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Morlais Project

Shipping and Navigation

Proof of Evidence

Relating to an Application for an Order pursuant to the Transport and Works Act 1992 for the Morlais Demonstration Zone

Applicant: Menter Môn Morlais Limited

Document Title: Shipping and Navigation Proof of
Evidence

Author: Paul Brown – Marico Marine



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SHIPPING AND NAVIGATION - PROOF OF EVIDENCE



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SHIPPING AND NAVIGATION - PROOF OF EVIDENCE

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1 INTRODUCTION

1.1 NAME, POSITION, CAPABILITY AND QUALIFICATIONS

1.1.1 Name and Position

My name is Commander Paul Brown Royal Navy (Retired) and I am a Principal Consultant for Marine and Risk Consultants Limited, known as Marico Marine.

1.1.2 Capability and Qualifications

My CV is attached at **Annex A**. I am a master mariner with 20 years' sea going experience with the Royal Navy on active service around the world including 3 separate warship Commands. On coming ashore, I was appointed as the Harbour Master, General Manager Operations and as a Class 1 Pilot at the Port of Dover for 5 years. Since leaving Dover in 2017, I continue to work at sea as a marine pilot and I currently hold authorisations for the ports of Bideford, Appledore, Yelland and Tor Bay.

I have been a Principal Consultant for Marico Marine for 4 years working on a variety of projects including running 2 separate navigation simulations to assess the impact of a proposed extension to the Thanet offshore windfarm on the operations of the North East Spit Pilot Station, a number of Navigation Risk Assessments (NRA) including a proposed Liquid Natural Gas Terminal in Shannon in Ireland, a Red Funnel Ferries Passage NRA, providing specialist marine and navigation advice to the Rotherhithe to Canary Wharf Bridge Project in London and a capacity study for the Port of St Ives.

I am also a keen recreational leisure sailor and water sports enthusiast, have held an RYA Yachtmaster (Offshore) qualification since 1991 and, in 2019, gained an RYA Commercially Endorsed Advanced Powerboat Certificate which allows me to take paid work with motorboat, yacht and RIB charters and vessel deliveries throughout the UK. I have navigated various naval ships and recreational vessels through the Skerries Traffic Separation Scheme and delivered yachts routeing through the South Stack Inshore route on a number of occasions over the previous 20 years, most recently delivering a yacht in 2017 from Southampton to Liverpool Marina at Coburg Wharf. In my spare time I surf and wave ski at various sites in south Devon.

This proof of evidence represents my true and professional opinion, based on my knowledge and experience in accordance with the guidance of my professional Institute. I understand I have a duty to provide assistance to the Inspector as an independent expert witness.

1.2 INVOLVEMENT WITH THE PROJECT

I am engaged by Menter Môn to act as an expert witness for Shipping and Navigation for the Inquiry into the Morlais Tidal Demonstration Zone. I was tasked to conduct an independent review of the project and, having agreed with the conclusions reached by the NRA and the NRA Addendum, I have been asked to present evidence to this effect.

1.3 TOPIC OF EVIDENCE

Shipping and Navigation.

1.4 WHAT THE PROOF DEALS WITH PRINCIPALLY

This proof is produced at the request of Menter Môn. It intends to provide an independent view on the likely effects on shipping and navigation by the proposed Morlais Tidal Demonstration Zone (MDZ) during construction, operation and decommissioning.

1.5 ANY OTHER WITNESSES WHOSE EVIDENCE SHOULD BE READ IN CONJUNCTION WITH THIS PROOF

This proof should be read in conjunction with the Socio-Economic Proof of Evidence (Ref MDZ /P6) written by Dr Edward Thomas Jones of Bangor Business School, University of Wales and the Planning & Policy Proof of Evidence written by David Bell BSc (Hons) DipUD MCIHT MRTPI (Ref MDZ / P9).

1.6 ESSENTIAL READING LIST

There are two documents that are considered as essential reading to support this proof of evidence:

1.6.1 Marine Guidance Note 543 (MDZ/I2)

The Maritime and Coastguard Agency (MCA) is an executive government agency, sponsored by the Department for Transport and which “works to prevent the loss of life on the coast and at sea. It produces UK legislation and guidance on maritime matters and provides certification to seafarers.”¹

The MCA, as the non-devolved UK statutory authority for shipping and navigation has produced Marine Guidance Notice 543 (MGN 543), which “highlights issues that need to be taken into

¹ <https://www.gov.uk/government/organisations/maritime-and-coastguard-agency>

consideration when assessing the impact on navigational safety and emergency response caused by offshore renewable energy installation (OREI) developments.” The MCA has also produced a checklist as an “aid for developers to confirm the guidance in MGN 543 has been addressed within an Environmental Statement and/or Navigation Risk Assessment as required for development consent decisions.”²

1.6.2 Marico Marine – NRA Addendum dated 18th September 2020 (MDZ/I1)

The NRA Addendum updates and extends the previous NRA completed by Marico Marine in 2019 and assesses the layout changes introduced since completion of the 2019 NRA. It also elaborates and provides further clarity around elements concerning navigational risk raised by navigational stakeholders since completion of the 2019 NRA assessment utilising newly available data, including the HR Wallingford Coastal Process report (MDZ/I3). The context of its commissioning and production are discussed in further detail in **section 3**: the factual background.

1.7 WHAT THE EVIDENCE ADDRESSES AND CONFIRMS IN SUPPORT OF THE PROJECT

In this proof of evidence I examine the current shipping and navigation activity in the vicinity of the proposed MDZ and provide an independent assessment of the likely effects of the potential interactions between the project, its infrastructure above and below the surface and all types of vessel using the adjacent sea space.

I discuss the NRA, the NRA Addendum and the mitigations, either already adopted by the applicant or other additional measures proposed by Marico Marine to reduce the severity of the hazards identified.

I examine the representations and objections received from key stakeholders and, where appropriate, provide an independent opinion and rebuttal in order to give balance and perspective to their arguments for the benefit of the Inspector.

My opinion is that the NRA and the NRA Addendum were conducted in accordance with the stipulations of the statutory authority guidance contained in MGN 543 and with the full support and cooperation of the MCA, Trinity House and the Chamber of Shipping. I consider that the applicant has been active and attentive in engaging navigation and shipping stakeholders across the board, has

² MGN 543 - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/502021/MGN_543.pdf

made sustained efforts to listen to their concerns and, as a consequence, subsequently made fundamental changes to the project design and layout.

The NRA Addendum, having re-evaluated the new MDZ layout and the amendments agreed with stakeholders, assessed that the resulting project design reduced the severity of the navigational hazards associated with the project such that only 6 of the hazards in the construction phase and 3 hazards in the operational phase scored in the mid to low “As Low as Reasonably Practical” (ALARP) range. The rest of the hazards were scored as being “low.”

The NRA Addendum stated, “The Project is therefore assessed to be acceptable in terms of navigational risk assuming compliance with embedded, and implementation of, suggested additional mitigation measures, where appropriate, for hazards scoring as ALARP.”

It is my view that the NRA Addendum is an independent, thorough and comprehensive re-examining of the updated MDZ layout and that it adheres to the procedural strictures and requirements laid out in the MGN 543 checklist for developers. I also consider that the NRA Addendum rightly scores the hazards associated with the project as comparatively low.

In concluding, I consider that, from a navigation and shipping point of view, the project is safe and should be granted approval to proceed for the following reasons:

1. The project has been the subject of two full and independent NRAs which were conducted exactly in accordance with the strictures laid down in MGN 543 and which assessed the project as navigationally safe.
2. Statements of Common Ground which provide considered endorsement of the project and the methods by which it has been navigationally assessed have been reached with the MCA and Trinity House.
3. The deployment of the tidal devices to full capability will be graduated in at least 4 phases over a period of 15 years, allowing ample opportunity for all to measure impact against prediction.
4. Each phase and the deployment of each new type of device will receive its own separate navigation risk assessment.
5. The extension of the eastern inshore channel has, in my professional opinion, provided ample sea room for the safe passage of all types of leisure vessels past the project site.
6. HR Wallingford, as one of the leading hydrodynamic modellers in the world, has predicted that the impact of the tidal devices on wave height and tidal stream to be below the measurable threshold detection for most leisure users.

7. The siting of any surface piercing devices over 1000m offshore will minimise the effect on kayakers who mostly operate within 200-300m of the shore.
8. Even 1000m offshore, where the superstructure of some the tidal devices will pierce the surface, the tidal devices will be set 200m apart and with 500m east west safety corridors between differing zones.
9. Any moving part of any tidal device will always be at least 3m below the surface of the water.

1.8 LIST OF OBJECTORS

The Royal Yachting Association (RYA.)

The Snowdonia Canoe Club (SCC).

A summary of the objections raised in the Statements of Case from the RYA and the SCC is at **Annex B** and **Annex C** respectively. This also contains a table with a response by the applicant to each individual objection made.

The responses made by the MCA, Trinity House and The Chamber of Shipping also raise navigation issues but were not registered as formal objections and have been resolved, as would be expected in the normal course of constructive stakeholder negotiation and discussion, through Statements of Common Ground. These are discussed in **Section 5.2**.

2 STRUCTURE OF EVIDENCE

- Section 3 Factual Background.
- Section 4 Relevant legislation, policy and guidance to the subject matter.
- Section 5 How the Project performs when tested against the policy, guidance and other constraints.
- Section 6 Addressing representations made by interested parties and how the Project has responded to the concerns raised.
- Section 8 Summary and Conclusions.

3 FACTUAL BACKGROUND

Menter Môn Morlais Limited (Menter Môn) proposes the development of 240 MW of tidal generating capacity within the 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.

It should be noted that deployment of the tidal devices to achieve the headline 240 MW generating capability will not be achieved until 15 years from project start. The first two stages of the project are relatively small scale and only envisage achieving 17 MW capacity by year 2 and 40 MW by year 5. Necessarily this modest deployment will only cover a fraction of the entire licensed site and allows plenty of opportunity for all, including those who object to the project, to measure the actual impact of the devices against prediction. Similarly, each new phase and type of generating device will require its own dedicated NRA with associated stakeholder consultation and incident analysis.

3.1 THE NAVIGATIONAL CONTEXT

3.1.1 Offshore Vessel Transits

Commercial vessels making passage through the Irish Sea will invariably transit past the South Stack sea area using the “Off Skerries” Traffic Separation Scheme³ (TSS) which, at its closest point to the Anglesey coast, lies over 4 nautical miles (nm)⁴ offshore. Eastbound ships will route from the Skerries towards the “In Liverpool Bay” TSS and southbound vessels onward to the “Celtic Deep TSS” in the southern Irish Sea as shown in **Figure 1** below.

³ TSSs are used to regulate the traffic at busy, confined waterways or around capes. Within a TSS there is normally at least one traffic-lane in each main-direction and a separation zones between the main traffic lanes. A ship navigating in a traffic-lane should sail in the general direction of that lane. The body of water between two opposite lanes is to be avoided by vessels travelling within the TSS as far as possible except in certain circumstances such as emergencies or for fishing activities.

⁴ A nautical mile is a unit of measurement used in air, marine, and space navigation, and for the definition of territorial waters. Historically, it was defined as one minute of latitude along any line of longitude. Today the international nautical mile is defined as exactly 1852 metres (approximately 2,025 yards).

3.1.2 Irish Sea Ferries

Two companies run frequent scheduled ferry services to Dublin from Holyhead and their preferred east west track running through the north of the project site shows very clearly in Irish Sea Commercial Routeing **Figure 1** below.

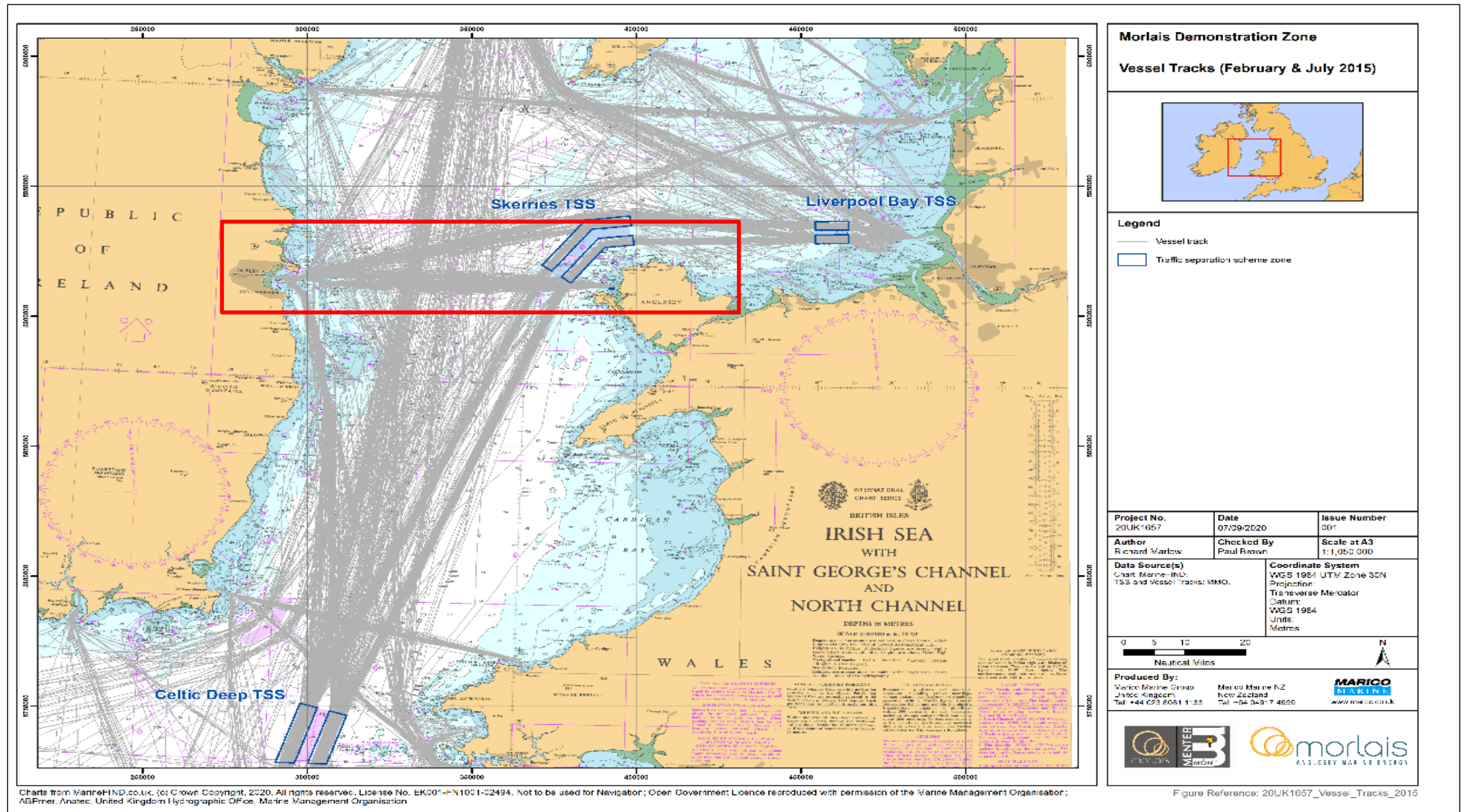


Figure 1: Irish Sea Commercial Routing

3.1.3 Inshore Vessel Transit (inside 4nm)

The RYA states that “Passage planning is an obligation for all seafarers under the International Convention on Safety of Life at Sea (SOLAS V)”⁵ and, in common with many other exposed headlands on Britain’s south and western coast, the inshore sea area off South Stack requires any mariner to carefully plan a passage in advance and to pay considerable respect to the dynamic and rapidly changing navigational circumstances of this potentially demanding piece of water.

⁵ RYA Passage Planning Guide: <https://www.rya.org.uk/knowledge-advice/safe-boating/have-a-plan/Pages/hub.aspx>

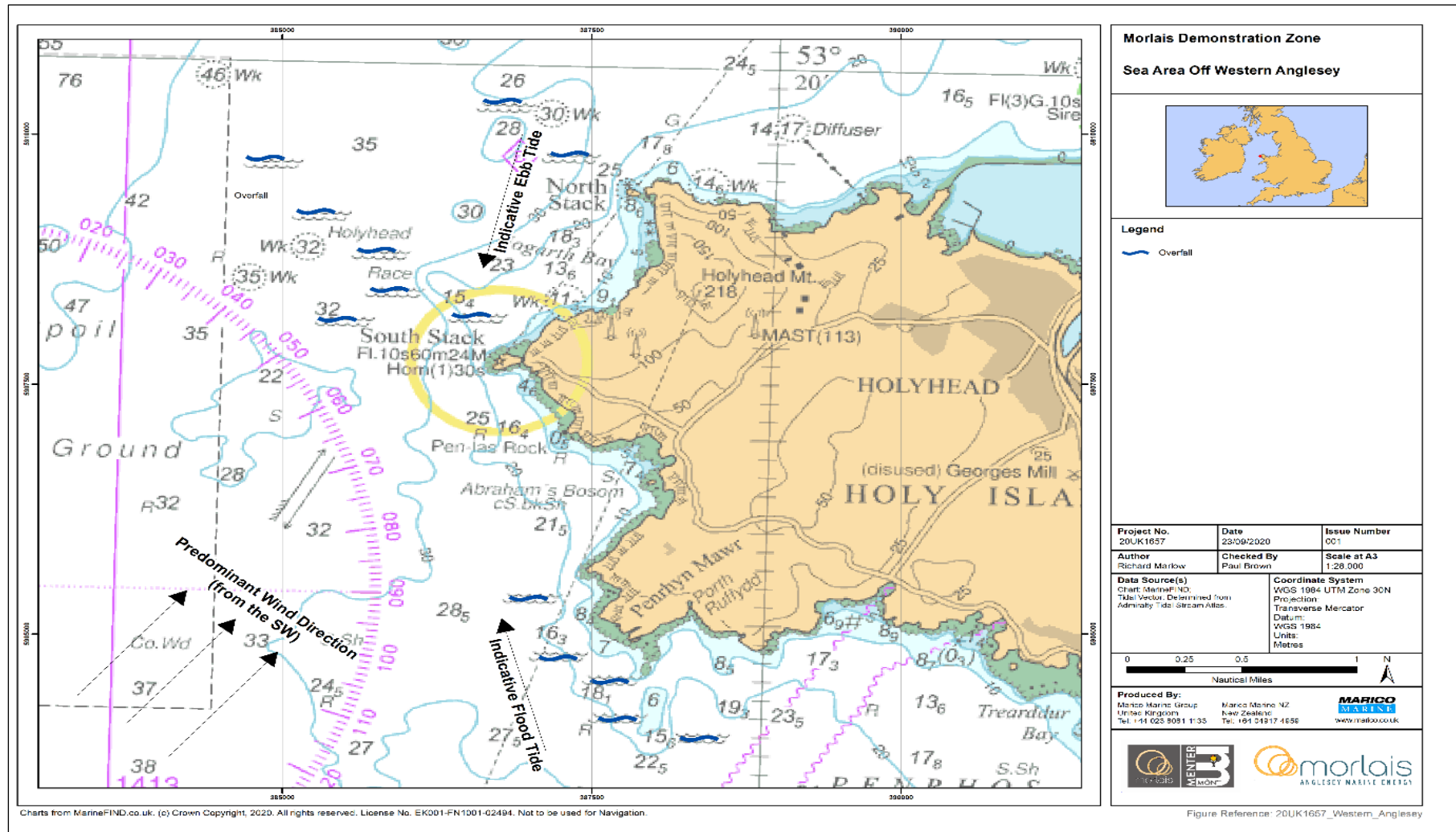


Figure 2: Western Anglesey showing indicative tidal streams, prevailing wind and overfalls

As shown in **Figure 2** above, in the prevailing south westerly winds, there is inevitably a lee shore⁶ onto a rocky coastline and there are very few nearby places of refuge. The bay of Abrahams Bosom is exposed if there is any westerly component to the wind and, despite the anchorage symbol on the Admiralty Chart, the sea bottom holding for the anchor is described as “poor.” The tidal streams can run at speeds of up to 6 knots⁷ at spring tides⁸ and as this current passes over ridges on the sea floor overfalls are created⁹ occasionally creating large standing waves and/or confused short choppy seas. Guidance for mariners for this area is plentiful in print and on-line; most leisure mariners will consult the Imray Sailing Directions for Anglesey which state:

“South Stack offers an area of particularly confused sea and in heavy conditions an offing of 7 miles is needed to avoid overfalls and tide races.”¹⁰ Further, they say “In the event that there is any sign of a tide race off either Stack it may be advantageous to stand in close to the cliffs and cut through the race as near as possible to the rocks. It may be dangerous to attempt passage round the Stacks, in either direction, in any sort of tide conditions or with winds of Force 5 or greater.”¹¹

Harbour Guides.com says:

“From the south and west, the overfalls off South Stack need caution and a favourable tide. Here tides of up to 5 knots each (at Springs) meet over uneven ground, creating overfalls and whirlpools which can be dangerous to smaller vessels but under normal conditions, whilst due regard must be paid to the strength of the tide, sea conditions should not trouble any well-found vessel.”¹²

3.1.4 Cruising and Leisure

The sea area off South Stack can be extremely navigationally challenging and, as such, most cruising motor or sailing mariners will not seek to loiter here in anything other than the most benign conditions

⁶ “A shore lying on the leeward side of a ship (and on to which a ship could be blown in foul weather).” Oxford Dictionary.

