- Contact: Commercial Ship with Mid-Water Device (<8 m below CD);
- Contact: Commercial Ship with Mid-Water Device (>8 m below CD);
- Contact: Commercial Ship with Sea-Bed Device >20 m UKC;
- Collision: Commercial Ship ICW Commercial Ship;
- Collision: Commercial Ship ICW Passenger Vessels;
- Collision: Commercial Ship ICW Fishing Vessel;
- Collision: Commercial Ship ICW Recreational Vessel;
- Collision: Commercial Ship ICW Other Vessel;
- Snagging/ Obstruction: Commercial Ship; and
- Breakout of device / device not at stated depth

99. The overall severity of consequences for the construction phase are considered to be moderate (C3) due to the potential for notable damage to infrastructure / vessel(s) and interruption to construction (including impacts on businesses). The frequency of occurrence is considered remote (F1) due to low vessel density and the presence of embedded mitigations.

100. This indicates an overall risk ranking of (C3 x F1) = **Low Risk**. An exception is Breakout of device / device not at stated depth (C4 X F3) = **ALARP**.

15.6.3.1.1. Additional Mitigation

101. Associated possible additional mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;

- Restrict Navigation through the MDZ;
- Only deploy devices that provide at least 20 m UKC as shown within **Figure 4-1** (**Volume II**);
- Use of guard vessel(s) to monitor passing traffic;
- Implementation of Safety Zones;
- Temporary navigation aids as required by Trinity House;
- Undertake device specific NRA's prior to deployments, i.e. once exact locations and scale/type of device deployment is known;
- Construction vessels to be marked in accordance with COLREGS; and
- Check device surveys.

15.6.3.1.2. Residual Impact

102. If all the mitigations measures as detailed are utilised then the overall impact would be reduced but would still remain as **Low Risk**.

### 15.6.3.2. Impact 2: Potential Impacts on Commercial Vessel Routing

103. Very few commercial vessels intersected the development site (**Appendix 15.1, Volume III**).

104. As already noted, there would be increased activity associated with these phases at the offshore site. There would also be deviations for transiting traffic associated with the avoidance of any 500 m rolling navigational safety zones in use. However, the early notification of the works through the promulgation of information will ensure that all receptors, including regular operators, are kept informed, enabling them to safely passage plan and anticipate the works taking place.

105. Potential impacts identified as part of the assessment include:

- Impact on Commercial Vessel Routing – Commercial vessel forced to take alternative route due to presence of the site.

106. The overall severity of consequences for the construction phases are considered to be minor (C2). The frequency of occurrence is considered remote (F1) due to the presence of embedded mitigations. This indicates an overall risk ranking of (C2 x F1) = **Low Risk.**

15.6.3.2.1. Additional Mitigation

107. Associated additional embedded mitigation measures that could be utilised would be as shown for Impact 1 (**Section 15.6.3.1**).

15.6.3.2.2. Residual Impact

108. If all the mitigations measures as detailed are utilised then the overall impact would be reduced but would still remain as **Low Risk**.

### 15.6.3.3. Impact 3: Potential Impacts on Passenger Vessels (Safe Operations)

109. Irish Ferries and Stena Line ferries operate to the north of the proposed MDZ as shown in **Appendix 15.1** (**Volume III**). Typically, the ferries transit clear of the northern zone boundary; however, occasionally pass within the northern two sub-zones and the western sub-zone during poor weather conditions. A summary of poor weather routing from consultation is given within **Appendix 15.1** (**Volume III**)**.**

110. Traffic is most dense offshore across the most northern part of the MDZ. The main flow of passenger vessels was east / west and vice versa, as expected given the ferries routes in this area. In addition to ferries, five transits were made by four unique cruise ship vessels; Hebridean Sky (draught 4.2m), Corinthian (draught 4m), Variety Voyager (draught 3.4m) and Balmoral (draught 2.1m) within the two-week summer 2017 dataset. The cruise ships, while infrequent, are noted occupying a larger portion of the proposed MDZ. *Epsilon* is noted in **Appendix 15.1** (**Volume III**) transiting through the proposed MDZ to anchor at Abrahams Bosom on 03rd March 2018 although this is considered a rare event.

111. The impacts potentially associated with passenger vessels were raised at the consultation meetings with the Ferry Companies, Holyhead Harbour Master and the Chamber of Shipping, see **Appendix 15.1** (**Volume III**).

112. Potential impacts may also affect ports or harbours utilised / in the vicinity of MDZ traffic, dependent or where staging areas are to be located.

113. During the construction phases there would be an increase in marine traffic associated with the vessels required to carry out these operations. This could increase the risk to other vessels operating within proximity of the offshore site or those vessels engaged in the construction phase. It is also possible that there could be an increased risk of vessels alliding with the tidal devices, due to the fact that either the devices are part constructed/ or navigational aids (e.g. lights and markings) may not all be present.

114. Close consultation and co-operation with ports where construction vessels or operations are to be based will reduce the potential for impacts within port limits.

115. Potential impacts identified as part of the assessment include:

- Contact: Passenger Vessels with Surface Device;
- Contact: Passenger Vessels with Mid-Water Device (<8m below CD);
- Contact: Passenger Vessels with Mid-Water Device (>8m below CD);
- Contact: Passenger Vessels with Sea-Bed Device >20m UKC;
- Collision: Passenger Vessels ICW Commercial Ship;

- Collision: Passenger Vessels ICW Passenger Vessels;
- Collision: Passenger Vessels ICW Fishing Vessel;
- Collision: Passenger Vessels ICW Recreational Vessel;
- Collision: Passenger Vessels ICW Other Vessel;
- Snagging / Obstruction: Passenger Vessels; and
- Breakout of device / device not at stated depth.

116. The overall severity of consequences for the construction phases are considered to be moderate (C3) due to the potential for notable damage to infrastructure / vessel(s), possible pollution and interruption to construction (including impacts on businesses). The frequency of occurrence is considered unlikely (F2) due to the presence of embedded mitigations. This indicates an overall risk ranking of (C3 x F2) =**Low Risk.** Exceptions are Contact Passenger Vessels with Mid-Water Device (<8m below CD) where the increased (F3) frequency gives a risk ranking (C3 X F3) = **ALARP;** Collision Passenger Vessel ICW Passenger Vessel (C4 X F3) = **ALARP** and Breakout of device / device not at stated depth (C4 X F3) = **ALARP**.

15.6.3.3.1. Additional Mitigation

117. Associated possible additional mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;
- Restrict Navigation through the MDZ;
- Only deploy devices that provide at least 20 m UKC as shown within **Figure 4-1** (**Volume II**);
- Redesign the Northern Boundary;
- Use of guard vessel(s) to monitor passing traffic;
- Implementation of Safety Zones;
- Temporary navigation aids as required by Trinity House;
- Undertake device specific NRA's prior to deployments, i.e. once exact locations and scale/type of device deployment is known;
- Construction vessels to be marked in accordance with COLREGS; and
- Appropriate spacing of devices.

15.6.3.3.2. Residual Impact

118. If all the mitigations measures as detailed are utilised then the overall impact would be reduced but would still remain as **Low Risk**. With regard to Contact Passenger Vessels with Mid-Water Device (<8m below CD) where the increased (F3) frequency gives a risk ranking (C3 X F3) = **ALARP** then restricting the deployment of devices greater than 20m below CD as shown within **Figure 4-1** (**Volume II**) would reduce this to **Low Risk.** An exception is Collision: Passenger Vessel ICW Passenger Vessel which remains as **ALARP** driven by major (C4) Consequences.

### 15.6.3.4. Impact 4: Potential Impacts on Passenger Vessel Routing

119. Whilst cruise ships are seen to intersect the development site (**Appendix 15.1, Volume III**); they undertake thorough passage planning and, in contrast to ferries, cruise ships may more easily alter passage plans to accommodate offshore infrastructure.