⁷ A Knot of speed is equal to 1.151mph; thus 6 knots equals 6.905 mph.

⁸ “When there is a high tide, the Sun, Moon and Earth are in alignment and the gravitational force is strong. These tides are known as spring tides and occur twice a month.” Met Office.Gov.UK

⁹ “A turbulent surface of water caused by strong currents setting over submerged ridges or shoals or by winds opposing a current” Oxford Dictionary.

¹⁰ “Cruising Anglesey & Adjoining Waters” - Ralph Morris. Published by Imray as Sailing Directions - Para 3.4.3 Passage making.

¹¹ “Cruising Anglesey & Adjoining Waters” - Ralph Morris. Published by Imray as Sailing Directions - Para 3.4.3 Passage making.

¹² From Harbour Guides.com: <https://www.harbourguides.com/harbours/Holyhead/pilot-notes>.

and will instead seek to make swift and safe passage to calmer, less demanding waters. It is clear that any passage through this area must be planned in detail and that it be treated with appropriate respect. When the tidal and wind conditions combine to create overfalls and the associated turbulent waters, the leisure mariner is obliged to stand offshore and 'go around' or, as described by the sailing directions, 'cut close' inshore, both practices which are safe and common to this and other similar locations throughout the UK, from the Portland Bill race to the Cape Wrath (NW Scotland) tide rips. Nevertheless, despite the challenging conditions, there is no reason why any mariner with the right knowledge, preparation and equipment ought not be able to make a safe transit past the Stacks and, ultimately, the prudent option to wait for a more suitable tidal and/or weather opportunity to make the passage is always open.

3.1.5 Sea Kayaker and Canoeists

The tidal races, standing waves and the dramatic coastline in the area make it a destination of choice for Sea Kayakers and Canoeists and there is a thriving commercial guiding and recreational paddling community that deliberately seeks out and enjoys the challenging conditions close inshore off South Stack, North Stack and Penryhn Mawr. It must be noted that these "Sea kayaks are generally just over 5 m long, up to 0.5 m wide and with a draught of less than 0.15 m" and that "We work at an intimate scale with the water using eddies for safety¹³" such that these small craft rarely stray more than 200-300m offshore. British Canoeing, the National Governing Body for sea kayakers considers that much of this area is "Advanced Tidal Water" where "tidal races, overfalls or open crossings may be encountered, which cannot be avoided; sections of coastline where landings may not be possible or difficult; difficult sea states and/or stronger winds (may be experienced).¹⁴" Even the Canoe and Kayaking UK route card for South Stack, which contains details from "Welsh Sea Kayaking", contains the quote "Anything more than a gentle breeze from the south, west or north has a significant effect on the tidal races. Wind against tide can produce huge breaking seas that are, for mortals, better observed from land."¹⁵ Viewing of a short video clip at:

<https://www.youtube.com/watch?v=ehN9c7WfLMIs>

¹³ Snowdonia Canoe Club Consultation response Dated 16th August 2020.

¹⁴ British Canoeing Terms of Reference Jan 17 - p13.

¹⁵ Canoe & Kayak UK "No 8 - The Stacks" Route Card – with excerpts from "Welsh Sea Kayaking" by Andy Biggs and Jim Krawiecki ISBN 0954706188 published by Pesda Press Caernarfon.

is recommended which, aside from demonstrating the astonishingly dramatic skills of the kayakers, enables a vivid understanding of the inshore nature of their operating area.

3.2 THE FIRST NRA

At inception, the project aimed to introduce as much generating flexibility as possible by retaining the ability to deploy any type of tidal device in any part of the development zone. Marico Marine was commissioned by Menter Môn to conduct an NRA using the Formal Safety Assessment (FSA) methodology. This is a process that is adopted by International Maritime Organisation (IMO) (**See para 3.3 below**), is endorsed by the MCA and is the accepted method to assess the navigational impact of a marine project, large or small, and has been used in the UK and around the world for over 25 years.

Because the layout of the devices was unknown, the NRA adopted the “Rochdale Envelope” approach to assume a worst case scenario for the deployment of any type of generating device at any point in the entire project area. The considerations of the Rochdale Envelope are discussed in the Planning and Policy Proof of Evidence written by David Bell BSc (Hons) DipUD MCIHT MRTPI (Ref MDZ / P9).

The original NRA identified and considered 46 individual hazards during the operation and construction¹⁶ phases of the project and the majority of hazards emerged to be scored at low-risk. However, one hazard - “Grounding Recreational Vessel” - scored as ‘significant’ for both phases, driven by the reduction in sea room as a result of the narrowing of the inshore routeing passage for small vessels. As a mitigation measure for this hazard the NRA recommended that the eastern boundary of the project site be reconsidered. The NRA also recommended the introduction of mitigation measures designed to ensure the safe navigation of ferries over the northern part of the project site and that fishing be excluded within the MDZ.

¹⁶ The Construction phase also includes the process of repowering and decommissioning.

3.3 THE FORMAL SAFETY ASSESSMENT METHODOLOGY

Marico Marine uses a form of risk assessment that has been specifically adapted for navigational use and is based on the Formal Safety Assessment (FSA)¹⁷ methodology adopted by the IMO and which was specifically approved for use in this project by the MCA.

It is fundamentally based on the concepts of assessing the “Most Likely” and “Worst Credible,” range of outcomes arising from an accident. Data analysis and information from consultation with stakeholders is then used to identify hazards associated with the project. These hazards are scored for their likelihood and consequence, and a ranked hazard list of the greatest hazards is produced using Marico Marine’s proprietary risk management software, Hazman II, which was built on the foundations of the established IMO FSA risk assessment methodology. Additional mitigation measures are then identified and offered for adoption by the client to reduce the residual risks to a level that is “As Low As Reasonably Practicable (ALARP)” or better. This MCA approved process has been successfully used by Marico Marine in 124 NRAs, of which 23 are classified as renewable, to assess projects for ports, organisations and harbour authorities around the world since 2013.

¹⁷ FSA is a structured and systematic methodology, aimed at enhancing maritime safety, including protection of life, health, the marine environment and property, by using risk analysis and cost-benefit assessment - REVISED GUIDELINES FOR FORMAL SAFETY ASSESSMENT (FSA) FOR USE IN THE IMO RULE-MAKING PROCESS – Apr 2018 .

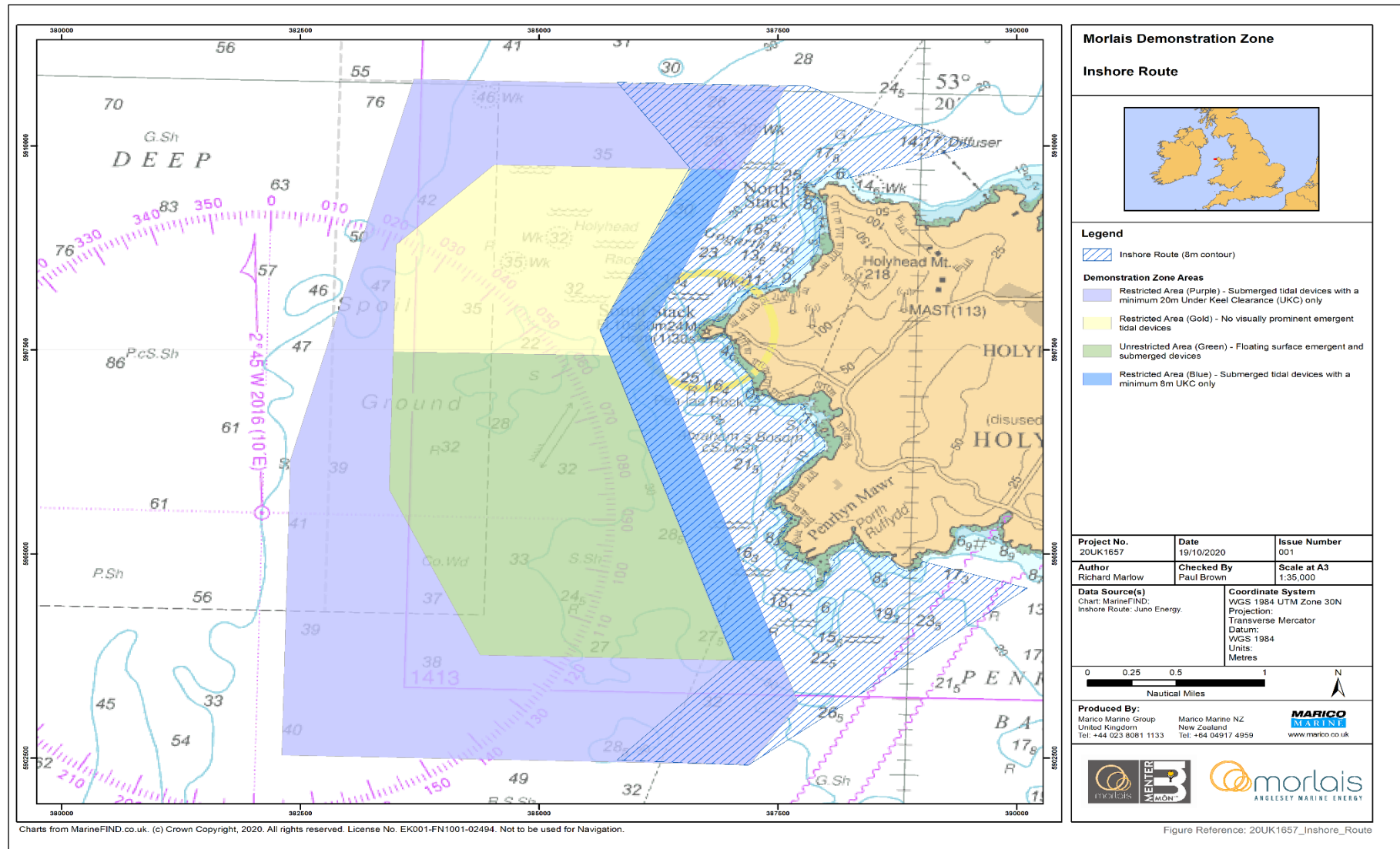


Figure 3: Proposed Morlais Development Zones Layout

3.4 THE NEW LAYOUT

In the subsequent dialogue with key navigation stakeholders and reflecting their concerns, the design layout of the project was amended by the applicant into its present zones as shown **Figure 3** above. The zone shown in purple was introduced to ensure an Under Keel Clearance (UKC)¹⁸ of at least 20m on large sections of the MDZ; this was introduced after consultation with Irish Sea Ferries to allow for the safe transit of their vessels along the northern edge of the project area but also for other commercial vessels making passage through the western part of the MDZ.

The zone shown in light blue gives a UKC of at least 8m and was introduced after stakeholder feedback to expand the inshore eastern passage, making it **at least** 1000m wide at its narrowest point and with an average width along its length of 1.9km. The blue hatched area shows the sea room available to vessels approaching and transiting through the eastern inshore channel including the “funnels” from the north and south which highlight likely courses for recreational craft approaching from Holyhead in the east, the Isle of Man in the North and from the Bardsey Island in the south. This zone is sufficient, in my opinion, to comfortably allow enough sea room for the safe passage of the predicted number of vessels and the recreational use of the waters close inshore.

Significantly, both the MCA and Trinity House agreed that the widening of the eastern inshore passage “addressed previous comments with regard to the difficulty in navigating along the eastern boundary of the <8m UKC zone and also widens the zone to provide greater sea room for navigators”¹⁹ and that in their response to Statement of Case the MCA was “content with the proposed boundary (eastern) layout for motorised vessels, including for Search and Rescue vessels.”²⁰

The MCA did also recommend that the applicant continued discussions with the RYA with regard to sea room for vessels under sail. It should be noted every sailing vessel seen passing through the MDZ area in the traffic surveys was large enough to be fitted with an engine and that that Rule 3(b) of the IRLCAS defines a power driven vessel as “any vessel propelled by machinery.” Similarly, Rule 3(c)

¹⁸ Under-keel clearance (UKC) is the term commonly used to define the distance between the lowest point on the ship's keel (or hull) and the highest point on the channel bottom beneath the ship. UKC is equal to the minimum total water depth at the location of the ship minus the maximum dynamic draft of the ship – International Hydrographic Review 1998. The Dynamic Draft is the draft when the vessel is making way and subject to squat, sea and swell state and increase of draft due to heel when turning. The UKC methodology used in the NRA is set out in “Guidance To Developers in Assessing Minimum Water Depth over Tidal Devices” a paper produced by an MCA chaired working group known as NOREL (Navigation: Offshore Renewable Energy Liaison group) endorsed by the MCA and produced in 2014.

¹⁹ MCA Statement of Common Ground Table 3.2 Page 9.

²⁰ MCA Response to Statements of Case – Page 1.

defines a sailing vessel as “any vessel under sail provided that propelling machinery, if fitted, is not being used.” Accordingly, therefore, any yacht under sail, upon starting its engine immediately, becomes a power driven vessel.

3.5 DIALOGUE AND STATEMENTS OF COMMON GROUND

As the project design evolves, active dialogue between the key stakeholders including the MCA, Trinity House and the RYA continues. Individual statements of common ground were agreed with both the MCA and Trinity House providing “a clear position of the state and extent of matters relating to the Project which were agreed and not agreed between Menter Môn and MCA/TH.”²¹ At the time of submission it remains the aim of the applicant (and the RYA) to achieve a statement of common ground. The SoCG are analysed in greater detail in **section 5.2**.

3.6 INTERACTIVE BOUNDARY ASSESSMENTS (IBO)

An Interactive Boundary Assessment (IBO) is a tool mandated by MGN 543 and is designed to guide developers on the siting of Offshore Renewable Energy Installations (OREI) specifically with regard to commercial shipping routes. A first IBO was conducted as a part of the initial NRA process and assessed two areas of the project to present an “intolerable” risk to shipping; these were the east/west route across the northern section of the project site taken by the Irish Sea ferries and the eastern inshore route used mostly by leisure traffic.

The applicant redesigned the project site layout as described in **section 3.4** and commissioned a second IBO. Using the criteria outlined in MGN 543, this assessed that the addition of a UKC zone of over 20m for the northern ferry route made this section of the MDZ “tolerable.” The eastern inshore route, when measured against the MGN criteria, remained as “intolerable” in the second IBO. It should, however, be remembered that the explicit purpose of the IBO process is to assess commercial vessel routeing with regard to OREI developments, the eastern inshore passage is almost uniquely used by leisure vessels and rarely by commercial traffic and the MGN requires developers to “recognise that the template is not a prescriptive tool but needs intelligent application and that advice will be provided on a case-by-case basis,”²²

²¹ SoCG with MCA MOR/RHDHV/DOC/00XX – Section 1.5, TH is Trinity House, see below.

²² MGN 543 Annex 3 paragraph 3.

3.7 THE NRA ADDENDUM

As a result of the dialogue with the key stakeholders including the MCA, Trinity House, the RYA and local Kayaking organisations and, acknowledging that significant amendments to the layout of the project had been made, the applicant commissioned an ‘addendum’ to the NRA. The intent was to reflect the changed layout of the project, the new zones and the additional mitigation measures that have been adopted by the applicant as a result of consultation. The output of the NRA Addendum is discussed in further detail in **section 5** below.

4 LEGISLATION AND POLICY CONTEXT

4.1 LEGISLATION

The following legislation applies:

- The Environmental Impact Assessment (EIA) Regulations (Chapter 2, Policy and Legislation);
- The International Regulations for Preventing Collisions at Sea 1972 (as amended) (IRPCAS);
- The Merchant Shipping Act 1995; and
- The Marine and Coastal Access Act 2009.

4.2 GUIDANCE

The key guidance used to support this Proof of Evidence is:

MGN 543 Safety of Navigation: Offshore Renewable Energy Installations – which is the foundation documentary guidance on UK Navigational Practice, Safety and Emergency Response for developers of OREI sites.

MGN 543 Checklist²³: Offshore Renewable Energy Installations - a document produced by the MCA as an aid for developers to confirm that the guidance in MGN 543 has been addressed within an Environmental Statement and/or NRA as required for development consent decisions.

²³

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/546756/MGN_543_Checklist_v180816.docx

The proof of evidence also had regard to:

1. **MGN 372 Offshore Renewable Energy Installations** - Guidance to Mariners Operating in the Vicinity of UK OREIs;
2. **Royal Yachting Association (RYA)**: Position on Offshore Energy Developments;
3. **MGN 166 Guidelines for Voyage Planning**; and
4. **International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA AISM) 0-139**: the Marking of Man-Made Offshore Structures.

5 THE PROJECT'S RESPONSE

The potential impacts on shipping and navigation that might occur within the construction²⁴ and operation phases of the Morlais project were initially identified and quantified via a formal NRA process. This was further refined with a comprehensive NRA addendum which reflected the considerable changes made by the applicant to the shape and design of the project following feedback from key stakeholders. It was the MCA, as the statutory government authority for navigation, that suggested that an NRA Addendum would be the most appropriate tool to update the original NRA and, in my opinion, marks the culmination of an extended track record of engagement with the regulator which was conducted exactly in the spirit envisaged by MGN 543.

5.1 THE NRA ADDENDUM

The NRA Addendum was completed in early September 2020 and was a comprehensive reworking of the original NRA. It incorporated the new layout of the project and considered the mitigations that have been accepted and already embedded into the fabric of the project by the applicant. Accepting that the exact type and number of tidal devices to be deployed in each zone will necessarily remain uncertain as each sector in the zones will be used by differing developers, the NRA Addendum sensibly chose to assume the worst case for each different UKC zone in the MDZ.²⁵ The list of embedded mitigations is at **Table 1** below and while many of the mitigations are self-evident and represent

²⁴ The construction phase is taken to include the repowering, maintenance and decommissioning phases.

²⁵ "The Project will install multiple technology types. Device types will be determined through consideration of the direction of future developments and technology. The deployment of any device within any zone of the MDZ in line with embedded minimum UKC requirements has been considered to represent the worst case." NRA Addendum – Table 11-4 NRA Assumptions.

common practice for OREI developments, this forms part of a healthy audit trail to demonstrate the applicant's ongoing commitment to best practice:

Table 1: NRA Addendum Embedded Risk Controls

ID	Embedded Risk Control	Description
1	Compliance with applicable guidance and regulations.	All construction, operational and maintenance operations are to be fully compliant with legislation, guidance and best practice as well as in accordance with up to date written procedures. Adherence to the MCA Guidance on Offshore Renewable Energy Installation: Requirements, Advice and Guidance for Search and Rescue and Emergency Response.
2	Promulgation of information to local stakeholders.	Promulgation of information and warnings through local Notices To Mariners (NTM) and other appropriate Maritime Safety Information (MSI) dissemination methods. Rolling and regular updates during construction phases. Planning and coordination between applicant and vessel operators.
3	Selection of appropriate construction and maintenance vessels.	Suitable vessels are to be utilised and personnel are to be trained and competent. Use of appropriate Personal Protective Equipment (PPE) by personnel.
4	Incidents and near misses are reported and investigated by applicant and operators.	Incidents to be reported to the MAIB in accordance with MGN 564: Marine Casualty and Marine Incident Reporting. ²⁶
5	Marked in accordance with Trinity House.	Devices to be marked in accordance with MGN 543 and to comply with IALA standards.
6	Surveyed and charted as required by UKHO.	It should be determined at what depth below the seafloor export cables are buried to ensure there are no changes to charted depths. Changes to charted depth arising from tidal turbines and the burial depth of cabling should be surveyed and marked on navigational charts. Detailed and accurate hydrographic surveys are required pre and post construction and following decommissioning. Where traffic patterns are altered as a result of installed generating assets - it may be considered necessary that a hydrographic survey of alternate passages be undertaken. ²⁷

²⁶ Marine Accident Investigation Branch (2017) Marine Casualty and Marine Incident Reporting, MGN 564 (M+F).

²⁷ Maritime and Coastguard Agency (2016) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) Guidance on UK Navigational Practice, Safety and Emergency Response.
MGN 543 (M+F); Maritime and Coastguard Agency (2014) Hydrography Guidelines for Offshore Developers; Maritime and Coastguard Agency (2014) Offshore Developers: Post-Construction Hydrographic Guidelines.

ID	Embedded Risk Control	Description
7	Formulation and implementation of an Emergency Response Co-operation Plan (ERCoP).	Creation of an ERCoP with the MCA's Search and Rescue Branch to outline general safety procedures and provide guidance on emergency response procedures in the event of SAR operations. To be in place for the construction phase onwards. The MCA document 'Offshore Renewable Energy Installation: Requirements, Advice and Guidance for Search and Rescue and Emergency Response' outlines the SAR requirements.
8	Passage plans for construction and maintenance craft.	Development of routing plans between site and offshore base.
9	Consideration of weather and sea state during construction planning.	Limit hazardous activities during adverse weather conditions.
10	Devices >8m below CD to be deployed along eastern boundary in accordance with Figure 2 .	To maintain safe navigation within the inshore route for small, primarily recreational vessels (draught <3m).
11	Devices >20m below CD to be deployed along northern boundary in accordance with Figure 2 .	To maintain navigation of fair weather and poor weather ferry routes.

The NRA Addendum incorporated stakeholder feedback and considered, assessed and scored 85 hazards for the construction phase and 70 hazards for the operational phase against 7 differing types of vessels. The NRA Addendum offered the additional risk control measures shown in **Table 2** for consideration and the applicant considered and accepted each one for incorporation into the project.

Table 2 NRA Addendum Suggested Additional Risk Control Measures

ID	Risk Control	Description	Phase
1	Continuous Monitoring by Marine Co-ordination Centre	Monitoring by radar, AIS, Closed Circuit Television (CCTV) or other agreed means. Appropriate means for OREI operators to notify, and provide evidence of, the infringement of safety zones or ATBA.	All Phases
2	Restrict Navigation through the Gold and Green MDZ Zones.	<p>For example, via designation of site as an Area To Be Avoided (ATBA) or Precautionary Area (PA).</p> <p>In the UK, all vessels have freedom to transit through OREIs, subject to any applied safety zones, and their own risk assessments and passage plans, which should take account of factors such as vessel size, manoeuvrability, environmental factors and competency of the Master and crew. MGN 372²⁸ (or subsequent update) provides further guidance on navigation in and around OREIs.</p> <p>An ATBA is an area within defined limits that should be avoided by all ships or certain classes of ship, in which navigation is particularly hazardous or in which it is exceptionally important to avoid casualties. In general, ATBAs should be established only in places where: inadequate survey or insufficient provision of aids to navigation may lead to danger of stranding; local knowledge is considered essential for safe passage; there is the possibility that unacceptable damage to the environment could result from a casualty; or there may be hazards to a vital aid to navigation.</p> <p>PAs are defined as areas within defined limits where ships must navigate with particular caution and within which the direction of flow of traffic may be recommended.</p> <p>NOTE: In subsequent discussions with the MCA, as described in the SoCG and in their Response to Statements of Case, this measure was not deemed necessary by the MCA and consequently will not be adopted by the applicant.</p>	All Phases
3	MDZ designation as No Fishing Zone	<p>To prevent fishing gear snagging on underwater devices and their associated infrastructure.</p> <p>NOTE: In subsequent discussions with the MCA, as described in the SoCG and in their Response to Statements of Case, this measure was not deemed necessary by the MCA and consequently will not be adopted by the applicant.</p>	All Phases
4	Appropriate alignment and spacing of devices	<p>The MCA has statutory obligations to provide Search and Rescue services in and around OREIs in UK waters. Device layout designs must be designed to ensure clear lines of sight and navigation allow safe transit by rescue craft and those vessels that decide to transit through them including during poor visibility, high sea states and at night.</p> <p>In order to minimise risks to surface vessels transiting through an OREI, structures (turbines, substations etc.) should be aligned and in straight rows or columns. Multiple lines of orientation provide alternative options for passage planning and for vessels to counter the environmental effects on handling i.e. sea state, tides, currents, weather, visibility etc. Developers should plan for at least two lines of orientation unless they can clearly demonstrate that fewer is acceptable.</p> <p>The MCA document 'Offshore Renewable Energy Installation: Requirements, Advice and Guidance for Search and Rescue and Emergency Response' outlines the SAR requirements.</p> <p>See also 12: 'Undertake Device / Array Specific Risk Assessments'.</p> <p>It was noted during consultation with recreational stakeholders that 'if surface devices are spaced adequately then sailing and motoring could occur between them, although this would not be recommended at night'.</p>	Operational

²⁸ Maritime and Coastguard Agency (2008) MGN372 (M+F) Offshore Renewable Energy Installations (OREIs): Guidance to Mariners Operating in the Vicinity of UK OREIs.

ID	Risk Control	Description	Phase
5	Check device surveys	To ensure devices remain at the stated charted depth. Changes to charted depth arising from tidal turbines should be surveyed and marked on navigational charts.	Operational
6	Guard vessel to monitor passing traffic	To prevent a vessel contacting a device / partially constructed device during construction / installation. To keep watch and warn vessels that may be in danger, for example, to prevent a collision as a result of third-party avoidance.	Construction
7	Establish no anchoring areas	No anchoring areas to be established around nearshore cable route. NOTE: In subsequent discussions with the MCA, as described in the SoCG and in their Response to Statements of Case, this measure was not deemed necessary by the MCA and consequently will not be adopted by the applicant.	All Phases
8	Enhanced cable protection	If burial is not possible, for example due to underwater features and/or seabed ground conditions, export cables should be suitably protected such as by rocks or other such suitable mattress placements to mitigate the risks to the cable and vessels. The MCA would be willing to accept up to 5% reduction in surrounding charted depths referenced to Chart Datum, unless developers are able to demonstrate evidence that any identified risks to any vessel type are satisfactorily mitigated. ²⁹	All Phases
9	Implementation of Safety Zones	Safety zones of appropriate configuration, extent and application; typically: 500m during construction, extension, maintenance or decommissioning and 50m during operation.	Construction
10	Construction vessels to be marked in accordance with COLREGS	To ensure that construction craft remain visible at all times and to ensure passing craft are aware of construction activities.	Construction
11	Temporary navigation aids as required by Trinity House	Temporary marking, lighting and buoyage should be utilised during construction phase in accordance with Trinity House requirements.	Construction
12	Undertake Device / Array Specific Risk Assessments to include NavAids and Marker Buoys.	Further site-specific assessments should be undertaken to build on previous assessments and assess the proposed locations of individual turbine devices, substations, platforms and any other structure within the tidal array. This assessment should include the potential impacts the proposed location may have on navigation and SAR activities and should be undertaken in liaison with the MCA. Additionally, this assessment should consider the tow / delivery of devices to and from the site. MCA has statutory obligations to provide Search and Rescue (SAR) services in and around OREIs in UK waters. Turbine layout designs must be designed to allow safe transit through OREIs by SAR helicopters operating at low altitude in bad weather, and those vessels (including rescue craft) that decide to transit through them. Developers should therefore carry out further site-specific assessment to build on previous assessments to assess the proposed locations of individual turbine devices, substations, platforms and any other structure within the windfarm or tidal/wave array. This assessment should include the potential impacts the proposed location may have on navigation and SAR activities. Risk assessments for proposed layouts should build on earlier work conducted as part of the Navigation Risk Assessment and the mitigations identified as part of that process. Where possible, this original assessment should be referenced to confirm where information or the assessment remains the same or can be further refined due to the later stages of project development.	Construction
13	Provision of life saving equipment on fixed structures and floating devices.	Provide a refuge for people in the water for example: grab chains and ladders.	All Phases
14	Minimise use of marker buoys in zones of minimum UKC.	To reduce the risk of contact with buoys by vessels navigating in the zones of minimum UKC. It was reported by recreational stakeholders in consultation that <i>'if the devices are</i>	All Phases

²⁹ MGN 543

ID	Risk Control	Description	Phase
		<i>under water with a sufficient UKC preference would be that there is no buoy at the surface to maintain navigation'.</i>	

The NRA Addendum assessed that:

1. The majority of hazards were scored to be low risk;
2. The NRA Addendum assessed that 6 of the hazards in the construction phase and 3 hazards in the operational phase scored in the mid to low “As Low as Reasonably Practical” (ALARP) range. The rest of the hazards were scored as being “low;”
3. The top scoring hazard for both phases was “A recreational vessel is forced ashore or grounded’ which registered in the low to mid ALARP range and reflected the lee shore nature of the eastern inshore passage. It is important to remember that this risk is already present with or without the presence of the MDZ – see further discussion in **section 6** below;
4. “An unpowered recreational vessel is swamped or capsizes” was the second highest scoring hazard which only just registered as ALARP and whose scoring was unaffected by the addition of the project as again, all of the hazards (overfalls / tidal race / exposed location) are already present; and
5. Cumulative impacts driven by the proximity of the proposed MDZ to existing projects and their associated infrastructure were assessed and determined to be low risk.

The NRA Addendum concluded that:

- In the blue zone of the MDZ, where a UKC of at least 8m will be achieved, the navigation of every type of vessel presently using the inshore routeing will still be possible and safe;
- In the purple zone of the MDZ where UKC of at least 20m will be achieved, the navigation of commercial and passenger vessels should be possible and safe;
- Navigation will be restricted / hazardous in the Green and Gold zones because of the presence of floating and submerged tidal devices. In theory, navigation through both zones could still be possible as the tidal devices will be spaced 200m apart, but in practice this is not felt to be feasible. Discussion as to the nature and status of any formal restriction that might be applied is ongoing with the MCA and ultimately will be advised /implemented by the MCA’s UK Safety of Navigation Group (UKSON); and
- All trawling/anchoring will be excluded from within 200m any cables laid outside the MDZ.

The NRA Addendum stated, “The Project is therefore assessed to be acceptable in terms of navigational risk assuming compliance with embedded and implementation of suggested additional mitigation measures where appropriate for hazards scoring as ALARP.”³⁰

It is my firm view that the NRA Addendum is an independent, thorough and comprehensive re-examining of the updated MDZ layout and that it adheres to the procedural strictures and requirements laid out in MGN 543 and the associated “checklist for developers.” I also consider that the NRA Addendum rightly scores the hazards associated with the project as comparatively low.

5.2 STATEMENTS OF COMMON GROUND

The Statements of Common Ground reached with the MCA and Trinity House reflect and record the active and positive dialogue between the parties:

Maritime Coastguard Agency (MCA)

The key issues that were discussed and agreed between the MCA and the Applicant were:

- The MCA accepted and endorsed the methodology used for conducting the NRA and the NRA Addendum;
- The MCA suggested that an Addendum to the NRA would be the best way to ensure that the entire spectrum of changes made to the project design by the applicant after consultation were covered. The MCA was clear that the Addendum would not trigger a requirement for further traffic surveys;
- The MCA considered that the AIS, radar and visual data sets used to support the NRA and the NRA Addendum were “fully compliant with the requirements set out in MGN 543.” The additional use of the data from the RYA ‘Atlas of Recreational Boating’ in the NRA Addendum was welcomed as being ‘helpful’ but not specifically required by the MCA or MGN 543;
- The MCA welcomed the doubling of the size of the Eastern Inshore Passage and was content that the new boundary would be “satisfactory for motorised vessels, including Search and Rescue vessels.”³¹ The MCA did recommend that the applicant continued discussions with the RYA with regard to sea room for vessels under sail;
- The MCA suggested the conduct of a 2nd IBO to augment the NRA Addendum. The MCA accepted that the ‘intolerable’ grading of the Eastern Inshore Passage in the 2nd IBO was ‘not

³⁰ NRA Addendum Executive Summary page VI.

³¹ MCA response to Statements of Case P1.

significant' because the IBO is a tool designed for commercial routeing and the Eastern Inshore Passage is primarily used by leisure traffic;

- The MCA accepted the methodology³² used in the NRA for the calculation of UKC and noted that the northern ferry corridor had allowed a generous additional 2m margin for error;
- The NRA and the NRA Addendum proposed that the MDZ be designated either as an "Area To Be Avoided"³³ or a "Precautionary Area."³⁴ but the MCA stated that provided the MDZ is properly charted, lit and marked this process would be unnecessary. Similarly, the MCA stated that no formal exclusion of fishing in the MDZ would be necessary as, assuming that it was properly marked, lit and charted, the fishermen would voluntarily exclude themselves;
- The MCA and the applicant agreed that an MDZ-wide as well as a device and location specific Emergency Response Cooperation Plan will be delivered before and as the MDZ is developed; and
- The MCA requested that the list of embedded and additional mitigation measures that emerged from the NRA and the NRA Addendum be issued as a formal stand-alone document.

Trinity House (TH)

TH is the General Lighthouse Authority (GLA) for England, Wales, the Channel Islands and Gibraltar, is the UK's largest-endowed maritime charity, and has a 'statutory duty to deliver a reliable, efficient and cost-effective aids to navigation service for the benefit and safety of all mariners.'

In addition to all of the measures described above the key issues that were discussed between TH and the Applicant were:

- TH stated that the MDZ would be marked and lit in accordance with the requirements of the International Association of Lighthouse Authorities (IALA). TH also stated that the marking of the MDZ could be made to reduce the visual impact from ashore while still remaining compliant; and

³² The NRA uses a UKC methodology set out in "Guidance To Developers in Assessing Minimum Water Depth over Tidal Devices" a paper produced by an MCA chaired working group known as NOREL (Navigation: Offshore Renewable Energy Liaison group) endorsed by the MCA and produced in 2014.

³³ An 'Area To Be Avoided' or an ATBA is "an area within defined limits in which either navigation is particularly hazardous or it is exceptionally important to avoid casualties and which should be avoided by all ships, or by certain classes of ships." The International Maritime Organisation.

³⁴ A 'Precautionary Area' is "an area within defined limits where ships must navigate with particular caution in order to reduce the risk of a maritime casualty and resulting marine pollution. It is also an area within which a particular direction of traffic flow may be recommended." The International Maritime Organisation.

- The Applicant agreed that individual NRAs will be conducted for the deployment of each new type of tidal device / array.

5.2.1 Snowdonia Canoe Club (SCC) - Kayakers and Canoeists

The objections raised by the SCC in their Statement of Case runs to 116 pages and their responses to other Statements of Case to another 48 pages. A tabulated list of responses to the points raised by the SCC from the applicant is at **Annex C**.