120. Ferries frequently intersected the development site (**Appendix 15.1, Volume III**) to the north of the MDZ and during poor weather ferries were seen transiting right across the MDZ.

121. As already noted, there would be increased activity associated with these phases at the offshore site. There would also be deviations for transiting traffic associated with the avoidance of any 500m rolling navigational safety zones in use. However, the early notification of the works through the promulgation of information will ensure that all receptors, including regular operators, are kept informed, enabling them to safely passage plan and anticipate the works taking place. This would potential require discussions with the ferry companies to look at alternate poor weather routing if possible, or staging the construction works during the summer period, as is likely, to avoid the increase in poor weather routing during the winter.

122. Potential impacts identified as part of the assessment include:

123. Impact on Passenger Vessel Routing – Passenger vessel forced to take alternative route due to presence of the site. The overall severity of consequences for the construction phase are considered to be moderate (C2). The frequency of occurrence is considered likely (F5) due to the interaction of the proposed MDZ with ferry standard operational and poor weather routing. This indicates an overall risk ranking of (C2 x F5) = ALARP.

15.6.3.4.1. Additional Mitigation

124. Associated additional embedded mitigation measures that could be utilised would be as shown for Impact 3 (**Section 15.6.3.3.1**) with the addition of:

- Provisions made for continued use of ferry poor weather routing or alternative routes to be established.

15.6.3.4.2. Residual Impact

125. If all the mitigation measures as detailed are utilised then the residual impact would be reduced to **Low Risk**.

### 15.6.3.5. Impact 5: Potential Impacts on Fishing Vessels

126. Holyhead is one of three main commercial fishing ports in Wales. Catch types within the vicinity of the MDZ include; velvet crab, lobster, green shore crab, whelks, scallops and skate. Fishing activity in the MDZ, as indicated by local fishermen, is dominated by static gear, which are used to target shellfish species. Prawns also feature highly in the MMO landings data (MMO, 2018), as well as bass. Skate were also highlighted as a key species during consultation. There is generally no pelagic fishing due to no quotas being available to fish species here.

127. Three receptor groups were used in the Commercial Fisheries Assessment, A) ≤10m nearshore static gear vessels targeting crab/lobster in the nearshore region; B) ≤10m and >10m static gear vessels targeting whelk/crab/lobster in the MDZ; and C) >10m mobile gear vessels targeting whitefish and/or scallops in the MDZ and surrounding area (see **Chapter 14, Commercial Fisheries**).

128. The tracks of fishing vessels during summer and winter from radar and AIS are given in **Appendix 15.1** (**Volume III**) and show that tracks within the inshore passage and those actively fishing within the eastern portion of the proposed MDZ are comprised of smaller fishing vessels that do not carry AIS while the majority of fishing vessels on transit are larger vessels carrying AIS.

129. Fishing intensity from VMS in the vicinity of the MDZ is shown within **Appendix 15.1** (**Volume III**). Intensity is determined to be low at less than 20,000 kWh per year, particularly to the west of the zone where the intensity falls to <5,000 kWh per year.

130. Both the MMO data and observations during the marine traffic surveys indicated that the fishing vessels engaged in potting (static gear) were the most common vessels in proximity to the development site. Larger vessels carrying AIS with other gear types do not seem to operate in the area and were only observed on transit through the MDZ.

131. Static gear fishing vessels are regular users of the area in general, weather and conditions dependent, and operate with no notable impact on the other receptors transiting the area. These static gear vessels were densest between the development site boundary and the shore, in keeping with the gear being used.

132. The impacts potentially associated with fishing vessels were raised at the consultation meetings with the Welsh Fishing Association and Holyhead Harbour Master, see **Appendix 15.1** (**Volume III**).

133. Potential impacts identified as part of the assessment include:

- Contact: Fishing Vessels with Surface Device;
- Contact: Fishing Vessel with Mid-Water Device (<8m below CD);
- Contact: Fishing Vessel with Mid-Water Device (<8m below CD);
- Contact: Fishing Vessel with Sea-Bed Device >20m UKC;
- Collision: Fishing Vessel ICW Commercial Vessel;

- Collision: Fishing Vessel ICW Passenger Vessel
- Collision: Fishing Vessel ICW Fishing Vessel;
- Collision: Fishing Vessel ICW Recreational Vessel;
- Collision: Fishing Vessel ICW Other Vessel;
- Grounding: Fishing Vessel;
- Snagging/ Obstruction: Fishing Vessel; and
- Breakout of device / device not at stated depth.

134. Due to the gear type and activity of fishing vessels operating in proximity to the development site, the subsea structures present a risk with regard to interaction between devices and fishing gear. There is also risk posed by works traffic transiting to / from the development site.

135. The overall severity of consequences for the construction phase are considered to be moderate (C3) due to the potential for notable damage to infrastructure / vessel(s) and interruption to construction (including impacts on businesses). The frequency of occurrence is considered frequent (F3). This indicates an overall risk ranking of (C3 x F3) = **ALARP**.

15.6.3.5.1. Additional Mitigation

136. Associated possible additional mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;
- Restrict Navigation through the MDZ;
- Exclusion of fishing within the MDZ;
- Only deploy devices that allow at least 8 m UKC along eastern boundary;
- Re-design eastern boundary of the MDZ;
- Ensure appropriate alignment and spacing of devices;
- Ensure regular programme of device condition surveys;
- Use of Guard vessel(s) to monitor passing traffic;
- Enhanced cable protection;
- Implementation of Safety Zones;
- Temporary navigation aids as required by Trinity House;

- Undertake device specific NRA's prior to deployments, i.e. once exact locations and scale/type of device deployment is known; and .
- Construction vessels to be marked in accordance with COLREGS

15.6.3.5.2. Residual Impact

137. Re-designing the eastern boundary of the MDZ was considered as a possible additional mitigation measure but was excluded as it was considered an unacceptable measure effecting the viability of the development. Therefore, this additional mitigation measure has not been included when assessing the residual impact.

138. Mid Water Devices <8m below CD present a great risk to commercial fishing vessels along with the possibility for Grounding of fishing vessels and snagging/obstruction. This is best reduced by considering additional mitigation measures particularly the exclusion of fishing within the MDZ. The severity of consequences for the construction phase would still be considered to be minor (C2). The frequency of occurrence could then be reduced to unlikely (F2) due to the presence of additional mitigations. This indicates an overall risk ranking of (C2 x F2) = **Low Risk**.

### 15.6.3.6. Impact 6: Potential Impacts on Recreational Craft

139. Recreational craft includes a variety of vessels, all generally have similar characteristics; small in size with relatively shallow keels (<3m) including yachts, powerboats, kayaks and canoes.

140. Recreational craft are highly influenced by season, daylight, fair weather and tidal conditions. This insight is consistent with the observations of the marine traffic survey, where during the summer, gate analysis (**Appendix 15.1, Volume III**) identified 52 % of all transits were by recreational craft making them the most prolific receptor, both in proximity to the development site and intersecting the development site.

141. Most tracks for recreational vessels are concentrated close to shore with craft, including yachts, primarily utilising the inshore passage to the east of the MDZ. The density of recreational vessels increases substantially in summer where the area occupied by these vessels is much greater, overlapping the eastern portion of the proposed MDZ. In consultation, August was described as the busiest month as a result of favourable weather conditions and the school holidays. It is likely therefore that the vessel track analysis underrepresents the recreational vessel activity in the summer months and vessel traffic may be more numerous around late July and August.

142. Although not observed on the traffic survey peak traffic is likely to be during the days with planned events taking place such as Holyhead and Trearddurr Bay Sailing Club Races events during the summer.