A summary of the objections with navigational relevance raised by the SCC in both documents is set out below:

- **Omission by the Morlais Project of sea kayakers as important ‘receptors’ of project impacts.**
“There is no evidence that the potential impacts on sea kayakers, including positioning of tidal devices and restrictions on access during construction, operation and decommissioning activities were considered or even recognised.”
 - **Comment:** I see a demonstrable audit trail record of full and frank consultation with the SCC that was part of the NRA Addendum and which specifically addressed unpowered small craft and this is further shown at Annex C. I consider that the widening of the eastern inshore passage to over 1km offshore is direct testament to the fact that the representations of the SCC were listened to and given serious consideration by the applicant.
With regard to restrictions on access, the applicant has already undertaken to minimise construction safety zones both geographically and temporally to avoid or minimise disruption to other water users. The TWAO comprehensively defines a construction safety zone as an “Area extending 500m from any part of a tidal work or such an alternative area as may be determined by the undertaker following the approval of an updated NRA and consultation with the MCA and the RYA.³⁵” It should be understood that work in the MDZ will invariably require a heavy lift capability, a storage barge, tugs and other support craft. The heavy lift equipment requires benign conditions in which to work (typically tidal streams of less than 1 knot, swell of less than 1 metre and winds of less than 15 knots) and the window in which this ‘plant equipment’ will be able to work is very small – thus typically any traffic restriction

³⁵ TWAO Section “Safety zones for navigation, trawling and anchoring.”

would already be no longer than 2-3 hours every tide. It is common practice for this type of activity to be announced by a Notice to Mariners at least 48 hours in advance and would be supported by VHF broadcasts every 30 minutes in the time leading up to the restriction taking place.

- **Lack of information on potential changes to tidal flow regimes against which to assess impacts on sea kayaking activities.**

“Morlais has commissioned mathematical modelling to determine how much energy can be extracted from tidal energy devices proposed for the MDZ. However, this does not inform sea kayakers on the potential impact of the MDZ on wave trains and eddies they rely on to safely enjoy the area.”

Comment: HR Wallingford are world leaders in hydrodynamic modelling and their prediction skills have been successfully used to support and assess the impact of many major development projects in the UK marine industry for over 20 years³⁶. The conclusions made by the HR Wallingford report are summarised as follows: for tidal streams as “The difference in average speeds is mostly a decrease up to 0.2 m/s (0.3 knots) within the MDZ sub-zones” and for wave height as “The differences in maximum heights are mainly located within the MDZ and vary between a decrease of 0.4 m and an increase of 0.2 m.” In my opinion these projected changes to tidal rates and wave heights do not represent a difference to the hydrodynamic regime that would be detectable by a kayaker on the water particularly when considered in respect of the existing highly active hydro dynamic regime in the inshore area in which the kayakers operate.

- **Risk to life from collisions.**

“For sea kayakers surfing in the tidal stream wave trains, capsize is likely and in the event of a failed roll, the kayaker becomes a swimmer attached to a 5m waterlogged kayak taken by the tide. Navigational squeeze within the inshore passage will force together higher numbers of different types of recreational vessels increasing the risk of collisions between boats. Any collision involving a kayaker in fast moving water could prove fatal. This is not recognised in the Morlais Navigational Risk Assessment.”

Comment: it is necessary to unpick the three separate arguments represented here:

³⁶ For eg: The London Gateway Project, Dover Western Docks Project, Thanet Windfarm Extension.

1. Kayaker swept into MDZ.

Aside from the admission in Annex 3 of the SCC Statement of Case that “It is recognised that these conclusions are not underpinned by anything other than speculation”³⁷ and setting aside the fact that the diagrams used by the author³⁸ show a kayaker being swept diagonally across a strong tidal stream (a physical impossibility), the SCC paper raises a very legitimate concern that a kayaker in distress will be swept into the area of the MDZ where surface piercing devices will be present. As can be seen in **Figure 4** and, as is strongly supported throughout the SCC Statement of Case, most sea kayakers operate within 200-300m of the shore and rarely stray further offshore; self-evidently there is little to see or do in a very small boat offshore and the exciting hydro dynamic conditions (wave trains etc.) only exist closer inshore.

In regard to “run out” it is accepted that close inshore there are complex counter eddies associated with the rocks and ridges but once more than 300m offshore, the tidal stream broadly follows parallel to the line of the coast, northerly on the flood and southerly on the ebb as shown in **Figure 5** below. If a Kayaker gets into difficulties at point 1, 300m off Penrhyn Mawr on the flood or at Point 2, 300m off North Stack on the ebb, and then 12 minutes of peak “downstream” flow (5 knots) is applied, **Figure 5** indicates that a kayaker is unlikely to be swept into proximity to the surface piercing tidal devices which lie as a minimum, at least 1000m offshore³⁹.

It should also be noted that even where a kayaker might be swept into this area, the devices are going to be sited at least 200m apart, with 500m east west safety corridors between differing zones and any moving part of these devices will be at least 3m below the surface of the water.

³⁷ Annex 3 to the SCC Statement of Case - “Hydrodynamic effects of Morlais Development Zone,” September 2020, Chris Bolton on behalf of Snowdonia Canoe Club – Page 16.

³⁸ Figure 6 and Figure 7 – pages 14 &15. Annex 3 to the SCC Statement of Case “Hydrodynamic effects of Morlais Development Zone,” September 2020, Chris Bolton on behalf of Snowdonia Canoe Club.

³⁹ It should be noted that Figures 6 and Figure 7 on pages 14 &15 of the Annex 3 to the SCC Statement of Case “Hydrodynamic effects of Morlais Development Zone,” show the authors own run out tracks, representing a distressed kayaker, remaining within the blue zone of the MDZ where the tidal devices are at least 8m below the surface and would thus represent no danger to a kayaker.

In truth, a kayaker over 300m offshore and swept downstream for 12 minutes would, in my opinion, be in more danger from being overcome by the pre-existing overfalls / confused sea and the effects of immersion in cold water than being concerned by tidal devices 8m below. More likely, as kayakers who are paddling in this area of “Advanced Tidal Water”⁴⁰ will never venture on the water alone and are almost always at sea in groups, an individual in this level of difficulty would have triggered a mutual support effort or summoned professional assistance.

2. Increase in collision risk.

Navigational squeeze or compression of vessels into a small geographical area is not considered to be significant in this instance – as described above, Kayakers choose to operate very close inshore in precisely the areas that other vessels will take special precautions to avoid and necessarily the risk of collision is low. Similarly, remembering that the traffic survey data shows 6-8 recreational vessels passing through the area **per day** the risk of collision is not felt to be significant.

3. Concerns not represented in the NRA.

As described above there is a demonstrable audit trail record of full and frank consultation with the SCC that was part of the NRA Addendum. The extension of the eastern inshore passage which moved the eastern inshore passage over 1km offshore is direct testament to the fact that the representations of the SCC were listened to and given serious consideration by the applicant.

- In their response to Statements of Case, the SCC state “Our conclusion is that the risk assessment in the Addendum NRA demonstrates an intolerable risk, under UK law, to the safety of members of the public. We also believe that Marico may have significantly underestimated that risk.”⁴¹

Comment: The SCC produced a lengthy annex in their Response to Statements of Case in an attempt to discredit the NRA and the process used by Marico to produce it, despite the considered acceptance of the NRA Addendum and its conclusions by the MCA as the statutory authority. The SCC also fail to establish their professional pedigree or expertise to allow them to legitimately challenge the process and

⁴⁰ As classified by the British Canoe Union.

⁴¹ SCC Comments Made on Statements of Case to Planning Inspectorate – Page 7.

conclusions of the NRA. It should be noted that the NRA process used by Marico is derived from an IMO methodology which is endorsed by the MCA and has been successfully used for the production of 124 NRAs, of which 23 are classified as renewable, to assess projects for ports, organisations and harbour authorities around the world since 2013. Far from “demonstrating an intolerable risk under UK Law,” I consider that the NRA Addendum is authoritative and crystal clear in concluding that “the Project is therefore assessed to be acceptable in terms of navigational risk assuming compliance with embedded, and implementation of, suggested additional mitigation measures, where appropriate, for hazards scoring as ALARP.” It should also be noted that the UK law, against which the SCC allege an intolerable risk, is not specified.

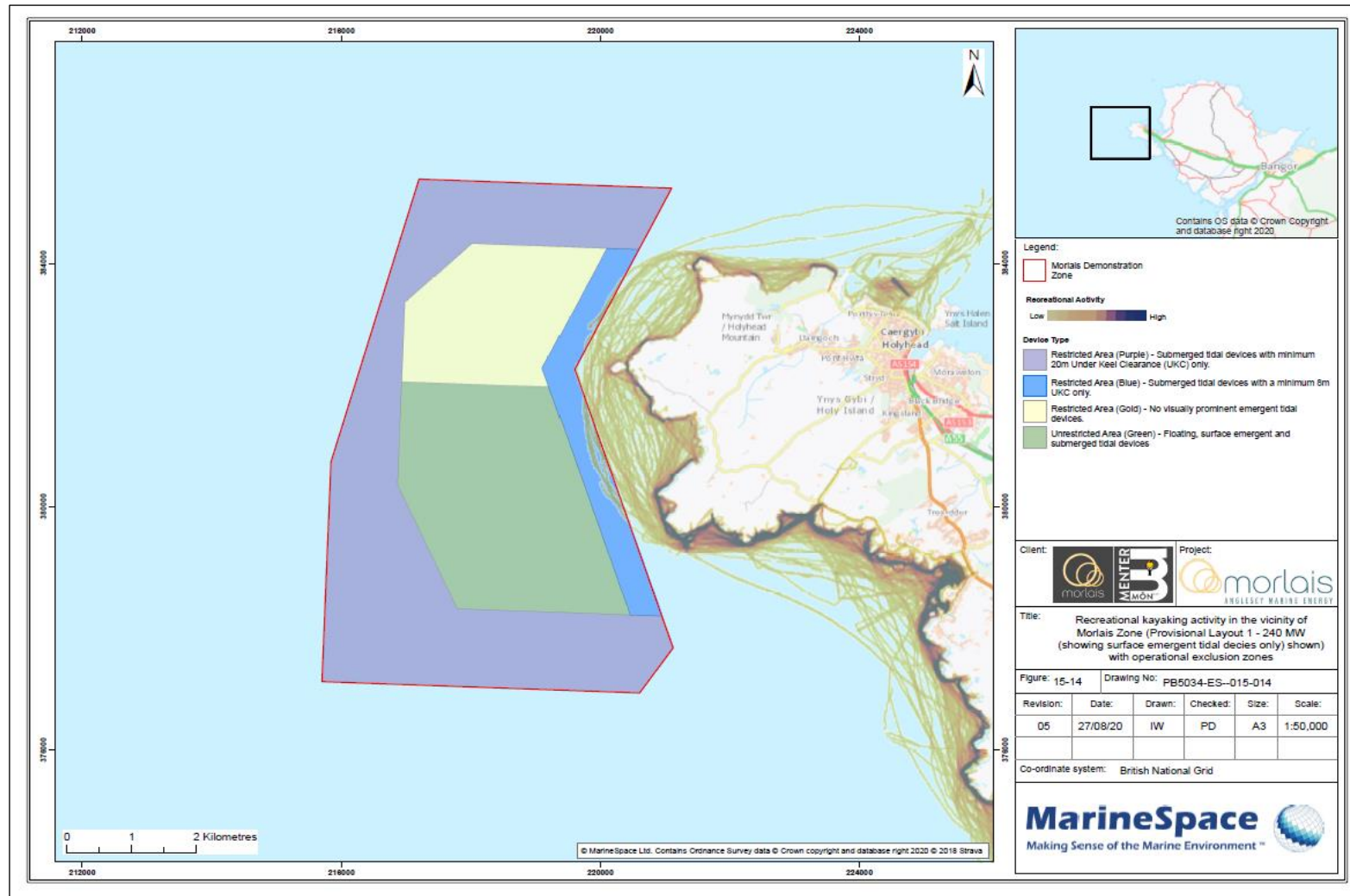


Figure 4: Kayaking Activity off West Anglesey

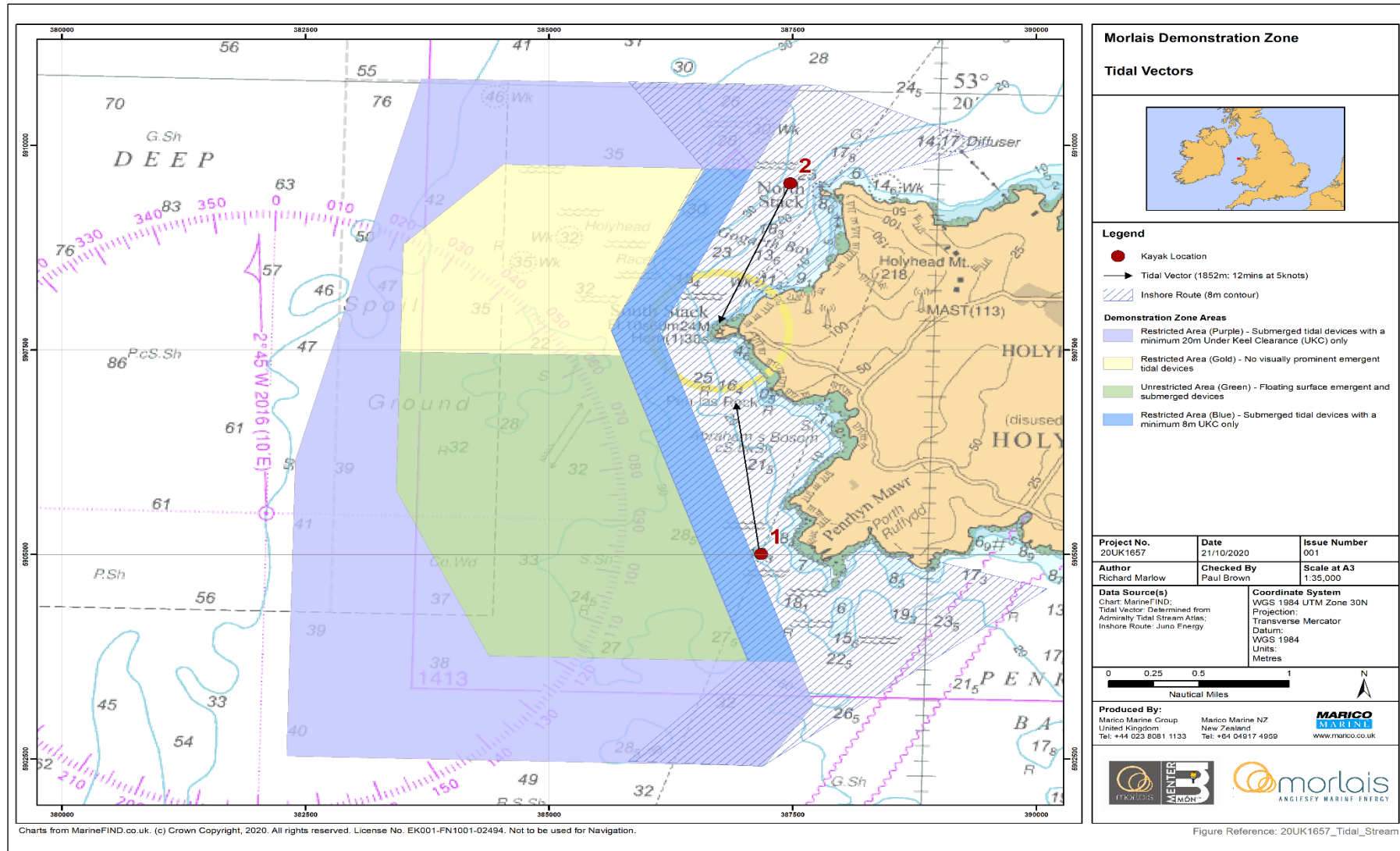


Figure 5: Maximum Tidal Streams vs Safe Runout

5.2.2 The Chamber of Shipping (CoS)

The CoS represented commercial shipping interests with Stena Line and Irish Ferries as the most significant stakeholders. The comments in bold below were received from Irish Ferries:

- **“The 20m UKC is of great benefit and assuages most of our concerns.”**
- **“The proposed development will prevent the use of certain routes that are only used rarely in particular circumstances, and we can accept this.”**
- **“The proposed development will still restrict options for ferries that cannot enter the Port of Holyhead in inclement weather – i.e. it limits areas in which to shelter.”**

Comment: Vessel traffic survey data shows that ferries very rarely use the area of the proposed MDZ to shelter in inclement weather; in my opinion as a Master Mariner it is too exposed (unless the wind is easterly) and offers no shelter from any wind in the west half of the compass.

- **“The proposed development leads to less sea room for traffic going in and out of Holyhead to safely pass each other. Inbound/Eastbound traffic may tend to navigate further north than it does presently, with the result that outbound/westbound traffic will be pushed further north, with the risk of impinging on the Traffic Separation Scheme.”**

Comment: There is already a TSS in the entrance to Holyhead harbour which allows for sufficient sea room for vessels to safely pass each other; although it is “unadopted by the IMO” it is clearly marked on the chart and traffic survey data shows commercial vessels regularly and safely using it. In addition, the ferries already safely pass through and across the “Off Skerries TSS”; Rule 10 of the International Regulations for the Prevention of Collisions At Sea (IRPCAS) is perfectly clear on the method and circumstances that a ferry or vessel might cross a traffic separation scheme and this is a long established, routine and perfectly safe event⁴².

- **“Northbound Traffic bound for the TSS may be less inclined to alter to starboard (towards the development) to give way to outbound/westbound traffic from Holyhead.”**

Comment: The northbound (closer inshore) lane of the “Off Skerries TSS” is 2nm wide and the closest that the lane edge comes to the furthest NW extremity of the MDZ is over 2nm. It is my opinion that there is enough sea room in this area to allow vessels to manoeuvre according to

⁴² International Regulations for the Prevention of Collisions At Sea - Rule 10 (c): “A vessel shall, so far as practicable, avoid crossing traffic lanes but if obliged to do so shall cross on a heading as nearly as practicable at right angles to the general direction of traffic flow.”

the IRPCAS without proximity to the purple (>20m UKC) of the MDZ becoming a ship handling concern.

5.2.3 Royal Yachting Association (RYA)

In “Pathways to Zero” the RYA’s 10-year sustainability strategy, the organisation has made an enduring and public commitment to “Developing a Zero Carbon Pathway: making intelligent use of energy and other natural resources with power-down through energy efficiency and power-up through the use of renewables” and to “Influencing through Procurement and Partnerships: Sharing our approach and working with our partners to develop pathways for the whole industry that work for boaters and businesses together.”⁴³

Nevertheless, despite 3 years of engagement with the applicant and a stated intention to attempt to reach a Statement of Common Ground, the RYA has chosen to maintain its objections to the TWAO application and a detailed response to each of their points raised in their Statement of Case is listed at **Annex A**. A brief summary of the key issues raised by the Association, including in their response to Statements of Case is set out below:

1. **“The Application ES and NRA fail to consider all possible maritime safety impacts to recreational craft.”**

Comment: The project has been designed strictly according to the strictures laid out in the guidelines set by the marine regulator and has the endorsement of the MCA and Trinity House. The project has been assessed by two full, independent and comprehensive NRAs which have used an internationally recognised and approved procedure specifically to consider every possible maritime safety impact and which is informed by stakeholder consultation as one of its founding principles. It is difficult to identify any other additional measures that the applicant could have taken to consider the maritime safety impacts.

2. **“The use of Automatic Identification System (AIS) and radar data to advise the NRA, ES and Interactive Boundary Assessment does not fully include the peak recreational period and does not appear to consider non-AIS equipped recreational craft or small craft without radar reflectors.”**

Comment: The data used to inform both NRAs was gathered by Anatec, a highly reputable survey firm, strictly in accordance with the guidelines set out by the MCA in MGN 543 and in accordance with long established practice in the marine industry. The level, timeliness and

⁴³ RYA Pathways to Zero - Sustainability Strategy 2020-2030.

quality of data, which included separate radar and visual surveys explicitly to ensure that non AIS equipped vessels were included, was specifically approved and endorsed by the MCA as the statutory regulator. Analysis of the winter and summer radar and visual data shows detections of non-radar reflector equipped craft including Kayaks, 6 and 8m Ribs, 20-30ft yachts, fishing and charter vessels and gives me a high degree of confidence that the survey accurately reflected traffic levels. Nevertheless, recognising the concerns expressed by the RYA about the survey data and, in an attempt to address this issue, the applicant agreed to purchase the RYA's proprietary "Coastal Atlas of Recreational Boating" and this data was included in the NRA Addendum. It is perhaps worth noting that the inclusion of the RYA's data served only to exactly endorse the conclusions reached by the original AIS, Radar and visual surveys from the NRAs.

3. **"The NRA on which the application is based has failed to follow the guidance of MGN 543 leading to an incomplete and inaccurate NRA which subsequently fails to support the ES.**

Comment: The MCA, as the national statutory authority on navigation, does not share this view and has agreed that the applicant followed the guidance of MGN 543 and the associated checklist.

4. **"The Environmental Impact Assessment process does not fully analyse the implications of the MDZ to recreational boating due to a failure to fully assess consultee concerns raised in 2015 and 2018."**

Comment: The applicant has successfully consulted and reached agreement with the MCA, TH and other local stakeholders including the ferry companies, over 3 years of careful stakeholder consultation which also included the RYA and other organisations representing every sort of local recreational activity. In my opinion significant efforts were made to understand the impact of the MDZ and specifically to listen to the concerns raised by the recreational boating sector. This is evidenced by concessions such as the project redesign of the eastern inshore passage and the on-going efforts to try and reach a consensus point and a statement of common ground with the RYA. It is disappointing that the RYA, in trying to centralise their response to the project in the lead up to the public enquiry, specifically forbade RYA clubs in Anglesey and their members from any contact with the applicant or their representatives. This served only to engender suspicion in the leisure community and to strangle the genuine efforts of the applicant to explain the project more fully and to try to reach a workable consensus; which they demonstrably managed to do with more receptive

organisations.⁴⁴ Nevertheless, I consider that there has been a full analysis of the MDZ and its impact on the recreational boating sector; it may just be that the RYA disagrees with the results.

5. **“The Rochdale Envelope/ Project Design Envelope approach has not been applied in keeping with guidance and fails to meet the requirements of Statutory Instrument 2017 No. 567 - The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations (2017) and the Marine Works (Environmental Impact Assessment) Regulations (2007).”**

Comment: The application of the Rochdale Envelope approach is addressed in the Planning and Energy Policy Proof of Evidence submitted by David Bell BSc (Hons) DipUD MCIHT MRTPI.

Attempting to register a positive note, in their Statement of Case, the RYA did allow that “ ... an order can be made when the NRA informs the ES and consenting process of the impact and mitigation measures to address potential conflicts between the MDZ and recreational boating with respect to:”

1. **“Displacing recreational craft to the East and West of the MDZ and navigational squeeze.”**

Comment: The amended layout for the eastern inshore passage moved any surface piercing devices at least 1000m offshore and it now has an average width along its length of 1.9km. In my opinion, the inshore traffic route now has sufficient sea room making it wide enough to avoid displacing recreational vessels further offshore or to result in significant navigational squeeze. In terms of width it is the same as other passages such as: the entrance to Falmouth Harbour, Southampton Water at Calshot, the western entrance to the Solent through the Needles and Hurst Castle channels, Holyhead Harbour and the Gulf of Corryvreckan (in Scotland). All the examples cited above are all also about 1000m across and within which recreation vessels safely regularly navigate; sometimes in much busier circumstances (Calshot / Hurst), some in at least as equally challenging tidal surroundings (Hurst / Corryvreckan) and some in which large scale recreational boating events are organised (Cowes week, Round the Island Race etc).

A useful comparison can be made using the picture of the Hurst Castle and Needles Channel shown in **Figure 6** below. This passage starts at the Needles, extends for 4.5 nautical miles and is less than 500m wide at its narrowest point. At the time of the picture the ebb tide was running at a speed of 3-4 knots, with a fresh south westerly wind at 15 -20 knots. The overfalls

⁴⁴ In response to a “request for a brief chat re Navigation and the Morlais Project” Holyhead Sailing Club Website posted “BE AWARE: Request for Information on Morlais Demonstration Zone - We have been advised by the RYA not respond to this request as this is being dealt with by their professionals on our behalf.” 20-10-20.

on the Shingles Bank were producing 2-4m breaking waves and yet the picture shows 17 yachts and small leisure vessels transiting the narrows in perfect safety.

I consider that there is sufficient sea room⁴⁵ in the inshore route to allow the safe passage of smaller vessels and not to force them to displace to the offshore route.

With regard to navigational squeeze and the implied increase of risk of collision, it is acknowledged that the eastern inshore traffic route is likely to be marginally busier than it was before. But vessel traffic survey data of showing vessels presently passing the entire area on a daily average (6 in summer per day and 3 per day in winter)⁴⁶ does not indicate that the risk of collision will rise significantly and not on the scale of similar sized passages elsewhere in the UK. The comparison with the Needles / Hurst Castle channel to the Western Solent in **Figure 7** below shows that in a similar sized area with similarly challenging tidal conditions⁴⁷ will see the passage of an average of at least 50 vessels per day in summer and 20 per day in the winter.

2. “The effects of tidal streams, wind masking, turbulence or shear on small craft handling and manoeuvrability near arrays and within the Eastern Inshore Route.”

Comment: Leaving aside the possible cut and paste error from a previous windfarm objection where the RYA questions the effect of wind masking caused by underwater tidal devices, MGN 543 requires the applicant to consider the changes to tidal streams that will affect small vessels. Accordingly, the applicant commissioned HR Wallingford, a world leader in hydrodynamic modelling with an extensive track record in informing marine projects throughout the UK over the last 20 years, to produce the Coastal Processes report. A comprehensive analysis of the changes to the hydrodynamic environment produced by the deployment of the full 240MW capability, the report did not indicate a significant rise or fall in tidal velocity, nor a significant change in the set of the tidal streams particularly within the eastern inshore route. The changes predicted to tidal rates or wave height, in my opinion, do not represent a difference to the hydrodynamic regime that would be detectable by any

⁴⁵ “Unobstructed space at sea in which a vessel can be easily manoeuvred or navigated.” OED

⁴⁶ MCA approved Radar and AIS vessel survey data from NRA – Traffic Survey Data 20UK1647

⁴⁷ Tidal streams through the Needles and Hurst Channels can flow at speeds of over 6knots at peak (Admiralty Chart 2035 diamond E)

mariners, particularly when considered in respect of the already existing highly active hydro dynamic regime in the MDZ.

3. “Foundering and capsize risk to small craft from increases in tidal currents, due to tidal arrays, in combination with naturally occurring overfalls.”

Comment: The HR Wallingford Coastal Processes report does not indicate a significant rise or fall in tidal velocity and, in my opinion, any minor projected changes to tidal rates or wave height do not represent a difference to the hydrodynamic regime that would be detectable by any mariners, particularly when considered in respect of the existing highly active hydro dynamic regime in the MDZ and the eastern inshore route. In my opinion I do not feel that the risk of recreational craft capsize, or foundering will be measurably changed by the addition of the project.

4. “Concentrating craft in close proximity to an exposed coast (lee shore) in SW wind and wave conditions.”

Comment: A passage through this area already requires careful planning by the prudent mariner in order to time the passage to avoid, or at least account for, the overfalls - this is standard practice for every competent small boat mariner. The overfalls require respect from any mariner but “Under normal conditions, whilst due regard must be paid to the strength of the tide, sea conditions should not trouble any well-found vessel.”

It is considered that with the new MDZ layout, there is now sufficient sea room in the eastern inshore route to allow the safe passage of smaller recreational vessels.

5. “Shore deflection of vessel wash on to the course of recreational craft.”

Comment: The new layout which extends the eastern inshore passage to lie at least 1000m offshore should mean that the wash from any vessel using the route is dissipated enough not to pose any additional risk to recreational small craft. It should be remembered that this area lies on an exposed coastline with an existing active wave and swell climate and so any additional wash from passing vessels is unlikely to have any noticeable impact or change the risk profile of foundering / swamping to recreational small craft.

6. “Ensuring that both the current MDZ and future array specific NRAs and ESs meet the requirements of MGN 543.”

Comment: The NRA and the NRA Addendum strictly adhered to the requirements of MGN543 and this is endorsed by the MCA itself. The applicant has already committed to conducting

fresh NRAs for each new array deployment and these will again be written according to the guidelines set out in MGN 543.



Figure 6: The Needles Channel – showing concentrations of yachts navigating the Channel

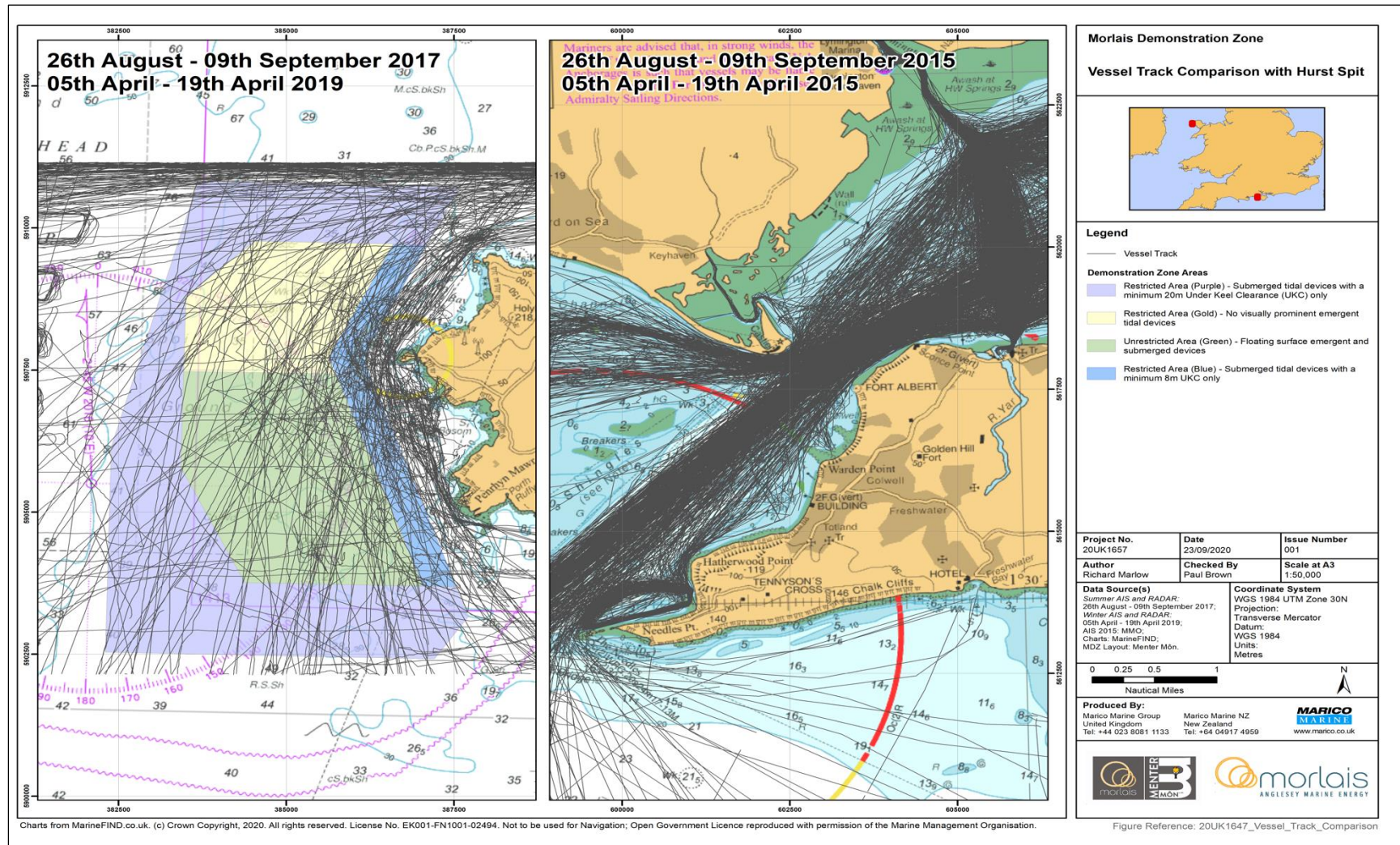


Figure 7: Track Comparison Hurst Castle Needles Channel vs MDZ

6 SUMMARY AND CONCLUSIONS

6.1.1 Summary of Objections

I considered that it would be helpful to the Inspector for me to summarise the navigation and shipping objections raised against the project and provide a very brief rebuttal of each of them:

- Inadequate sea room in eastern inshore passage / Vessel compression / traffic squeeze into the Eastern inshore passage:
 - Is 1000m of navigable water enough room in which to navigate a small vessel even if the existing tidal and wave regime is demanding? This POE considers that it is and uses existing similar examples from elsewhere in the UK as a comparison. The sea area off South Stack already requires careful planning for the leisure sailor in conceiving a transit and it is accepted that the addition of the MDZ slightly alters the routeing (to transit the eastern inshore passage) but, like the MCA and the assessment of the NRA Addendum, I do not consider that it significantly increases the risk profile.
- Displacement of small vessel traffic offshore to the west, increasing the likelihood of interaction with larger vessels:
 - The presence of the MDZ will have little or no impact on this. The existing presence of the overfalls and strong tidal streams in the area that will be occupied by the MDZ means that the prudent mariner will ALREADY either route close inshore, or extend offshore by “up to 7 miles” or, more likely, will choose a time when more benign conditions are present. The key point here is that this already occurs and that the placement of the MDZ will have little or no additional displacement effect on leisure routeing.
- Change in Hydro dynamic regime – tidal stream / wave height:
 - This is already an active hydro dynamic area and the changes described by the HR Wallingford Coastal Processes paper shows that they are unlikely to be significant enough to be measurable by the average mariner / kayaker.
- Unpowered /disabled kayaker swept into MDZ:
 - This POE has demonstrated that there is enough safe water “downstream” from the likely kayaking operating area for a rescue (self or otherwise) to be affected before any likely proximity of a casualty to the MDZ.
- SAR Access into MDZ:

- This emerged as a key mitigation action recommended by the NRA Addendum and one that has been accepted by the applicant. Thus, a full Emergency Response Co-operation Plan (ERCoP) will be conducted once the exact layout of the tidal devices is known. It is very likely that helicopter rescue of a casualty will emerge as the preferred method for vessels within the MDZ with surface vessel rescue emerging as less preferred. This will depend on spacing and type of devices.
- Swamping / reflected wave energy:
 - Raised as a concern but not felt to be changed by the addition of the MDZ and the devices within. The sea area already has a challenging wave climate in which the danger of swamping and reflected wave energy is already a consideration to the prudent mariner. The addition of tidal devices is not felt likely to make this any worse and perhaps, by the very nature of removing kinetic from the water, they might actually reduce this risk.
- Construction / maintenance / de-commissioning exclusion zones:
 - The applicant has undertaken to minimise construction safety zones both geographically and temporally to avoid or minimise disruption to other water users and has committed to “do everything possible to ensure inshore passage remains open.”

6.1.2 Conclusion

This Proof of Evidence concludes that the NRA and the Addendum were conducted exactly in accordance with the stipulations of the statutory authority guidance contained in MGN 543 and with the full support, long term engagement and cooperation of the MCA, Trinity House and other stakeholders. Further, the applicant was active in consulting with stakeholders across the board and has a demonstrable track record of paying full heed to their concerns and opinions. Having incorporated the amendments suggested by stakeholders into the project design, the applicant commissioned an independent NRA Addendum to formally examine the updated risk profile and it concluded that:

- In the blue zone of the MDZ, where a UKC of at least 8m will be achieved, the navigation of every type of vessel presently using the inshore routeing will still be possible and safe;
- In the purple zone of the MDZ where UKC of at least 20m will be achieved, the navigation of commercial and passenger vessels will still be possible and safe; and

- Navigation will be restricted / hazardous in the Green and Gold zones because of the presence of floating and submerged tidal devices. In theory, navigation through both zones could still be possible as the tidal devices will be spaced 200m apart, but in practice this is not felt to be feasible.

The NRA Addendum stated: “The Project is therefore assessed to be acceptable in terms of navigational risk assuming compliance with embedded, and implementation of, suggested additional mitigation measures, where appropriate, for hazards scoring as ALARP.”

It is my firm view that the NRA Addendum is an independent, thorough and comprehensive re-examining of the updated MDZ layout and that it adheres to the procedural strictures and requirements laid out in MGN 543 and the associated “checklist for developers.” I also consider that the NRA Addendum rightly scores the hazards associated with the project as comparatively low.

It should also be noted that the NRA Addendum necessarily assessed the worst case scenario of a deployment of the full 240MW generating capability across the entire licensed MDZ site. In reality, the phased nature of the deployment of generating devices over a period of 15 years with a very modest first 2 phases in the first 5 years allows plenty of opportunity to measure actual impact against prediction. Similarly, reassurance should be gained from knowing that each new phase and array of generating device will require its own updated NRA with associated stakeholder consultation, review of incident analysis and risk assessment.

The sea area where the MDZ will be placed is an active and challenging one and it already demands the respect of those choosing to navigate through it. Like other similar areas in the UK, the MDZ area is by its very nature not somewhere where a leisure sailor would normally choose to loiter except on very rare occasions of slack tidal stream, no swell and little wind. Normally, therefore, those choosing to pass here will do it quickly, within a favourable wind and tide window and will either choose to stand well offshore or, more likely, keep very close to the coast.