143. The impacts potentially associated with recreational vessels were raised at the consultation meetings with the Recreational Users, the RYA, Holyhead Harbour Masters and the RNLI see **Appendix 15.1** (**Volume III**)**.**

144. As noted for other receptors, recreational craft are also susceptible to the impacts associated with construction activities. Although, less so to partially constructed / installed devices, as long as there is sufficient UKC.

145. Potential impacts identified as part of the assessment include:

- Contact Recreational Vessel with Surface Device;
- Contact Recreational Vessel with Mid-Water Device (<8m below CD);
- Contact Recreational Vessel with Sea-Bed Device >20m UKC;
- Collision: Recreational Vessel ICW Commercial Vessel;
- Collision: Recreational Vessel ICW Passenger Vessel;
- Collision: Recreational Vessel ICW Fishing Vessel;
- Collision Recreational Vessel ICW Recreational Vessel;
- Collision Recreational Vessel ICW Other Vessel;
- Grounding Recreational Vessel;
- Snagging/ Obstruction Recreational Vessel; and
- Breakout of device / device not at stated depth

146. The overall severity of consequences for the construction phase are considered to be moderate (C3) due to the potential for loss of life and notable damage to vessel(s). The frequency of occurrence is considered possible (F3). This indicates an overall risk ranking of (C3 x F3) = ALARP. There is one exception, Grounding: Recreational Vessel which was scored as Significant Risk due to the increased frequency of occurrence (C3 x F5). Mitigation measures are required to reduce the risk of Grounding: Recreational Vessel. The following mitigation measures should be considered to reduce this hazard to ALARP: Devices >8m below CD to be deployed along the eastern boundary; and redesign of the Eastern boundary.

15.6.3.6.1. Additional Mitigation

147. Associated possible additional mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;
- Restrict Navigation through the MDZ;
- Only deploy devices that allow at least 8 m UKC along eastern boundary (to reduce the risk of Grounding Recreational Vessel to ALARP);
- Re-design eastern boundary of the MDZ (to reduce the risk of Grounding Recreational Vessel to ALARP);

- Ensure appropriate alignment and spacing of devices;
- Ensure regular programme of device condition surveys;
- Use of guard vessel(s) to monitor passing traffic;
- Establish no anchoring areas;
- Enhanced cable protection;
- Implementation of Safety Zones;
- Temporary navigation aids as required by Trinity House;
- Undertake device specific NRA's prior to deployments, i.e. once exact locations and scale/type of device deployment is known; and
- Construction vessels to be marked in accordance with COLREGS.

15.6.3.6.2. Residual Impact

148. Re-designing the eastern boundary of the MDZ was considered as a possible additional mitigation measure but was excluded as it was considered an unacceptable measure effecting the viability of the development. Therefore, this additional mitigation measure has not been included when assessing the residual impact.

149. If all the mitigation measures as detailed are utilised, with the exception of redesigning the eastern boundary, then the overall impact would be reduced to **Low Risk**.

### 15.6.3.7. Impact 7: Potential Impacts on Other Vessels

150. The professional nature of the vessels engaged in the operations associated with these phases will ensure this risk is as low as possible. The types of vessels which may be used in the project construction phase would be SOLAS (and other relevant conventions / codes) compliant. They would be operating in line with their safety management system (SMS) and using the appropriate Personal Protective Equipment (PPE).

151. Potential impacts identified as part of the assessment include:

- Contact Other Vessel with Surface Device;
- Contact Other Vessel with Mid-Water Device (<8m below CD);
- Contact Other Vessel with Sea-Bed Device >20m UKC;
- Collision: Other Vessel ICW Commercial Vessel;
- Collision: Other Vessel ICW Passenger Vessel;
- Collision: Other Vessel ICW Fishing Vessel;

- Collision Other Vessel ICW Recreational Vessel;
- Collision Other Vessel ICW Other Vessel;
- Grounding Other Vessel;
- Snagging/ Obstruction Recreational Vessel; and
- Breakout of device / device not at stated depth

152. The overall severity of consequences for the construction phases are considered to be moderate (C3) due to the potential for loss of life and notable damage to vessel(s). The frequency of occurrence is considered likely (F4) due to the presence of embedded mitigations. This indicates an overall risk ranking of (C3 x F4) **= ALARP**.

15.6.3.7.1. Additional Mitigation

153. Associated additional embedded mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;
- Restrict Navigation through the MDZ;
- Use of guard vessel(s) to monitor passing traffic;
- Temporary navigation aids as required by Trinity House; and
- Construction vessels to be marked in accordance with COLREGS

15.6.3.7.2. Residual Impact

154. If all the mitigation measures as detailed are utilised then the overall impact would be reduced to **Low Risk**.

### 15.6.3.8. Impact 8: Potential Impacts on Emergency Response Operations

155. The device types and tidal technologies covered within the Project Design Envelope, as noted within **Chapter 4, Project Description** are such that they presents less of an obstruction to aerial SAR activities than other renewable technologies (OWF's). However, as highlighted in consultation with the MCA appropriate alignment and spacing of devices is key to SAR operations and clear lines of sight and navigational channels between devices to maintain SAR access especially at night.

156. The impacts potentially associated with Emergency Response vessels were raised at the consultation meetings with the RNLI and MCA see **Appendix 15.1** (**Volume III**).

157. Depending on the tidal device types installed, the recovery and evacuation of persons from the water in the development site would potentially be impacted due to surface piercing superstructure which could complicate recovery operations.

158. An ERCoP will be in place for all phases of the MDZ development. In addition, the vessels undertaking work at the development site will have some level of self-rescue capability, as required by SOLAS or their Flag State regulations.

159. The capability of those vessels engaged in work at the development site will also lend extra resilience to any response required. As will the guard vessel(s) during the phases where this is engaged.

160. Potential impacts identified as part of the assessment are the same for SAR as for other vessels e.g. Contact RNLI vessel with mid water device etc. as well as:

- Restricted SAR in the MDZ during an emergency.

161. The overall severity of consequences for all phases are considered to be moderate (C3). The frequency of occurrence is considered. This indicates an overall risk ranking of (C2 x F2) = **Low.** An exception is Contact RNLI Vessel with Mid-Water Device (<8m below CD) which scored as **ALARP.**

15.6.3.8.1. Additional Mitigation

162. Associated possible additional mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;
- Restrict Navigation through the MDZ;
- Only deploy devices that allow at least 8 m UKC along eastern boundary;
- Re-design eastern boundary of the MDZ;
- Ensure appropriate alignment and spacing of devices;
- Ensure regular programme of device condition surveys;
- Use of guard vessel(s) to monitor passing traffic;
- Implementation of Safety Zones;
- Temporary navigation aids as required by Trinity House; and
- Construction vessels to be marked in accordance with COLREGS.

15.6.3.8.2. Residual Impact

163. Re-designing the eastern boundary of the MDZ was considered as a possible additional mitigation measure but was excluded as it was considered an unacceptable measure effecting the viability of the development. Therefore, this additional mitigation measure has not been included when assessing the residual impact.

164. If all the mitigations measures as detailed are utilised, with the exception of redesigning the eastern boundary, then the overall impact would be reduced but would still remain as **Low Risk**.

#### 15.6.3.9. Impact 9: Subsea Infrastructure – Potential Impacts on all Receptors

165. The construction phase will involve a large specialist vessel(s) to undertake the work within the offshore site. This activity would be protected by the use of a rolling navigational safety zone and guard vessels. The cable would be protected by the most suitable method, as detailed within **Chapter 4, Project Description**; this could include cable burial or alternative protection (rock bags, mattresses or split-pipe).