My own personal experience mirrors this premise exactly; skippering a sailing yacht on a delivery voyage from Southampton to Liverpool, I deliberately planned my passage northwards through the Irish Sea making sure I timed it to be passing the “Stacks” to ensure a brisk following (flood) tidal stream and I also elected to follow the “close inshore” track as recommended by the Admiralty Pilot. We took some elementary precautions for passing through an area notorious for overfalls and

turbulent waters⁴⁸ and, as expected, the transit passed uneventfully, if quite lively for short periods as we passed the headlands.

It is my considered opinion that while the addition of the MDZ may very slightly alter the routing of the leisure vessels that transit this area, the risk profile associated with their movement is not significantly changed.

Similarly, for Kayakers, who remain very close inshore, I feel that the navigation risk profile for the MDZ remains largely unchanged.

In concluding, I consider that, from a navigation and shipping point of view, the project is safe and should be granted approval to proceed for the following reasons:

1. The project has been the subject of two full and independent NRAS which were conducted exactly in accordance with the strictures laid down in MGN 543 and which assessed the project to be navigationally safe.
2. Statements of Common Ground which provide considered endorsement of the project and the methods by which it has been navigationally assessed have been reached with the MCA and Trinity House.
3. The deployment of the tidal devices to full capability will be graduated in at least 4 phases over a period of 15 years, allowing ample opportunity for all to measure impact against prediction.
4. Each phase and the deployment of each new type of device will receive its own separate navigation risk assessment.
5. The extension of the eastern inshore channel has, in my professional opinion, provided ample sea room for the safe passage of all types of leisure vessels past the project site.
6. HR Wallingford, as one of the leading hydrodynamic modellers in the world, has predicted that the impact of the tidal devices on wave height and tidal stream to be below the measurable threshold detection for most leisure users.
7. The siting of any surface piercing devices over 1000m offshore will minimise the effect on kayakers who mostly operate within 200-300m of the shore.

⁴⁸ For a yacht these precautions are normally limited to closing all the hatches in the boat, including the main saloon to cockpit hatch, as well as making sure the crew are wearing harnesses on and that they are "hooked on" and the engine is ready for immediate use, if not already running.

8. Even 1000m offshore, where the superstructure of some of the tidal devices will pierce the surface, the tidal devices will be set 200m apart and with 500m east west safety corridors between differing zones.
9. Any moving part of any tidal device will always be at least 3m below the surface of the water.

6.1.3 Statement of Truth

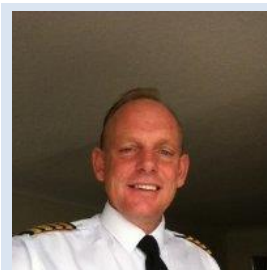
I hereby declare as follows:

- Insofar as the facts stated in this Proof of Evidence are within my own knowledge, I believe them to be true, and that the opinions I have expressed represent my true and complete professional opinion.
- This Proof of Evidence includes all facts which I regard as being relevant to the opinions which I have expressed and that I have drawn the Inquiry's attention to any matter which would affect the validity of those opinions.
- I understand that my duty to the Inquiry is to help it with matters within my expertise and I have complied with that duty.

Annex A Curriculum Vitae



Paul Brown MNI
Principal Consultant



Specialism/Profession	Marine Professional and Pilot
Nationality	UK Citizen
Key Experience	Paul is one of Marico's Principal Consultants, is based in South Devon and is the retained authorised pilot for the Devon ports of Bideford, Appledore and Tor Bay. He also sits as the Commercial representative on the UK Harbour Masters national council. Previously he served as the Harbour Master, General Manager Operations and as a Class 1 Pilot for the Port of Dover, one of the busiest ports in the UK. Prior to Dover, ran his own hotel business for 3 years and before that has 18 years of experience as a deck officer including 5 years in Command of Royal Naval warships.
Positions Held	<p>Present: Marico Marine: Principal Consultant and Devon Pilot</p> <p>2011-2017: Port of Dover: General Manager, Operations, Harbour Master and Class 1 Pilot.</p> <p>2008 – 2011: Sun Bay Hotel: Managing Director</p> <p>1990 – 2008: Royal Navy:</p> <p>May 2006 – Dec 2008: Commanding Officer HMS EXETER</p> <p>Feb 2007 – Aug 2007: Commanding Officer HMS EDINBURGH</p> <p>Sept 2004- Jul 2005: Advanced Command and Staff Course</p> <p>Oct 2002 – Sept 2004: Commanding Officer HMS GRIMSBY</p> <p>Apr 1990 – Jun 2002: Navigator / Deck Officer various HM Ships</p> <p>Sept 1987 – Apr 1990: Beach Sailing Centre Manager</p>
Education and Professional Status	<p>2018: RYA Commercially Endorsed Advanced Powerboat Certificate</p> <p>1999: RN STCW II/2</p> <p>1984-87: BA (Hons) Geography –University of Wales</p> <p>1986: RYA Yacht Master / Dinghy Instructor</p>
Skills and Competences	<p>Former member of the Port of Dover Executive Management Group, accountable for the corporate management, strategic planning and financial performance of the port.</p> <p>Former Harbour Master for the Port of Dover, with direct statutory responsibility for the safety of navigation and the Safety Management System.</p> <p>Council member for the UK Harbour Masters Association acting as the representative for the South East region of the UK.</p> <p>Member of the MCA Port Marine Safety Code committee and the British Ports Association Marine and Pilotage working groups.</p> <p>Class 1 Port of Dover pilot handling ships of up to 320m in the constrained waters of the port.</p> <p>5 years in Command of HM Ships EXETER, EDINBURGH, NOTTINGHAM and GRIMSBY operating around the world.</p> <p>Former Port Security Officer for the Port of Dover and member of the Dover Port Security Authority.</p>
Project Portfolio	<p>Jun 20 – Navigation Risk Assessment for a proposed LNG terminal in Shannon, Eire.</p> <p>Mar 20 – PMSC Audit for Canals and Rivers Trust</p> <p>Feb 20 – Cowes Floating Bridge Safety Assessment</p> <p>Jan 20 – Port capacity assessment St Ives – Cornwall Council</p> <p>Sep 2019 – PMSC Audit for the ports of Bridport, Lyme Regis and Weymouth.</p>

2019 – Marico and UK representative for sales and training for Navicom Portable Pilot Units. Customers have included Sharpness Pilots, Londonderry Pilots and Liverpool Pilots.

2019 – Thanet Offshore Windfarm Extension Project – representing the applicant including a navigation simulation of the influence the extension would have on the NE Spit Pilot Station.

2018 – Project manager for the Rotherhithe to Canary Wharf bridge project, acting as the marine liaison between Transport for London and the Port of London Authority and other stakeholders.

November 2017 – Present: Acting as the ‘house mariner’ for the introduction of a new port management system for the Ports of Guernsey on behalf of ProDevelop SA.

April-Sept 2018: A passage navigational risk assessment for Red Funnel Ferries in the Isle of Wight.

October 2017: NE Spit windfarm extension ship simulations and assessing the effect on the Port of London pilot station.

2017: Dover Western Docks Revival, the management of the dredging and marine works of the Western Docks Revival project in Dover while ensuring one of the busiest ports in the UK continued to operate safely.

2015-2016: Port Marine Safety Code rewrite, instrumental in the complete rewrite of the 2016 UK PMSC and accompanying Guide to Good Practice.

2014: Dover Traffic Access Protocol, negotiating the use of a 6-mile section of the A20 trunk road to queue freight traffic at peak times in order to prevent catastrophic congestion in the town of Dover - a UK first.

2013-2015: Ferry ETA Management, negotiating a change in the way the 3 cross channel ferry operators managed their ship timetables to remove vessel queuing at the entrance to Dover port but continuing to protect each individual organisation’s commercial freedom to operate.

2008-2011 - Sun Bay Hotel Refurbishment: Acting as the project manager for £1 million refurbishment of a 14-bed hotel and its 60-seat restaurant.

Annex B Summary of RYA Statement of Case Rebuttals

Annex C Summary of SCC Statement of Case Rebuttals



MENTER MON

RESPONSE TO RYA STATEMENT OF CASE TRANSPORT AND WORKS ACT ORDER APPLICATION TWA/3234121



Report Number: 20UK1657
Issue: 01
Date: 15 October 2020



British
Ports
Association



International
Harbour Masters
Association



MARINE AND RISK CONSULTANTS LTD

MENTER MON

RESPONSE TO RYA STATEMENT OF CASE TRANSPORT AND WORKS ACT ORDER APPLICATION TWA/3234121

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Date	Release	Prepared	Authorised	Notes
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15 Oct 2020

EXECUTIVE SUMMARY

On 29 September 2020, MarineSpace (MS) commissioned Marine and Risk Consultants Ltd (Marico Marine) to provide vessel navigation specialist support to the Morlais Demonstration Zone (MDZ) project on behalf of their client (applicant) Menter Môn (MM).

MM have received a number of objections to the MDZ project from the Royal Yachting Association (RYA).

The RYA have detailed 74 individual arguments based on five main concerns, supporting 3 overarching objections relating to navigational safety.

Those concerns, arguments and objections have been extracted from “Royal Yachting Association: Statement of Case Transport and Works Act Order application: TWA/3234121 Morlais Demonstration Zone” (Statement of Case) and presented in this report with responses from MS.

The three primary objections are;

- Maritime Safety Impact Affecting Recreational Craft (Statement of Case Objection 1);
- Vessel Movement Data Used to Support the NRA (Statement of Case Objection 2); and
- Navigation Risk Assessment/MGN 543 (Statement of Case Objection 3).

Within the RYA Statement of Case, recurring themes relating to navigational safety, result in 74 individual arguments that can be broadly grouped into one of five themes or statements (detailed in **Table 1**) and listed below:

1. Not enough room for safe navigation in the proposed inshore channel;
2. AIS data does not provide an accurate perspective of recreational vessels as most do not have AIS installed;
3. RYA Members’ views from consultation not acted on;
4. HR Wallingford report not fully considered; and
5. MGN 543 not complied with.

Section 5 of the RYA’s statement of case details the main concerns which form the basis of their arguments and objections. These are:

- The failure to finalise design options makes commenting on the order difficult;
- The Navigation Risk Assessment (NRA) and Environmental Statement (ES) do not use all available AIS data and do not consider the number of recreational craft that may not be equipped with AIS or have a low radar silhouette, so both documents do not adequately take account of recreational small craft use of the area;
- The NRA does not include all information required by MGN 543 to determine if construction and operation of the MDZ will enable existing use by recreational craft to continue in safety;
- The ES does not appear to have considered all potential impacts to recreational craft;

MM have undertaken a significant amount of work to address the RYA's objections, including making several changes to the MDZ project area and the purchasing of additional data as per the RYA's suggestion. This is evidenced across the following documentation:

- Navigation Risk Assessment (2019) Marico Document 18UK1479_Morlais_NRA;
- NRA Addendum (2020) NRA Addendum [MMC196];
- HR Wallingford Coastal Processes Modelling Report;
- Morlais RYA concerns and project responses Menter Mon document MOR-MM-DOC-011; and
- Menter Mon-RYA Morlais MDZ project meeting minutes 09 Oct 2020.

Having reviewed this documentation, this report lists and signposts to evidence that answers the RYA's specific arguments and objections. This report also details additional work commissioned by MM where the applicant felt further detail or investigation was required to expand on matters under scrutiny.

It is Marico's belief that MM have fully and properly assessed and mitigated the navigational risks posed by the project in line with the requirements of the Maritime & Coastguard Agency's MGN 543 (M+F) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response.

Table 1 : Recurring Themes

Objection Argument	RYA Statement of case report section	Number of times occurs	Work completed to address
Not enough room for safe navigation in the proposed Inshore channel	6.3.3, 6.3.4, 6.3.5, 6.3.7, 6.3.8, 8.2.5, 8.4.1, 8.4.2, 8.5.6, 8.5.17, 8.5.18	11	<p>The Inshore route has been identified and considered. It has been extended to a minimum of 1km wide and Under Keel Clearance >8m.</p> <p>Evidence located: NRA Addendum [MMC196]</p>
AIS data does not provide an accurate perspective of recreational vessels as most don't have it installed.	6.3.2, 6.4.2, 6.4.3, 6.4.4, 6.4.5, 6.4.6, 6.4.9, 6.5.1, 8.1, 8.2.1, 8.2.2, 8.2.6, 8.3.1, 8.3.2, 8.3.3, 9.8, 15.4, 15.5.	18	<p>RYA feedback during consultation with regards to peak summer traffic levels was taken into consideration within the NRA scoring. Additionally, the RYA Coastal Atlas - which presents peak summer AIS data - was obtained to supplement the RADAR and AIS class A and B data already being analysed for the NRA Addendum.</p> <p>Evidence located: NRA Addendum [MMC196], Includes AIS class A and B and RADAR data for the periods 26 Aug 17- 09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used. Alongside that information from the RYA coastal Atlas, which presents peak summer AIS data, was obtained for the NRA, and RYA feedback during consultation with regards to peak summer traffic levels was taken into consideration within the NRA scoring.</p>
RYA Members views from consultation not acted on.	6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.8, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.4.5, 6.4.6, 6.4.7, 6.4.9, 6.4.10, 6.4.11, 6.4.12, 6.4.13, 6.5.1,	23	<p>The Morlais Demonstration Zone project team have considered each, and every concern raised by the RYA that they are aware of.</p> <p>Evidence located:</p>

	8.2.4, 8.4.1, 8.5.8, 8.5.20, 15.4.		Menter Mon document MOR-MM-DOC-011 Morlais RYA concerns and project responses
Hr Wallingford report not taken account of.	6.4.10, 6.4.11, 8.5.1, 8.5.9, 8.5.17, 13.1.7.	6	<p>The HR Wallingford Coastal Process report was also considered in the NRA Addendum:</p> <p>Evidence located: NRA Addendum [MMC196], Section 9.1 HR Wallingford Coastal Processes Modelling Report</p>
MGN 543 not complied with.	7.3.7, 7.3.9, 7.3.11, 7.3.13, 8.1, 8.3.1, 8.3.2, 8.5.1, 8.5.2, 8.5.4, 8.5.5, 8.5.6, 8.5.7, 8.5.10, 13.3.8, 15.4.	16	<p>The MCA as the Marine authority have confirmed that MGN 543 has been complied with.</p> <p>Evidence located: MGN 543 referenced throughout NRA Addendum [MMC196]</p>

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1 INTRODUCTION

On 29 September 2020, MarineSpace (MS) commissioned Marico Marine to provide additional nautical support for the Morlais Demonstration Zone (MDZ) project.

In response to Menter Mon's MDZ Transport and Works Act Order Application (TWA), MS received a response from the RYA entitled *Royal Yachting Association: Statement of Case Transport and Works Act Order application: TWA/3234121 Morlais Demonstration Zone* (RYA Statement of Case) which details, amongst their other concerns, objections related to the Navigation Risk Assessment (NRA) conducted as part of the TWA process.

MS have requested support interpreting and responding to the objections relating to the NRA due to the specialist marine navigation knowledge required to do so.

This report lists and signposts to evidence collated by MS that answers the RYA's specific arguments and objections.

To support ease of reference, this report is divided into sections following the RYA's order of objections:

- Statement of Case Objection 1: Maritime Safety Impact Affecting Recreational Craft;
- Statement of Case Objection 2: Vessel Movement Data Used to Support the NRA; and
- Statement of Case Objection 3: Navigation Risk Assessment/MGN 543.

Each argument from the RYA Statement of Case relevant to one of these objections has been extracted, evidence located, and tabulated showing RYA Statement of Case section number, objection case text and response text.

This report should be read in conjunction with;

- MGN 543 (M+F) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response;
- Morlais Navigation Risk Assessment (2019) Marico report 18UK1479_Morlais_NRA;
- Morlais NRA Addendum (2020) NRA Addendum [MMC196];
- HR Wallingford Coastal Processes Modelling Report;
- Menter Mon document MOR-MM-DOC-011 Morlais RYA concerns and project responses;
- RYA Coastal Atlas; and
- Menter Mon-RYA Morlais MDZ project meeting minutes 09 Oct 2020

2 RYA STATEMENT OF CASE OBJECTION 1: MARITIME SAFETY IMPACT AFFECTING RECREATIONAL CRAFT

“The Environmental Statement (ES) and NRA fail to consider all possible maritime safety impacts to recreational craft.”