166. Potential impacts identified as part of the assessment include:

- Vessel anchoring on or dragging anchor over subsea equipment; and
- Fishing gear interaction with subsea export cable.

167. The overall severity of consequences are considered to be minor (C2). The frequency of occurrence is considered possible (F3). This indicates an overall risk ranking of (C2 x F3) = **Low Risk**. An exception is Snagging / Obstruction: Fishing Vessel which scored as (C2 x F5) **ALARP.**

15.6.3.9.1. Additional Mitigation

168. Associated additional embedded mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;
- Exclusion of Fishing within MDZ;
- Restrict Navigation through the MDZ;
- Only deploy devices that allow at least 8 m UKC along eastern boundary;
- Re-design eastern boundary of the MDZ;
- Ensure appropriate alignment and spacing of devices;
- Ensure regular programme of device condition surveys;
- Use of guard vessel(s) to monitor passing traffic;
- Implementation of Safety Zones;
- Temporary navigation aids as required by Trinity House;
- Construction vessels to be marked in accordance with COLREGS; and
- Cable protection by burial (where possible), rock bags, burial, mattresses or split pipe.

15.6.3.9.2. Residual Impact

169. Re-designing the eastern boundary of the MDZ was considered as a possible additional mitigation measure but was excluded as it was considered an unacceptable measure effecting the viability of the development. Therefore, this additional mitigation measure has not been included when assessing the residual impact.

170. If all the mitigation measures as detailed are utilised, with the exception of redesigning the eastern boundary, then the overall impact would be reduced but would still remain as **Low Risk**.

### 15.6.4. Potential Impacts During the Operation and Maintenance (including Repowering) Phases

#### 15.6.4.1. Impact 1: Potential Impacts on Commercial Vessels (Safe Operations)

171. The operation and maintenance (including repowering) phases will see a reduced level of project related traffic activity and is expected to decline over the lifetime of this phase as technologies bed in and tidal devices require less attention. Developers are expected to visit each TEC up to 15 times annually for both planned and unplanned maintenance activities. Many developers plan to undertake at least monthly routine inspection / maintenance using small vessels. A worst-case scenario of one five-hour visit to each device on site per month may be foreseeable. Conversely, the operational phase will see increased utilisation of the MDZ and a larger device footprint.

172. Potential impacts identified as part of the assessment include:

- Contact: Commercial Ship with Surface Device;
- Contact: Commercial Ship with Mid-Water Device (<8m below CD);
- Contact: Commercial Ship with Mid-Water Device (>8m below CD);
- Collision: Commercial Ship ICW Commercial Ship;
- Collision: Commercial Ship ICW Passenger Vessels;
- Collision: Commercial Ship ICW Fishing Vessel;
- Collision: Commercial Ship ICW Recreational Vessel;
- Collision: Commercial Ship ICW Other Vessel;
- Snagging/ Obstruction: Commercial Ship; and
- Breakout of device / device not at stated depth.

173. The overall severity of consequences for commercial vessels during the operation and maintenance (including repowering) phases are considered to be moderate (C3) due to the potential for notable damage to infrastructure / vessel(s). The frequency of occurrence is considered remote (F1) due to the low commercial traffic density and presence of embedded mitigations. This indicates an overall risk ranking of (C3 x F1) = **Low**.

15.6.4.1.1. Additional Mitigation

174. Associated possible additional mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;
- Restrict Navigation through the MDZ;
- Check devices surveys;
- Only deploy devices that provide at least 20 m UKC as shown within **Figure 4-1** (**Volume II**);
- Use of Guard vessel(s) to monitor passing traffic; and
- Exclusion of fishing within the MDZ (applicable to break out of device/device not at stated depth)

15.6.4.1.2. Residual Impact

175. If all the mitigations measures as detailed are utilised then the overall impact would be reduced but would still remain as **Low**.

### 15.6.4.2. Impact 2: Potential Impacts on Commercial Vessel Routing

176. As noted above, project related vessel activity during this phase would be much reduced. Only maintenance and/or repowering works taking place in the development site would have any impact on the receptor.

177. Potential impacts remain the same as the construction phase.

178. The overall severity of consequences for the operation and maintenance (including repowering) phases are considered to be minor (C2). The frequency of occurrence is considered likely (F4). This indicates an overall risk ranking (C2 x F4) = **Low.**

15.6.4.2.1. Additional Mitigation

179. Associated possible additional mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;
- Restrict Navigation through the MDZ;
- Check device surveys;
- Only deploy devices that provide at least 20 m UKC as shown within **Figure 4-1** (**Volume II**); and
- Use of Guard vessel(s) to monitor passing traffic.

15.6.4.2.2. Residual Impact

180. If all the mitigations measures as detailed are utilised then the overall impact would be reduced but would still remain as **Low**.

### 15.6.4.3. Impact 3: Potential Impacts on Passenger Vessels (Safe Operations)

181. Once again it is anticipated that there will be a decrease in project related marine traffic as compared to the construction phases of the project.

182. Potential impacts identified as part of the assessment are as per Impact 3 for the Construction Phase (**Section 15.6.3.3**).

183. The overall severity of consequences for the operational and maintenance (including repowering) phases are considered to be moderate (C3) due to the potential for notable damage to infrastructure / vessel(s) and possible pollution. The frequency of occurrence is considered unlikely (F2) due to the presence of embedded mitigations. This indicates an overall risk ranking of (C3 x F2) = **Low**. The exception is Contact Passenger Vessels with Mid-Water Device (<8m below CD) where the slight increased frequency of likely (F4) gives a risk ranking of (C3 x F4) = **ALARP** and Collision: Passenger Vessel ICW Passenger Vessel (C4 x F2) = **ALARP.**

15.6.4.3.1. Additional Mitigation

184. Associated possible additional mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;
- Restrict Navigation through the MDZ;
- Check device surveys;
- Only deploy devices that provide at least 20 m UKC as shown within **Figure 4-1** (**Volume II**);
- Redesign Northern Boundary; and
- Use of Guard vessel(s) to monitor passing traffic.

15.6.4.3.2. Residual Impact

185. If all the mitigation measures as detailed are utilised then the overall impact would be reduced but would still remain as **Low Risk**. With regard to Contact Passenger Vessels with Mid-Water Device (<8m below CD) where the increased (F4) frequency gives a risk ranking (C3 X F4) = **ALARP**, restricting the deployment of devices in the north to greater than 20m below CD would reduce this to **Low Risk**. An exception is Collision: Passenger Vessel ICW Passenger Vessel which remains as **ALARP** driven by major (C4) Consequences.

#### 15.6.4.4. Impact 4: Potential Impacts on Passenger Vessel Routing

186. As previously stated, ferries frequently intersected the development site (**Appendix 15.1, Volume III**) to the north of the MDZ and during poor weather ferries were seen transiting right across the MDZ.

187. Potential impacts identified as part of the assessment include:

- Impact on Passenger Vessel Routing: Passenger vessel forced to take alternative route due to presence of site.

188. The overall severity of consequences for the operational and maintenance phase (including repowering) are considered to be minor (C2). The frequency of occurrence is considered frequent (F5). This indicates an overall risk ranking of (C2 x F5) = **ALARP.**

15.6.4.4.1. Additional Mitigation

189. Associated possible additional mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;
- Restrict Navigation through the MDZ;
- Check device surveys;
- Only deploy devices that provide at least 20 m UKC as shown within **Figure 4-1** (**Volume II**);
- Redesign Northern Boundary;
- Use of Guard vessel(s) to monitor passing traffic; and
- Provisions made for continued use of ferry company poor weather routing or alternative routes to be provided.

15.6.4.4.2. Residual Impact

190. If all the mitigation measures as detailed are utilised then the overall impact would be reduced to **Low Risk**.

#### 15.6.4.5. Impact 5: Potential Impacts on Fishing Vessels

191. Potential impacts identified as part of the assessment include:

- Contact: Fishing Vessels with Surface Device;
- Contact: Fishing Vessel with Mid-Water Device (<8m below CD);
- Contact: Fishing Vessel with Mid-Water Device (>8m below CD);

- Contact: Fishing Vessel with Sea-Bed Device >20m UKC;
- Collision: Fishing Vessel ICW Commercial Vessel;
- Collision: Fishing Vessel ICW Passenger Vessel;
- Collision: Fishing Vessel ICW Fishing Vessel;
- Collision: Fishing Vessel ICW Recreational Vessel;
- Collision Fishing Vessel with Other Vessel types;
- Grounding Fishing Vessel;
- Snagging/ Obstruction Fishing Vessel; and
- Breakout of device / device not at stated depth.

192. The overall severity of consequences for the operation and maintenance (including repowering) phases are considered to be minor (C2). The frequency of occurrence is considered possible (F3) due to the presence of embedded mitigations. This indicates an overall risk ranking of (C2 x F3) = **Low Risk**. Exceptions are Contact Fishing Vessel with Mid-Water Device <8 below CD (C2 x F5) **ALARP** and Snagging / Obstruction Fishing Vessel (C2 x F5) **ALARP**.

15.6.4.5.1. Additional Mitigation

193. Associated possible additional mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;
- Exclusion of fishing within the MDZ;
- Only deploy devices that allow at least 8 m UKC along eastern boundary;
- Re-design eastern boundary of the MDZ;
- Ensure appropriate alignment and spacing of devices; and
- Check device surveys.

15.6.4.5.2. Residual Impact

194. Re-designing the eastern boundary of the MDZ was considered as a possible additional mitigation measure but was excluded as it was considered an unacceptable measure effecting the viability of the development. Therefore, this additional mitigation measure has not been included when assessing the residual impact.

195. If all the mitigation measures as detailed are utilised, with the exception of redesigning the eastern boundary, then the overall impact would be reduced but would still remain as **Low Risk**.

#### 15.6.4.6. Impact 6: Potential Impacts on Recreational Craft

196. In the same manner as the other noted receptors, the reduction in project traffic levels will further reduce the impact of collision with project related vessels. Potential impacts remain the same as the construction phase.

197. The overall severity of consequences for the operation and maintenance (including repowering) phases are considered to be minor (C2). The frequency of occurrence is considered possible (F3) due to the presence of embedded mitigations. This indicates an overall risk ranking (C2 x F3) = **Low Risk.** Exceptions scored as ALARP include; Contact Recreational Vessel with Surface Device (C2 x F5) and Contact Recreational Vessel with Mid-Water Device (<8m below CD) (C2 x F5).

198. The hazard 'Grounding: Recreational Vessel' was scored as significant due to the increased frequency of occurrence (C3 x F5). Mitigation measures are required to reduce the risk of 'Grounding: Recreational Vessel.

##### 15.6.4.6.1. Additional Mitigation

199. Associated additional embedded mitigation measures that could be utilised, as identified in the NRA, include:

- Restrict navigation through the MDZ;
- Continuous Monitoring by Marine Co-ordination Centre;
- Only deploy devices that allow at least 8 m UKC along eastern boundary;
- Re-design eastern boundary of the MDZ;
- Check device surveys
- Ensure appropriate alignment and spacing of devices; and
- Establish no anchoring areas

##### 15.6.4.6.2. Residual Impact

200. The hazard 'Grounding: Recreational Vessel' was scored as significant. Mitigation measures are required to reduce the risk of 'Grounding: Recreational Vessel'.

201. The following mitigation measures were considered to reduce this hazard to ALARP:

- Devices >8m below CD to be deployed along the eastern boundary; and
- Redesign Eastern boundary.

202. Re-designing the eastern boundary of the MDZ was considered as a possible additional mitigation measure but was excluded as it was considered an unacceptable measure effecting the

viability of the development. Therefore, this additional mitigation measure has not been included when assessing the residual impact.

203. If all the mitigation measures as detailed are utilised, with the exception of redesigning the eastern boundary, then the overall impact would be reduced to **ALARP**.

#### 15.6.4.7. Impact 7: Potential Impacts on Other Vessels

204. While project specific traffic would be reduced, the same high levels of operational planning would take place. The vessels engaged in this phase would likely be different from those in the other phases, especially those concerned solely with personnel transfers, etc. They would still be compliant with the relevant shipping safety codes and have a suitable SMS and correct PPE for the tasks taking place. Potential impacts remain the same as the construction phase. Associated possible mitigation measures remain similar to the construction phase with the exception of guard vessels and temporary navigation aids which are not applicable for the operational phase.

205. The overall severity of consequences for the operation and maintenance (including repowering) phases are considered to be minor (C2. The frequency of occurrence is considered Possible (F3) due to the reduction of project related traffic and presence of embedded mitigations. This indicates an overall risk ranking of (C2 x F3) = **Low Risk.**

##### 15.6.4.7.1. Residual Impact

206. If all mitigation measures as detailed are utilised then the overall impact would be reduced but would remain **Low Risk**.

#### 15.6.4.8. Impact 8: Potential Impacts on Emergency Response Operations

207. As with construction, an ERCoP will be in place for all phases of the Morlais development. In addition, the vessels undertaking maintenance and/or repowering work at the development site will have some level of self-rescue capability, as required by SOLAS or their Flag State regulations. However, as highlighted in consultation with the MCA appropriate alignment and spacing of devices is key to SAR operations and clear lines of sight and navigational channels between devices to maintain SAR access especially at night.

208. The capability of those vessels engaged in work at the development site will also lend extra resilience to any response required. As will the guard vessel(s) during maintenance activities, where this is engaged, operation dependent. Potential impacts remain the same as the construction phase.

209. The overall severity of consequences for all phases are considered to be minor (C2) due to the potential for loss of life. The frequency of occurrence is considered unlikely (F2). This indicates an overall risk ranking of (C2 x F2) = **Low.** The exceptions are Contact RNLI Vessel with Mid-Water Device (<8m below CD) = (C2 x F4) **ALARP** and Contact RNLI Vessel with Surface Device = (C2 x F4) **ALARP**.

210. Associated possible additional mitigation measures that could be utilised, as identified in the NRA, include:

- Continuous Monitoring by Marine Co-ordination Centre;
- Restrict Navigation through the MDZ;
- Only deploy devices that allow at least 8 m UKC along eastern boundary;
- Re-design eastern boundary of the MDZ;
- Ensure appropriate alignment and spacing of devices; and
- Check device surveys.

15.6.4.8.1. Residual Impact

211. Re-designing the eastern boundary of the MDZ was considered as a possible additional mitigation measure but was excluded as it was considered an unacceptable measure effecting the viability of the development. Therefore, this additional mitigation measure has not been included when assessing the residual impact.