Marico Report Section	RYA Report section	Objection Text	Reply
2.1	6.3.2	Consultees also indicated that the peak period for recreational boating was “the last weekend of July to the bank holiday weekend of August”.	<p>RYA feedback during consultation with regards to peak summer traffic levels was taken into consideration within the NRA scoring. Additionally, the RYA Coastal Atlas - which presents peak summer AIS data - was obtained and analysed to supplement data analysis for the NRA Addendum.</p> <p>Evidence located: Marico report 18UK1479_Morlais_NRA Marico report NRA Addendum [MMC196]</p>
2.2	6.3.3	Proposed channel between the eastern boundary of the MDZ and the coast was too restrictive and narrow for safe navigation (<600m), but was subsequently addressed by a proposal (March 2020) to keep the boundary of the MDZ in position, but extend the area of submerged arrays another 500m west of the eastern boundary; giving approximately 1000 metres from the coast before floating and surface piercing arrays are to be encountered.	<p>The Inshore route has been identified and considered. It has been extended to a minimum of 1km wide and Under Keel Clearance >8m.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.3	6.3.4	in 2018, recreational boating consultees recommended a minimum safe distance from the coast of >1 nautical (1,852m) to the MDZ boundary	<p>The Inshore route has been identified and considered. It has been extended to a minimum of 1km wide and Under Keel Clearance >8m.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone.</p>
2.4	6.3.5	In 2018, recreational boating consultees raised the issue of wash from recreational craft and larger vessels deflecting from the shoreline and creating a hazard to navigation in the confines of the proposed Eastern Inshore Route. Once again, the minutes for 20/11/2018 are included within the NRA, but no reference or assessment is made within the NRA.	<p>This is a potential swamping hazard. Swamping is included within the NRA Addendum where the HR Wallingford report was considered when risk scoring.</p> <p>Evidence located: HR Wallingford Coastal Processes Modelling Report.</p> <p>Marico report NRA Addendum [MMC196]. Table 11-1 Hazard Categories [details the Hazards considered during the Risk assessment process]</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.5	6.3.7	<p>It was the RYA view that sufficient space (1km) should be left between arrays.</p> <p>We note that the NRA contains the minutes where this issue was raised, but no assessment appears to have been undertaken.</p>	<p>The Morlais Demonstration Zone project team considered this as part of the NRA Addendum. Annex B and C of that report consider contact between recreational vessels and structures.</p> <p>The results after risk scoring all fell within the ALARP or lower regions of the risk category definitions, as detailed in Section 12 of the Navigation Risk Assessment Results, of the NRA Addendum, indicating an acceptable level of risk and therefore no negative impact on safety.</p> <p>Furthermore, to provide an alternative route for the recreational mariner, the inshore route has been reconsidered and extended to a minimum of 1km wide and Under Keel Clearance >8m.</p> <p>Evidence located:</p> <p>Marico report NRA Addendum [MMC196].</p> <p>Shown in Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone.</p>

2.6	6.3.8	<p>Inshore (Eastern) passage difficult to navigate and unsafe to use; This concern was related to the narrowness of the channel and the location of overfalls. In addition, following the submission of the ES in 2019 (based on this consultation), a Coastal Process report was produced in 2020 by HR Wallingford. This confirms that the array structures may increase current velocity in the Eastern Inshore Channel and that the MDZ holds recreational craft against a lee shore which is exposed to extreme wave conditions, particularly in bad weather</p>	<p>The inshore route has been reconsidered and extended to a minimum of 1km wide and Under Keel Clearance >8m.</p> <p>Evidence located:</p> <p>Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone.</p> <p>The HR Wallingford Coastal Process report was also considered in the NRA Addendum:</p> <p><i>“The results of the predicted changes to tidal streams induced by the scheme were presented as differences in maximum flow speeds and differences in average flow speeds. The study found that the difference in maximum speeds at spring tides varies between a decrease of 0.7 m/s (1.3 knots) within the MDZ sub-zones and an increase of 0.3 m/s (0.6 knots) between the MDZ and the shore (inshore route). The difference in average speeds is mostly a decrease up to 0.2 m/s (0.4 knots) within the MDZ.</i></p> <p><i>Presuming that the Eastern Inshore Route is between the MDZ and the coast, then the worst-case differences in maximum flow speeds are a reduction of up to 0.3m/s and an increase up to 0.3m/s across the length and width of the Route (Figure 1). The largest area of change south of South Stack is a decrease and north of South Stack is an increase. With respect to average speeds, the changes are much smaller both in magnitude and spatially. Most</i></p>
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Marico Report Section	RYA Report section	Objection Text	Reply
			<p><i>of the Route is affected by changes to currents of +/- 0.1m/s with small areas where the speeds reduce or increase by up to 0.2m/s."</i></p> <p>Evidence located: Marico report NRA Addendum [MMC196], Section 9.1 HR Wallingford Coastal Processes Modelling Report.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.7	6.4.1	<p>In 2018, the RYA had concerns that the recreational boating issues raised in 2015 were not being addressed within the EIA or NRA process, with the RYA representatives concluding that: “concerns raised two years ago [2015] have not been taken seriously. To see if the situation had changed since the applications were made for the TWA Order, the RYA has undertaken consultation with representatives from our affiliated clubs in the area (2020). This consultation was based upon issues raised in 2018 and the RYA Position Statement on tidal energy. Initially a meeting was held with clubs (29/04/2020) to discern if the issues raised in 2018 had been dealt with within the applicant’s NRA and changed MDZ design. The outcome of these discussions and our professional views formed the basis for our initial objection to the TWAO (13/05/2020). Further consultation was based upon a questionnaire and structured interview (July 2020) with 5 clubs representing 2,577 members that use Anglesey waters.</p>	<p>The Morlais Demonstration Zone project team have considered each, and every concern raised by the RYA that they are aware of.</p> <p>Evidence located: Menter Mon document MOR-MM-DOC-011 Morlais RYA concerns and project responses address this.</p> <p>It is also the reason the project team commissioned an addendum to the original NRA. The addendum updates the risk assessment to take account of changes made as a result of concerns raised by the RYA and other stakeholder groups.</p> <p>Evidence located: Marico report NRA Addendum [MMC196]</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.8	6.4.2	Number of Recreational Craft: Clubs were asked to confirm how many recreational craft they have. The total number is approximately 750, although this is likely to be a low estimate as recreational craft from around the Irish Sea will pass Anglesey on cruising passage. Trearddur Bay Sailing Club, the closest to the MDZ and requiring access to the proposed Eastern Inshore Route, has over 200 craft.	<p>The Morlais MDZ project team considered the RYA's concern that AIS data is not itself strong enough to inform the NRA, particularly with regards to the number of recreational vessels within the area, especially as most recreational vessels are not fitted with AIS transmitters. They responded by acquiring additional AIS and RADAR data plus the RYA's own Coastal Atlas Data. The RYA Coastal Atlas presents peak summer recreational AIS data. These were subsequently considered as part of the NRA Addendum.</p> <p>Evidence located:</p> <p>Marico report</p> <p>NRA Addendum [MMC196] [Which includes AIS class A and B and RADAR data for the periods 26 Aug 17-09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used. The RYA Coastal Atlas data was also utilised.]</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.9	6.4.4	Only 10 of the 200 craft at the Trearddur Bay Sailing Club, nearest the MDZ, are equipped with AIS.	<p>The Morlais MDZ project team considered the RYA's concern that AIS data is not itself strong enough to inform the NRA, particularly with regards to the number of recreational vessels within the area, especially as most recreational vessels are not fitted with AIS transmitters. They responded by acquiring additional AIS and RADAR data plus the RYA's own Coastal Atlas Data. The RYA Coastal Atlas presents peak summer recreational AIS data. These were subsequently considered as part of the NRA Addendum.</p> <p>Evidence located:</p> <p>Marico report</p> <p>NRA Addendum [MMC196] [Which includes AIS class A and B and RADAR data for the periods 26 Aug 17-09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used. The RYA Coastal Atlas data was also utilised.]</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.10	6.4.5	Number of Recreational Craft Equipped with radar reflectors: Clubs were asked to confirm how many of these craft were equipped with radar reflectors. Clubs indicated that approximately 60 had radar reflectors (7.98% of the total). None of the Trearddur Sailing Club craft, nearest the MDZ, are equipped with reflectors.	<p>The Morlais MDZ project team considered the RYA's concern that AIS data is not itself strong enough to inform the NRA, particularly with regards to the number of recreational vessels within the area, especially as most recreational vessels are not fitted with AIS transmitters. They responded by acquiring additional AIS and RADAR data plus the RYA's own Coastal Atlas Data. The RYA Coastal Atlas presents peak summer recreational AIS data. These were subsequently considered as part of the NRA Addendum.</p> <p>Evidence located:</p> <p>Marico report</p> <p>NRA Addendum [MMC196] [Which includes AIS class A and B and RADAR data for the periods 26 Aug 17-09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used. The RYA Coastal Atlas data was also utilised.]</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.11	6.4.6	<p>Activities within Boating Area: Clubs were asked to indicate how they use the waters of the Boating Area (which the MDZ is within) identified by the RYA Coastal Atlas and the NRW online database. All 5 clubs indicated that they used the area for general recreation. Four clubs indicated they used the area for racing. Five clubs indicated they used the area for long distance cruising. One club indicated they used the area for training. One club also indicated they used the area for other activities (kayaking).</p>	<p>When considering risk from activities perspective the project team used AIS class A and B and RADAR data for the periods 26 Aug 17- 09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used.</p> <p>Alongside that information from the RYA Coastal Atlas, which presents peak summer AIS data, was obtained for the NRA, and RYA feedback during consultation.</p> <p>After risk scoring all hazards fell within the ALARP or lower regions of the risk category definitions, detailed in Section 12 Navigation Risk Assessment Results, indicating an acceptable level of risk.</p> <p>Evidence located: NRA Addendum [MMC196]</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.12	6.4.10	<p>Hazards before Construction: Clubs were asked to rank hazards within the area prior to construction of the MDZ. Foundering or capsize in overfalls is seen as the most important hazard. Followed by grounding against seabed or cliffs and collision with other craft. Collision with structures is of less concern as a hazard, with obstructing access to harbours and safe havens of least importance.</p>	<p>The pre-construction phase hazards* mentioned in the RYA Statement of Case section 6.4.10, are considered during the risk scoring process. The risk scoring process considers how much the level of risk has changed as a result of changes to the area being assessed compared to the area being assessed as is or without change.</p> <p>The comparison was measured against the construction phase which is referred to Annex B of the NRA Addendum. After risk scoring, all hazards fell within ALARP or lower regions of the risk category definitions indicating an acceptable level of risk.</p> <p>*Note: “obstructing access to harbour and safe havens” is an event potentially leading to one of the scored hazards. Therefore, was taken account of during the risk scoring process.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Section 12 Navigation Risk Assessment Results.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.13	6.4.11	Hazards Following Construction: Clubs were asked to rank hazards following construction of the MDZ. Collision with Structures was ranked as the most important hazard following construction, followed by obstructing access to harbour and safe havens. Collision with other craft was ranked next in importance, followed by foundering or capsize in overfalls and then grounding against seabed or cliff. It should be noted that the questions were completed before the RYA review of the HR Wallingford Coastal Process report.	<p>Evidence located:</p> <p>Marico report NRA Addendum [MMC196]. Table 11-1 Hazard Categories details the Hazards considered during the Risk assessment process;</p> <ul style="list-style-type: none"> • Contact; • Collision; • Grounding / Forced Ashore; • Swamping / Capsize; and • Snagging / Obstruction All Vessel Types. <p>Note: obstructing access to harbour is not a hazard, it is an event that potentially increases the risk of one or more of the above-mentioned hazards causing an incident.</p> <p>The results fell within the ALARP or lower regions, detailed in Annexes B and C of the NRA addendum, indicating an acceptable level of risk.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.14	6.4.12	<p>Risks Following Construction:</p> <p>Clubs were asked to indicate if risks in the area would decrease, stay the same or increase.</p> <p>No club indicated that risks would decrease. Four clubs indicated that collision risks with other craft and collision risks with structures would increase.</p> <p>One club indicated these would stay the same in both cases. Three clubs indicated that grounding risk against sea cliffs or seabed and risk of obstruction to harbour and safe havens would increase;</p> <p>with 2 indicating it would stay the same in both cases.</p> <p>Four clubs indicated that foundering or capsize risk in overfalls would stay the same, with one club indicating risk would increase.</p>	<p>Can RYA provide the risk scoring data these statements are based on?</p> <p>The Morlais Demonstration Zone project team considered this as part of the NRA Addendum.</p> <p>The NRA results, including those risks mentioned in the RYA Statement of Case section 6.4.12, are displayed in the report in Annex C for the operational phase of the project. After risk scoring all fell within the ALARP or lower regions of the risk category definitions, detailed in the same section of the NRA addendum, indicating an acceptable level of risk.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Section 12 Navigation Risk Assessment Results.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.15	6.4.13	<p>Impact:</p> <p>Clubs were asked to indicate if the MDZ would have a positive, negative or no impact on them. No clubs indicated a positive impact. Four, of four clubs responding, indicated that the MDZ would have a negative impact on safety.</p> <p>Four, of four clubs responding, indicated a negative impact on cruising activity. Four, of five responding, indicated the MDZ would have a negative impact on general recreation and racing. Three clubs, of four responding, indicated no impact on training; with one club (Holyhead Sailing Club) indicating a negative impact.</p> <p>Four clubs indicated that the MDZ would have no impact on membership. However, the closest club to the MDZ (Trearddur Sailing Club), did indicate a negative impact on membership.</p>	<p>The Morlais Demonstration Zone project team considered this as part of the NRA Addendum.</p> <p>The results after risk scoring all fell within the ALARP or lower regions of the risk category definitions, as detailed in Section 12 Navigation Risk Assessment Results, indicating an acceptable level of risk and therefore no negative impact on safety.</p> <p>Note: This report can only answer the part of objection relating navigational safety.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Section 12 Navigation Risk Assessment Results.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.16	6.5.1	<p>The 2018 consultation indicated that the applicant had insufficient information to understand the recreational boating use of the area due to an assessment with reliance on AIS and radar data. This flaw with respect to recreational use was raised with the applicant in 2018. The RYA consultation in 2020 indicates basic, and easily obtainable, information concerning the number of recreational craft and how many of these are equipped with AIS and radar reflectors is missing from the NRA and ES. Given the low percentage of craft equipped to make them “visible” to AIS and radar surveys conducted for the NRA, it is unlikely that the ES had sufficient data to draw conclusions with respect to the impact of the MDZ on recreational boating activity; this is reflected by the response from the majority of clubs in 2020 that confirmed that the NRA did not reflect the activities within the boating area or that activities such as general recreation, racing and cruising were not considered- a situation that has not changed since consultation on behalf of the applicant in 2018.</p>	<p>The Morlais MDZ project team considered the RYA’s concern that AIS data is not itself strong enough to inform the NRA, particularly with regards to the number of recreational vessels within the area, especially as most recreational vessels are not fitted with AIS transmitters. They responded by acquiring additional AIS and RADAR data plus the RYA’s own Coastal Atlas Data. The RYA Coastal Atlas presents peak summer recreational AIS data. These were subsequently considered as part of the NRA Addendum.</p> <p>Evidence located:</p> <p>Marico report</p> <p>NRA Addendum [MMC196] [Which includes AIS class A and B and RADAR data for the periods 26 Aug 17-09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used. The RYA Coastal Atlas data was also utilised.]</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.17	6.5.2	<p>We note that the NRA and ES do consider collisions with structures as an important hazard following construction. However, recreational boating consultees did raise a number of other issues related to the MDZ which do not appear to have been dealt with by the EIA process between the initial consultations in 2018, the production of the NRA and ES in 2019 and supplementary/further information in 2020. Given the safety related impacts to human health and the failure to describe and assess these with respect to recreational boating related issues (previously identified in the applicant's 2018 consultation) the RYA considers that the EIA process and resulting ES have failed to meet the requirements of:</p> <p>Regulation 4(2) and (3) and Regulation 17(3) and (4)(d) of The Town and Country</p> <p>Planning (Environmental Impact Assessment) (Wales) Regulations 2017.</p> <p>Rule 11 (1) (b) and (c), and (2), together with Schedule 1 (3), (4) and (5) of the Statutory</p> <p>Instrument No.1466 - Transport and Works (Applications and Objections Procedure)</p> <p>(England and Wales) Rules 2006.</p>	<p>The Morlais MDZ project team considered this as part of the NRA Addendum. Top Hazards scoring ALARP – Construction Phase and Top Ten Hazards – Operational Phase rank Collision as number 3 and 6 respectively.</p> <p>Note: this report can only comment on issues relating to navigational safety.</p> <p>Evidence located:</p> <p>Marico report</p> <p>NRA Addendum [MMC196], Table 12-2 Top Hazards scoring ALARP – Construction Phase and Table 12-3 Top Ten Hazards – Operational Phase.</p>

2.18	6.5.3	<p>The failure to address expected hazards, risks and impacts is demonstrated by the responses from clubs to the 2020 RYA consultation, which identifies a number of issues linked to the design of the MDZ and Eastern Inshore Channel that were first raised in 2015, then in 2018, and are still of concern to clubs following completion of the ES and provision of additional information (including the redesign of the MDZ Eastern Boundary in 2020).</p>	<p>The Morlais Demonstration Zone project team have considered each, and every concern raised by the RYA that they are aware of.</p> <p>Evidence located: Menter Mon document MOR-MM-DOC-011 Morlais RYA concerns and project responses.</p> <p>It is also the reason the project team commissioned an addendum to the original NRA. The NRA Addendum updates the risk assessment to take account of changes made as a result of concerns raised by the RYA and other stakeholder groups.</p> <p>Minutes to the RYA consultation meeting of 03 September 2020 and Trearddur Bay Sailing Club consultation meeting of 06 August 2020 are included.</p> <p>The NRA Addendum demonstrated that all Hazards fell within the ALARP or lower regions of the risk category definitions, (Section 12 of the NRA Addendum), indicating an acceptable level of risk.</p> <p>Evidence located: Marico report NRA Addendum [MMC196]Annex D NRA Addendum Stakeholder Consultation Minutes (2020).</p>
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Marico Report Section	RYA Report section	Objection Text	Reply
2.19	8.4.1	<p>A “primary concern” from the RYA and local recreational users is the “restriction of the inshore passage which is essential to recreational vessels”</p> <p>We note that the NRA takes account of this concern with respect to the narrow channel causing a risk of grounding, and clearly states that: “one hazard; ‘Grounding Recreational Vessel’, was scored as significant for both construction and operation phases and is, therefore, deemed unacceptable in the absence of additional mitigation. The score was driven by the restriction of sea room within the inshore passage increasing the risk of a recreational vessel contacting the cliffs which could result in loss of life”. As a result, the Navigation Risk Assessment recommends re-design of the eastern boundary of the MDZ/ OfDA – “To maintain safe navigation within the inshore passage during all sea states, weather and at night.”</p>	<p>The Inshore route has been identified and considered. It has been extended to a minimum of 1km wide and Under Keel Clearance >8m.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone.</p> <p>The NRA Addendum updated the risk findings of the original NRA. The results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Section 12 Navigation Risk Assessment Results.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.20	8.4.2	<p>Based upon the information provided by the NRA, the RYA agrees that grounding due to reduction in sea room as a result of a narrowing of the inshore passage (Eastern Inshore Route) is a significant hazard that could lead to loss of life. We agree that the eastern boundary should be redesigned to increase sea room to mitigate against a significant negative impact that may lead to loss of life. The RYA was informed by the applicant that a redesign had been undertaken by increasing “the width and area of the zone which is marked for the deployment of devices with an Under Keel Clearance (UKC) of greater than 8m. We believe this change to the original site layout will further mitigate the risks to recreational users, maintain the inshore route to reduce the relocation of traffic to the west and generally provide greater sea room for navigators along the inshore route”.</p> <p>The RYA has now consulted further with our membership and can confirm that the revised site layout, in combination with the NRA and Interactive Boundaries Assessment, does not provide sufficient information to indicate that the Eastern Inshore Route will be safe to navigate.</p>	<p>The Inshore route has been identified and considered. It has been extended to a minimum of 1km wide and Under Keel Clearance >8m.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone.</p> <p>The NRA Addendum updated the risk findings of the original NRA. The results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Section 12 Navigation Risk Assessment Results.</p>