212. If all the mitigation measures as detailed are utilised, with the exception of redesigning the eastern boundary, then the overall impact would be reduced but would remain **Low Risk**. The exceptions are Contact RNLI Vessel with Mid-Water Device (<8m below CD) = (C2 x F4) **ALARP** and Contact RNLI Vessel with Surface Device = (C2 x F4) **ALARP.**

**15.6.4.9. Impact 9: Subsea Infrastructure – Potential Impacts on all Receptors**

213. The subsea cable will be protected and the risk mitigated to ALARP.

214. Potential impacts remain the same as the construction phase.

215. Associated mitigation measures remain the same as the construction phase.

216. The overall severity of consequences for all phases are considered to be minor (C2). The frequency of occurrence is considered unlikely (F2) due to the presence of embedded mitigations. This indicates an overall risk ranking of (C2 x F2) = **Low Risk.** An exception is Snagging / Obstruction: Fishing Vessel which scored as (C2 x F5) **ALARP.**

15.6.4.9.1. Residual Impact

217. If all the mitigations measures as detailed are utilised then the overall impact would be reduced but would remain **Low Risk**. The hazard Snagging / Obstruction: Fishing Vessel which scored as (C2XF5) would be reduced to **Low Risk.**

**15.6.5. Potential Impacts During Decommissioning**

218. It is likely that decommissioning of individual structures will be the responsibility of the individual developers, as overseen by Mentor Môn. Decommissioning of the site comprises the complete removal of all infrastructure associated with the tidal energy project. Offshore decommissioning methodologies would vary considerably between devices but would be expected to be similar to the construction phase in reverse. For the purpose of this chapter, it is assumed that cables

are required to be removed as this represents the worst-case scenario in terms of impacts. Therefore, it can be assumed that all impacts identified as having the potential to arise during the construction phase (**Section 15.6.3**) may also occur during the decommissioning phase.

219. As the methodologies for decommissioning are expected to be similar to construction it can be assumed that the same impacts arise and can be applied to the decommissioning phase. It should be noted that this is a highly precautionary assessment as it is likely that the impacts from decommissioning will be less than those from construction (PTEC, 2014).

### 15.6.6. Cumulative Impacts

220. Cumulative impacts refer to the impact upon receptors, proposed developments and activities and any other foreseeable project proposals arising from the presence of the MDZ.

221. The approach to cumulative assessment considers the Cumulative Impact Assessment Guidelines issued by RenewableUK in June 2013.

222. In assessing the potential cumulative impacts, it is important to bear in mind that proposed and in development projects may or may not actually be taken forward. Relevant projects/ plans that are already under construction are likely to contribute to cumulative impact, whereas projects/ plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not ultimately be built.

223. Projects that were identified and informed this approach are outlined within **Table 15-13.**

**Table 15-13 Other Developments Considered in Cumulative Impact Assessment**

| Development Type | Project | Distance from Morlais (km) | Status |
|---|---|---|---|
| Tidal | Holyhead Deep | 1 | In Development |
| Oil and Gas | P2292 | 61 | Operational |
| Wind Farm | Rhyl Flats | 66 | Operational |
| Wind Farm | Gwynt y Mor | 67.5 | Operational |
| Wind Farm Extension | Gwynt y Mor | 67.5 | Proposed |
| Wind Farm | North Hoyle | 81.5 | Operational |
| Aggregate Extraction | Area 457 | 70 | Operational |
| Aggregate Extraction | Area 392 / 393 | 73 | Operational |

224. For the purposes of the cumulative assessment, the Holyhead Deep Tidal project with an aspirational maximum total installed capacity of 80 MW, is the only project currently in the planning phase considered to fall within the assessment study area, and as such the impact assessment has been driven by the cumulative impacts arising from this site. The assessed scenario is, therefore, outlined in **Table 15-14**.

**Table 15-14 Assessed Scenario**

| Impact | Scenario | Justification |
|---|---|---|

| | | |
|---|---|---|
| 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. | Potential increases in collision risk. |
| 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. | Change in vessel routing across multiple sites due to multiple developments. |
| Cumulative Impact from Cable Routes | Multiple cable routes that cross over one another may reduce the navigable depth of water. | Reduction in depth and increased maintenance works vessels. |

225. The results of the cumulative risk assessment are given in **Table** 15-15. The determination of risk was assessed to be a factor of the likelihood of the impact occurring and the consequence, should it occur. The criteria of frequency and consequence and risk score definitions are outlined within the risk assessment methodology (**Appendix 15.1, Volume III**).

**Table 15-15 Cumulative Risk Assessment**

| Impact | Description | Likelihood | Consequence | Risk Score | Impact |
|---|---|---|---|---|---|
| Impact from increased vessel Activity | Vessels associated with the Morlais and Holyhead Deep projects 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. | Unlikely | Minor | 2 | **Low Risk** |
| Impact on Vessel Routing | 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 routing are the inshore passage and impact upon vessels such as ferries utilising the northern ferry route, search and rescue and Holyhead Deep maintenance vessels. | Unlikely | Minor | 2 | **Low Risk** |
| Impact from Cable Route | 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. | Unlikely | Minor | 2 | **Low Risk** |

## 15.7. SUMMARY

226. This chapter has provided an overview on the potential impacts on shipping and navigation that may occur within the construction, operation and maintenance, and decommissioning phases of the Morlais project.

227. The impacts presented in this chapter were identified and quantified via a formal NRA process (see **Appendix 15.1, Volume III**). The assessment included allision / collision risk modelling (including UKC) and a formal safety assessment for all phases of the developments, as well as an assessment of cumulative and in-combination effects.

228. The risk assessment was undertaken according to FSA methodology as adopted by the IMO and detailed within the NRA methodology.

229. **Table 15-16** collates the determinations of each of the impacts assessed and is presented as a summary of the determinations. In line with the terminology adopted by the NRA and presented in this chapter, severity of consequence and frequency of occurrence are used rather than magnitude of effect and sensitivity of receptor. All the risks/impacts presented below also assume that embedded mitigation defined in preceding sections are successfully implemented. Where additional mitigation measures are proposed, these are listed.

230. It's is evident from the Impact Assessment for Navigation and Shipping that the Morlais Development Zone will impact navigation and that a range of additional mitigation measures will be required to reduce the potential impacts and risk during the construction, operations and maintenance (including repowering) and decommissioning phases. Some of these additional mitigation measures will be relevant to specific vessel types but otherwise will apply for all marine traffic in the area.

231. For the construction phase there will be a need to restriction navigation and fishing activity (see **Chapter 14, Commercial Fisheries**) within the MDZ and the export cable corridor which will be achieved through implementation of Safety Zones of up to 500 m around all offshore works during construction.

232. For the operation and maintenance (including repowering) phase there will be a need to restrict navigation, anchoring and fishing activity within the MDZ and the export cable corridors. This will achieved by excluding any navigation within an "operational safety zone" of up to 500m of any offshore works or such other areas as may be determined following risk assessment or consultation with the MCA and RYA. However it is unlikely that it will be necessary to exclude all activity within the area such that:

- Navigation of commercial and passenger vessels should be possible within the MDZ where devices that provide at least 20 m UKC will be deployed as shown within **Figure 4-1** (**Volume II**);
- Navigation of recreational vessels should be possible within the MDZ except for all areas where floating devices are deployed (as shown within **Figure 4-1** (**Volume II**); and
- Within the export cable that lies outside the MDZ all navigation should be possible but all trawling/anchoring will be excluded within 200 m any cables once laid.

233. For the decommissioning phase there will be a need to restriction navigation and fishing activity (see **Chapter 14, Commercial Fisheries**) within the MDZ and the export cable corridor which will be achieved through implementation of Safety Zones of up to 500 m around all offshore works during construction.

**Table 15-16 Summary of Potential Impacts on Shipping and Navigation Associated with the Development of the Project**

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| Construction Phase | | | | | |
| 1. Potential impacts on commercial vessels (safe operations) | Moderate (C3) | Remote (F1) | (C3 x F1) = **Low** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Restrict Navigation through the MDZ;<br>▪ Only deploy devices that provide at least 20m UKC as shown within **Figure 4-1** (**Volume II**);<br>▪ Use of guard vessel(s) to monitor passing traffic;<br>▪ Implementation of Safety Zones;<br>▪ Temporary navigation aids as required by Trinity House; and<br>▪ Undertake device specific NRA's prior to deployments, i.e. once exact locations and scale/type of device deployment is known;<br>▪ Construction vessels to be marked in accordance with COLREGS;<br>▪ Check device surveys; and<br>▪ Exclusion of fishing within the MDZ (applicable to break out of device/device not at stated depth). | (C3 x F1) = **Low** |
| 2. Potential impacts on commercial vessel routing | Minor (C2) | Remote (F1) | (C2 x F1) = Low | As above | (C2 x F1) = **Low** |
| 3(a). Potential impacts on Passenger Vessels (safe operations) | Moderate (C3) | Unlikely (F2) | (C3 x F2) = **Low** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Restrict Navigation through the MDZ; | (C3 x F1) = **Low** |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| | | | | ▪ Only deploy devices that provide at least 20 m UKC as shown within **Figure 4-1** (**Volume II**);<br>▪ Redesign the Northern Boundary;<br>▪ Use of guard vessel(s) to monitor passing traffic;<br>▪ Implementation of Safety Zones;<br>▪ Temporary navigation aids as required by Trinity House;<br>▪ Undertake device specific NRA's prior to deployments, i.e. once exact locations and scale/type of device deployment is known;<br>▪ Construction vessels to be marked in accordance with COLREGS;<br>▪ Appropriate spacing of devices; and<br>▪ Exclusion of fishing within the MDZ (applicable to break out of device/device not at stated depth). | |
| 3(b). Contact: Passenger Vessels with mid-water devices (<8m UKC) | Moderate (C3) | Possible (F3) | (C3 x F3) = **ALARP** | ▪ Restrict navigation through the Morlais Zone;<br>▪ Continues monitoring by Marine Co-ordination Centre;<br>▪ Devices >20m to be deployed along northern boundary;<br>▪ Re-design northern boundary;<br>▪ Check device surveys;<br>▪ Implementation of Safety Zones;<br>▪ Guard vessel to monitor passing traffic;<br>▪ Construction vessels to be marked in accordance with COLREGS; and | (C3 x F2) = **Low Risk** |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| | | | | ▪ Temporary navigation aids as required by Trinity House. | |
| 3(c). Collision Passenger Vessel ICW Passenger Vessel | Major (C4) | Unlikely (F2) | (C4 x F2) = **ALARP** | ▪ Continuous monitoring by Marine Co-ordination Centre;<br>▪ Re-design northern boundary;<br>▪ Guard vessels to monitor passing traffic;<br>▪ Construction vessels to be marked in accordance with COLREGS; and<br>▪ Temporary navigation aids as required by Trinity House. | (C4 x F1) = **ALARP** |
| 4. Potential impacts on passenger vessel routing | Minor (C2) | Frequent (F5) | (C2 x F5) = **ALARP** | As above | (C2 x F3) = **Low** |
| 5. Potential impact on fishing vessels | Moderate(C3) | Possible (F3) | (C3 x F3) = **ALARP** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Restrict Navigation through the MDZ;<br>▪ Exclusion of fishing within the MDZ;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary;<br>▪ Ensure appropriate alignment and spacing of devices;<br>▪ Ensure regular programme of device condition surveys;<br>▪ Use of Guard vessel(s) to monitor passing traffic; | (C2 x F2) = **Low** |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| | | | | ▪ Enhanced cable protection;<br>▪ Implementation of Safety Zones;<br>▪ Temporary navigation aids as required by Trinity House;<br>▪ Undertake device specific NRA's prior to deployments, i.e. once exact locations and scale/type of device deployment is known; and<br>▪ Construction vessels to be marked in accordance with COLREGS. | |
| 5 (b) Contact Fishing Vessel with Mid-Water Device <8 below CD | Minor (C2) | Frequent (F5) | (C2 x F5) = **ALARP** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Exclusion of fishing within the MDZ;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary;<br>▪ Ensure appropriate alignment and spacing of devices; and<br>▪ Check device surveys. | C2 x F3 = **Low** |
| 5 (c) Snagging / Obstruction Fishing Vessel | Minor (C2) | Frequent (F5) | (C2 x C5) = **ALARP** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Exclusion of fishing within the MDZ;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary;<br>▪ Ensure appropriate alignment and spacing of devices; and<br>▪ Check device surveys. | C2 x F3 = **Low** |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| 5 (d) Grounding Fishing Vessel | Minor (C2) | Likely (F4) | (C2 x F4) = **ALARP** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Exclusion of fishing within the MDZ;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary;<br>▪ Ensure appropriate alignment and spacing of devices; and<br>▪ Check device surveys. | (C2 x F3) = **Low** |
| 6(a). Potential impact on recreational craft | Moderate (C3) | Possible (F3) | (C3 x F3) = **ALARP** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Restrict Navigation through the MDZ;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary;<br>▪ Ensure appropriate alignment and spacing of devices;<br>▪ Ensure regular programme of device condition surveys;<br>▪ Use of guard vessel(s) to monitor passing traffic;<br>▪ Establish no anchoring areas;<br>▪ Enhanced cable protection;<br>▪ Implementation of Safety Zones;<br>▪ Temporary navigation aids as required by Trinity House;<br>▪ Undertake device specific NRA's prior to deployments, i.e. once exact locations and scale/type of device deployment is known; | (C3 x F2) = **Low** |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| | | | | ▪ Construction vessels to be marked in accordance with COLREGS; and<br>▪ Exclusion of fishing within the MDZ (applicable to break out of device/device not at stated depth). | |
| 6(b). Grounding Recreational Vessel | Moderate (C3) | Frequent (F5) | (C3 x F5) = **Significant** (Unacceptable in the absence of additional mitigation). | ▪ Devices >8m below CD to be deployed along the eastern boundary.<br>▪ | (C3 x F3) =ALARP |
| 7. Potential impact on Other vessels | Moderate (C3) | Likely (F4) | (C3 x F4) = **ALARP** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Restrict Navigation through the MDZ;<br>▪ Use of guard vessel(s) to monitor passing traffic;<br>▪ Temporary navigation aids as required by Trinity House; and<br>▪ Construction vessels to be marked in accordance with COLREGS | (C2 x F3) = **Low** |
| 8. Potential impact on emergency response operations | Minor (C2) | Unlikely (F2) | (C2 x F2) = **Low** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Restrict Navigation through the MDZ;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary;<br>▪ Ensure appropriate alignment and spacing of devices;<br>▪ Ensure regular programme of device condition surveys; | (C2 x F2) = **Low** |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| | | | | ▪ Use of guard vessel(s) to monitor passing traffic;<br>▪ Implementation of Safety Zones;<br>▪ Temporary navigation aids as required by Trinity House;<br>▪ Construction vessels to be marked in accordance with COLREGS; and<br>▪ Marine pollution contingency planning. | |
| 8 (b) Contact SAR Vessel with Surface or Mid-Water Device (<8m below CD). | Minor (C2) | Likely (F4) | (C2 x F4) = **ALARP** | ▪ Restrict Navigation through Morlais Zone;<br>Continuous Monitoring by Marine Co-ordination Centre;<br>Devices >8m below CD to be deployed along eastern boundary;<br><br>Check Device Surveys;<br>Appropriate spacing of devices.<br>Local Promulgation;<br>Creation of Emergency Response Cooperation Plan (ERCOP). | (C2 x F2) = **Low** |
| 9. Subsea Infrastructure – impact on all receptors | Minor (C2) | Possible (F3) | (C2 x F3) = **Low** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Restrict Navigation through the MDZ;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary;<br>▪ Ensure appropriate alignment and spacing of devices;<br>▪ Ensure regular programme of device condition surveys; | (C2 x F2) = **Low** |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| | | | | ▪ Use of guard vessel(s) to monitor passing traffic;<br>▪ Implementation of Safety Zones;<br>▪ Temporary navigation aids as required by Trinity House;<br>▪ Construction vessels to be marked in accordance with COLREGS; and<br>▪ cable protection by burial (where possible), rock bags, burial, mattresses or split pipe. | |
| Operational Phase | | | | | |
| 1. Potential impacts on commercial vessels (safe operations) | Moderate (C3) | Remote (F1) | (C3 x F1) = **Low** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Restrict Navigation through the MDZ;<br>▪ Check device surveys;<br>▪ Only deploy devices that provide at least 20 m UKC as shown within **Figure 4-1** (**Volume II**); and<br>▪ Use of guard vessel(s) to monitor passing traffic. | (C3 x F1) = **Low** |
| 2. Potential impacts on commercial vessel routing | Minor (C2) | (Likely) F) | (C2 x F4) = Low | As above | (C2 x F1) = **Low** |
| 3(a). Potential impacts on Passenger Vessels (safe operations) | Moderate (C3) | Unlikely (F2) | (C3 x F2) = **Low** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Restrict Navigation through the MDZ;<br>▪ Check device surveys;<br>▪ Only deploy devices that provide at least 20 m UKC as shown within **Figure 4-1** (**Volume II**); | (C3 x F1) = **Low** |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| | | | | ▪ Redesign Northern Boundary; and<br>▪ Use of Guard vessel(s) to monitor passing traffic; | |
| 3(b). Potential impact on passenger vessels: Contact: Passenger Vessels with mid-water devices (<8m UKC) | Moderate (C3) | Possible (F4) | (C3 x F4) = **ALARP** | As above | (C3 x F2) = **Low** |
| 3(c). Collision Passenger Vessel ICW Passenger Vessel | Major (C4) | Remote (F2) | (C4 x F2) = **ALARP** | As above | (C4 x F1) = **ALARP** |
| 4(a). Potential impacts on passenger vessel routing | Minor (C2) | Frequent (F5) | (C2 x F5) = **ALARP** | As above | (C2 x F3) = **Low** |
| 5. Potential impacts on fishing vessels | Minor (C2) | Possible (F3) | (C2 x F3) = **Low** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Exclusion of fishing within the MDZ;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary;<br>▪ Ensure appropriate alignment and spacing of devices; and<br>▪ Check device surveys. | (C2 x F1) = **Low** |
| 5 (b) Contact Fishing Vessel with Mid-Water Device <8 below CD | Minor (C2) | Frequent (F5) | (C2 x F5) = **ALARP** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Exclusion of fishing within the MDZ;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary; | C2 x F3 = Low |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| | | | | ▪ Ensure appropriate alignment and spacing of devices; and<br>▪ Check device surveys. | |
| Snagging / Obstruction Fishing Vessel | Minor (C2) | Frequent(F5) | (C2 x F5) = **ALARP** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Exclusion of fishing within the MDZ;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary;<br>▪ Ensure appropriate alignment and spacing of devices; and<br>▪ Check device surveys. | C2 x F3 = **Low** |
| 6(a). Potential impacts on recreational craft | Minor (C2) | Possible (F3) | (C2 x F3) = **Low** | ▪ Restrict navigation throughout the MDZ;<br>▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary;<br>▪ Check device surveys;<br>▪ Ensure appropriate alignment and spacing of devices; and<br>▪ Establish no anchoring areas. | (C4 x F2) = **Low** |
| 6(b). Grounding Recreational Vessel | Minor (C3) | Frequent (F5) | (C3 x F5) = **Significant**<br>(Unacceptable in absence of additional mitigation) | ▪ Devices >8m below CD to be deployed along the eastern boundary.<br>▪ | (C3 x F3) = **ALARP** |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| 6 (c) Contact Recreational Vessel with Surface Device | Minor (C2) | Frequent (F5) | (C2 x F5) = **ALARP** | ▪ Restrict navigation throughout the MDZ;<br>▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary;<br>▪ ;<br>▪ Check device surveys; and<br>▪ Ensure appropriate alignment and spacing of devices; and<br>▪ Establish no anchoring areas. | (C2 x F3) = **Low** |
| 6 (d) Contact Recreational Vessel with Mid-Water Device (<8m below CD) | Minor (C2) | Likely (F5) | (C2 x F5) = **ALARP** | ▪ Restrict navigation throughout the MDZ;<br>▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary;<br>▪ Check device surveys; and<br>▪ Ensure appropriate alignment and spacing of devices; and<br>▪ Establish no anchoring areas. | (C2 x F3) = **Low** |
| 7. Potential Impacts on other vessels | Minor (C2) | Likely (F3) | (C2 x F3) = **Low** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Restrict Navigation through the MDZ; and<br>▪ Construction vessels to be marked in accordance with COLREGS. | (C3 x F2) = **Low** |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| 7 (b) Contact Other Vessels with Mid-Water Device (<8m below CD). | Minor (C2) | Frequent (F5) | (C2 x F5) = **ALARP** | As Above | C2 x F3) = Low |
| 8.(a) Potential impacts on emergency response operations | Minor (C2) | Unlikely (F2) | (C2 x F2) = **Low** | ▪ Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Restrict Navigation through the MDZ;<br>▪ Only deploy devices that allow at least 8 m UKC along eastern boundary; and<br>▪ Check device surveys. | (C2 x F2) = **Low** |
| 8 (b) Contact SAR Vessel with Mid-Water Device (<8m below CD). | Minor(C2) | Likely (F4) | (C2 x F4) = **ALARP** | ▪ Restrict Navigation through Morlais Zone; Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Devices >8m below CD to be deployed along eastern boundary;<br>▪ Check Device Surveys;<br>▪ Appropriate spacing of devices.<br>▪ Local Promulgation;<br>▪ Creation of Emergency Response Cooperation Plan (ERCOP). | (C2 x F2) = **Low** |
| 9. (a) Subsea Infrastructure – potential impacts on all receptors | Minor (C2) | Unlikely (F2) | (C2 x F2) = **Low** | As above | (C2 x F2) = **Low** |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| 9 (b) Snagging / Obstruction Fishing Vessel | Minor (C2) | Frequent (F5) | (C2 x F5) = **ALARP** | As above | (C2 x F3) = **Low** |
| Decommissioning Phase | | | | | |
| | It is likely that decommissioning of individual structures will be the responsibility of the individual developers, as overseen by Mentor Môn. Decommissioning of the site comprises the complete removal of all infrastructure associated with the tidal energy project. Offshore decommissioning methodologies would vary considerably between devices but would be expected to be similar to the construction phase in reverse. As the methodologies for decommissioning are expected to be similar to construction it can be assumed that the same impacts arise and can be applied to the decommissioning phase. It should be noted that this is a highly precautionary assessment as it is likely that the impacts from decommissioning will be less than those from construction. | | | | |
| Cumulative Impacts | | | | | |
| C1. Impact from increased vessel activity | Minor (C2) | Unlikely (F2) | | ▪ Restrict Navigation through Morlais Zone; Continuous Monitoring by Marine Co-ordination Centre;<br>▪ Devices >8m below CD to be deployed along eastern boundary;<br>▪ Check Device Surveys;<br>▪ Appropriate spacing of devices.<br>▪ Local Promulgation;<br>▪ Creation of Emergency Response Cooperation Plan (ERCOP). | (C2 x F2) = **Low** |
| C2. Impact on vessel routing | Minor (C2) | Unlikely (F2) | | As above | (C2 x F2) = **Low** |

| Potential Impact | Baseline Severity of Consequence | Baseline Frequency of Occurrence | Baseline Impact | Additional Mitigation Measures | Residual Impact (Risk) |
|---|---|---|---|---|---|
| C3. Impact from subsea cables | Minor (C2) | Unlikely (F2) | | As above | (C2 x F2) = **Low** |

## 15.8. REFERENCES

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