2.21	8.5.1	<p>The RYA notes that neither the NRA nor the ES considers the implications of the HR Wallingford. Morlais Demonstration Zone: Coastal Processes report (DER6261-RT001-R02-00 & MOR/HRW/DOC/0001). On providing the new MDZ design information to our membership, the RYA noted that the NRA has also failed to address requirements of MGN 543 and issues raised in previous consultation (see Section 6.2). It should be noted that the Overfalls issue was not first identified in the RYA Objection (2020), it was first raised in consultation in 2018 (see Section 6.3.4) and should have been addressed in the NRA and ES.</p>	<p>The original NRA; Marico report 18UK1479_Morlais_NRA. was completed prior to the HR Wallingford report being commissioned. Therefore, was not considered.</p> <p>The MDZ project team realising additional evidence was required then commissioned The HR Wallingford Coastal Process report</p> <p>Which was then considered in the NRA addendum; NRA Addendum [MMC196], Section 9.1 HR Wallingford Coastal Processes Modelling Report.</p> <p>Tidal Stream and Overfalls were considered in the original NRA which included a section on Metocean conditions and in particular wind, wave and swell and sea tidal conditions which were factored into the risk assessment in 2019</p> <p>Since completion of the 2019 NRA, a Coastal Processes Modelling Report (CPMR) was completed by HR Wallingford in March 2020. The assessment follows industry best practice and utilised a validated flow model to assess tidal current flow speed variations resulting from the presence of the proposed worst-case scenario turbine deployment.</p>
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Marico Report Section	RYA Report section	Objection Text	Reply
2.22	8.5.3	The RYA notes that the NRA recognises that there is a significant variation in the set (direction) of the tidal stream along the Anglesey coast, in the area of the proposed Eastern Inshore Route (Morlais NRA, Section 3.1.3) We note that the NRA also provides information on the rate of the tidal stream, highlighting the high tidal flows (up to 4.5 knots) (Morlais NRA, Table 3-2, p.16). However, no information is provided on the implications of the set and rate of the tidal stream to the handling of vessels, particularly recreational craft approaching or confined to the proposed Eastern Inshore Route.	<p>The Morlais Demonstration Zone project team considered this in the NRA Addendum:</p> <p><i>“The impacts of the MDZ on the tidal streams in the area are assessed within the HR Wallingford CPMR and the predicted changes are assessed to be of low significance in terms of impact to navigation risk across all vessel types. The effect of the tidal set and rate on the handling of vessels in the area of the MDZ are considered to be of similar impact as the current baseline. The effect of the tidal streams should be considered as part of normal passage planning.”</i></p> <p>Evidence located: Marico report NRA Addendum [MMC196]. Table 9.1.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.23	8.5.4	Annex 2 of MGN 543 also requires consideration of if “the maximum rate tidal stream runs parallel to the major axis of the proposed OREI site layout, and if so, its effect on vessel handling and manoeuvring”.	<p>The Morlais Demonstration Zone project team considered this in the NRA Addendum:</p> <p><i>“The impacts of the MDZ on the tidal streams in the area are assessed within the HR Wallingford CPMR and the predicted changes are assessed to be of low significance in terms of impact to navigation risk across all vessel types. The effect of the tidal set and rate on the handling of vessels in the area of the MDZ are considered to be of similar impact as the current baseline. The effect of the tidal streams should be considered as part of normal passage planning.”</i></p> <p>Evidence located: Marico report NRA Addendum [MMC196]. Table 9.1.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.24	8.5.5	<p>Given the variation in the direction (set) of tidal streams across the proposed site, the RYA would expect to see information on impacts to vessel handling and manoeuvrability, linked to a risk assessment which takes account of the implications of this variability. This is not contained within the Morlais NRA. The RYA is also concerned that no information with respect to the implications on recreational craft handling and manoeuvring for the north of the proposed site (i.e. the area for floating and surface piercing arrays) is contained in the Morlais NRA. It is important to note that the NRA (Morlais NRA, Section 3.1.3) had already recognised changes in current direction before the HR Wallingford Coastal Processes Report was published, therefore the NRA should have dealt with the small craft/ vessel handling issue and advised the EIA process accordingly. Failure to include this in the NRA is not as a result of new information, but a failure to structure the NRA in accordance with MGN 543.</p>	<p>The Morlais Demonstration Zone project team considered this in the NRA Addendum:</p> <p><i>“The impacts of the MDZ on the tidal streams in the area are assessed within the HR Wallingford CPMR and the predicted changes are assessed to be of low significance in terms of impact to navigation risk across all vessel types. The effect of the tidal set and rate on the handling of vessels in the area of the MDZ are considered to be of similar impact as the current baseline. The effect of the tidal streams should be considered as part of normal passage planning.”</i></p> <p>Evidence located: Marico report NRA Addendum [MMC196]. Table 9.1.</p> <p>The NRA Addendum updated the risk findings of the original NRA. The results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Section 12 Navigation Risk Assessment Results.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.25	8.5.6	Annex 2 of MGN 543 further states that the NRA should show what “the set is across the major axis of the OREI layout at any time, and, if so, at what rate”. Again, given the variability of tidal streams we would expect the Morlais NRA to clearly indicate the set across the major axis of the OREI, or an indication as to if the variability is such that no set across the major axis can be determined. The NRA does not provide this information. If a set cannot be determined, the variation in tidal direction and rate may make recreational craft handling and manoeuvrability difficult to the point that the size of the proposed area is not suitable for the near shore	<p>The Morlais Demonstration Zone project team considered this in the NRA Addendum:</p> <p><i>“The maximum rate tidal stream runs parallel to the major axis of the proposed MDZ and eastern inshore channel.”</i></p> <p><i>“The impacts of the MDZ on the tidal streams in the area are assessed within the HR Wallingford CPMR and the predicted changes are assessed to be of low significance in terms of impact to navigation risk across all vessel types. The effect of the tidal set and rate on the handling of vessels in the area of the MDZ are considered to be of similar impact as the current baseline. The effect of the tidal streams should be considered as part of normal passage planning.”</i></p> <p>Evidence located: Marico report NRA Addendum [MMC196]. Table 9.1.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.26	8.5.7	MGN 543 also requires the NRA to describe: "In general, whether engine and/or steering failure, or other circumstance could cause vessels to be set into danger by the tidal stream ... , taking into account the prevailing winds for the area, whether engine failure or other circumstances could cause vessels to drift into danger, particularly if in conjunction with a tidal set." (Annex 2, MGN 543)	<p>The Morlais Demonstration Zone project team considered this in the NRA Addendum.</p> <p>The maximum rate tidal stream generally runs parallel to the major axis of the proposed MDZ and eastern inshore channel. In the event of an equipment or mechanical failure, vessels in the eastern passage are unlikely to be set onto the devices within the MDZ, however, vessels navigating within the MDZ could be set onto devices in the vicinity and this has been assessed in the NRA Addendum.</p> <p>Evidence located: Marico report NRA Addendum [MMC196]. Table 9.1. <i>"Equipment / Mechanical Failure and Loss of Control are considered as causal factors within the risk assessment"</i>. Annex B and Annex C.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.27	8.5.8	<p>The RYA notes that the Morlais NRA Hazard Log (Morlais NRA, Annex B and C) focuses primarily on contact, collision, grounding and snagging hazards to surface craft. The ES also only considers these potential impacts (Section 15.6.3.6, paragraph 145). We also note that the background and assessment sections of the Morlais NRA (particularly Section 3.1.3) makes no mention of “overfalls”. An overfall is a turbulent area of water caused by the morphology of the seabed and/or coast, wind direction/ speed and tidal current direction/ speed. Overfalls are a foundering hazard due to wave height and current velocity causing a recreational craft to be swamped or to capsize. These types of hazard are not contained in the Morlais NRA Hazard Logs. The omission is demonstrated in Sections 3.1.2 and 3.1.3 of the NRA where there is no mention of overfalls and the associated increase of wave height.</p>	<p>The effect of deployment of devices on tidal streams, eddies, overfalls and waves has been specifically included as a causal effect in the NRA Addendum.</p> <p>Evidence located:</p> <p>Marico report NRA Addendum [MMC196]. Table 11-1 Hazard Categories details the Hazards considered during the Risk assessment process;</p> <ul style="list-style-type: none"> • Contact; • Collision; • Grounding / Forced Ashore; • Swamping / Capsize; and • Snagging / Obstruction All Vessel Types.

2.28	8.5.9	<p>Within the area there are extensive overfalls which extend seaward off both North and South Stack, Penrhyn Mawr, the Fangs, Maer Piscar and Rhoscolyn Head. The proposed Eastern Inshore Route wholly or partially passes through all of these overfalls. The issue of overfalls and the need for craft to have sufficient navigable area for avoidance (2 mile offing sea room from the coast and/or four cable lengths from the overfall) was brought to the attention of the applicant at meetings on 20th November 2018 and again on 10th December 2018 (see Section 6.2). Overfalls are also clearly marked on charts for the area. The RYA considers overfalls to be another circumstance that should be assessed by the NRA. Other than retaining the minutes of these meetings, the Morlais NRA and ES make no mention of the hazard, risk or mitigation to address the dangers of overfalls to recreational craft. The proposed Eastern Inshore Route and areas of floating/ surface piercing arrays exacerbate the problem due to the concentrating of craft into narrow areas (navigational squeeze) where hazards from overfalls are present (e.g. off headlands and promontories). The issue of navigational restriction and overfalls (see Section 6.3.4) were brought to the applicant's attention in 2018, i.e. before the publication of the HR Wallingford Coastal Process Report (2020). The failure to include this issue within the NRA and EIA process indicates a failure to address an issue raised by consultees in 2018, not as the result of new information from the HR Wallingford Report.</p>	<p>Tidal Stream and Overfalls were considered in the original NRA which included a section on Metocean conditions and in particular wind, wave and swell and sea tidal conditions which were factored into the risk assessment. The effect of deployment of devices on tidal streams, eddies, overfalls and waves has been included as a causal effect in the NRA Addendum:</p> <p><i>"The impacts of the MDZ to the tidal stream are assessed within the HR Wallingford CPMR and are assessed to be minimal and of low significance in terms of impact to navigation risk across all vessel types. The effect of the tidal set and rate on the handling of vessels in the area of the MDZ are considered to be of equivalent impact as the current baseline. The effect of the tidal stream should be considered as part of normal passage planning."</i></p> <p>Evidence located:</p> <p>Marico Report 18UK 1479_MorlaisNRA Marico report NRA Addendum [MMC196] HR Wallingford Coastal Processes Modelling Report Marico report NRA Addendum [MMC196] Annex E original stakeholder consultation meeting minutes: <i>"Consultation Minutes – Trearddur Bay Sailing Club mention the effects of the overfalls".</i> <i>"We still feel that the navigable corridor between the proposed area and South Stack is far too narrow and presents a very dangerous 'lee-shore' risk, with the</i></p>
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Marico Report Section	RYA Report section	Objection Text	Reply
			<p><i>prevailing south westerlies to the treacherous shoreline of South Stack, Abrahams Bosom and it should be remembered that there is a complex series of back-eddies (the 'seven tides') that make sailing by Abrahams Bosom very tricky. We really fear a risk to life if this whole stretch becomes only a narrow navigable corridor."</i></p> <p>This was fully considered during risk scoring process for the NRA Addendum.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Section 11 Navigation Risk Assessment.</p>

2.29	8.5.10	<p>It is the RYA's view that the NRA has failed to consider the implications of the local circumstance of overfalls and associated foundering and capsizes hazards posed to recreational craft using the Eastern Inshore Route. Given this issue is related to the MDZ layout, and not device specific design, this issue and the potential hazards to navigation should have been addressed within the current NRA. By failing to identify or address this issue, the applicant's NRA does not meet the requirement of MGN 543 to identify "Potential navigational....impacts or difficulties caused to mariners..... using the site area and its environs".....nor has the NRA highlighted, "issues that could contribute to a marine casualty leading to injury, death or loss of property" (Paragraph 3.3, MGN 543).</p>	<p>Concerns around overfalls and associated hazards were considered in the NRA Addendum, having additionally been picked up at consultation with Trearddur Bay Sailing Club:</p> <p><i>"We still feel that the navigable corridor between the proposed area and South Stack is far too narrow and presents a very dangerous 'lee-shore' risk, with the prevailing south westerlies to the treacherous shoreline of South Stack, Abrahams Bosom and it should be remembered that there is a complex series of back-eddies (the 'seven tides') that make sailing by Abrahams Bosom very tricky. We really fear a risk to life if this whole stretch becomes only a narrow navigable corridor."</i></p> <p>These concerns were taken into account during the risk scoring process. Hazards considered during the Risk assessment process;</p> <ul style="list-style-type: none"> • Contact; • Collision; • Grounding / Forced Ashore; • Swamping / Capsize; and • Snagging / Obstruction All Vessel Types. <p>Evidence located: Marico report NRA Addendum [MMC196], Section 9.1 HR Wallingford Coastal Processes Modelling Report.</p>
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Marico Report Section	RYA Report section	Objection Text	Reply
			<p>Marico report NRA Addendum [MMC196], Annex E original stakeholder consultation meeting minutes.</p> <p>Marico report NRA Addendum [MMC196], Section 11 Navigation Risk Assessment.</p> <p>Marico report NRA Addendum [MMC196]. Table 11-1 Hazard Categories.</p>

2.30	8.5.16	<p>None of the mitigation measures listed within the ES (Section 15.6.3.6.1) addresses the issue of overfalls raised by consultees in 2018 (see Section 6.3.4) and acknowledged both within the NRA and ES consultation by inclusion of minutes for these meetings. The NRA/ ES cannot therefore justify the residual impact to recreational craft as low risk or ALARP. The RYA expected the applicant to provide supplemental information to address our concerns. The failure to provide an addendum to the NRA and a revision of the Shipping and Navigation chapter of the ES, as part of this further information (see Annex 1) and in line with the statements contained within the CIA Signposting Document (ORML1938 9_MOR-RHDHV-DOC- 0134), indicates that the incomplete further information does not fulfil the requirements of Section 14 of the Marine Works (Environmental Impact Assessment) Regulations (2007) and Rule 11 of the Statutory Instrument No.1466 - Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006. Without this necessary further information, the applicant has failed to meet the requirements of Section 17(1) of the Regulations. Until such time as the Eastern Boundary is redesigned or the MDZ relocated to provide the necessary offing and sea room (1 to 2 nautical miles depending on overfalls), the</p> <p>RYA considers the residual impact to be High Risk and will maintain an objection to the Order application.</p>	<p>The applicant has undertaken supplemental work. Both an NRA Addendum and updated Shipping and Navigation ES chapter have been produced and consulted on.</p> <p>Concerns around the overfalls are specifically addressed in the NRA Addendum:</p> <p><i>“The results of the predicted changes to tidal streams induced by the scheme were presented as differences in maximum flow speeds and differences in average flow speeds. The study found that the difference in maximum speeds at spring tides varies between a decrease of 0.7 m/s (1.3 knots) within the MDZ sub-zones and an increase of 0.3 m/s (0.6 knots) between the MDZ and the shore (inshore route). The difference in average speeds is mostly a decrease up to 0.2 m/s (0.4 knots) within the MDZ.</i></p> <p><i>Presuming that the Eastern Inshore Route is between the MDZ and the coast, then the worst-case differences in maximum flow speeds are a reduction of up to 0.3m/s and an increase up to 0.3m/s across the length and width of the Route (Figure 1). The largest area of change south of South Stack is a decrease and north of South Stack is an increase. With respect to average speeds, the changes are much smaller both in magnitude and spatially. Most of the Route is affected by changes to currents of +/- 0.1m/s with small areas where the speeds reduce or increase by up to 0.2m/s.”</i></p>
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			<p>The risk assessment conducted as part of the NRA Addendum, fully considered hazards, vessel types and hazard logs in relation to the construction and operational phases of the project.</p> <p>The results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>Evidence located:</p> <p>Marico report NRA Addendum [MMC196], Section 9.1 HR Wallingford Coastal Processes Modelling Report.</p> <p>Marico report NRA Addendum [MMC196]. Table 11-1 Hazard Categories details the Hazards considered during the Risk assessment process;</p> <ul style="list-style-type: none">• Contact;• Collision;• Grounding / Forced Ashore;• Swamping / Capsize; and• Snagging / Obstruction All Vessel Types. <p>Marico report NRA Addendum [MMC196]. Table 11-2 Vessel Categories details the vessel types considered during the Risk assessment process;</p> <ul style="list-style-type: none">• Commercial Vessel
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Marico Report Section	RYA Report section	Objection Text	Reply
			<ul style="list-style-type: none">• Passenger Vessel• Project Vessels (Construction phase only)• Fishing Vessel• Powered Recreational Vessel• Un-Powered Recreational Vessel• Other Vessel <p>Marico report NRA Addendum [MMC196], Annex B Hazard log Construction Phase and Annex C Hazard Log Operational Phase cover the risk scoring process for this.</p>

2.31	8.5.17	<p>The RYA notes that, following construction, the array structures are likely to have little direct blocking effect on waves. This situation coincides with the declaration of the MDZ as an “Area to Be Avoided” and the implementation of a 500 to 1000 metres wide Eastern Inshore Route for navigation. It should be noted that during consultation with the RYA and recreational boating community, a channel width of 1 to 2 Nautical Miles (1,852 to 3,704 metres) was recommended (meetings of 20/11/2018 and 10/12/2018) (see Section 6.3.4). Figure 5.2 of the HR Wallingford Coastal Process report (below) demonstrates that waves from the SW of the Anglesey coast have the significant height for the area.</p>	<p>The inshore route has been reconsidered and extended to a minimum of 1km wide and Under Keel Clearance >8m.</p> <p>The HR Wallingford Coastal Process report was also considered in the NRA Addendum:</p> <p><i>“The results of the predicted changes to tidal streams induced by the scheme were presented as differences in maximum flow speeds and differences in average flow speeds. The study found that the difference in maximum speeds at spring tides varies between a decrease of 0.7 m/s (1.3 knots) within the MDZ sub-zones and an increase of 0.3 m/s (0.6 knots) between the MDZ and the shore (inshore route). The difference in average speeds is mostly a decrease up to 0.2 m/s (0.4 knots) within the MDZ.</i></p> <p><i>Presuming that the Eastern Inshore Route is between the MDZ and the coast, then the worst-case differences in maximum flow speeds are a reduction of up to 0.3m/s and an increase up to 0.3m/s across the length and width of the Route (Figure 1). The largest area of change south of South Stack is a decrease and north of South Stack is an increase. With respect to average speeds, the changes are much smaller both in magnitude and spatially. Most of the Route is affected by changes to currents of +/- 0.1m/s with small areas where the speeds reduce or increase by up to 0.2m/s.”</i></p>
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Marico Report Section	RYA Report section	Objection Text	Reply
			<p>The NRA Addendum updated the risk assessment for the MDZ. The results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone.</p> <p>Marico report NRA Addendum [MMC196], Section 9.1 HR Wallingford Coastal Processes Modelling Report.</p> <p>Marico report NRA Addendum [MMC196], Section 12 Navigation Risk Assessment Results.</p>

2.32	8.5.18	<p>The orientation of Anglesey to this significant wave direction and SW prevailing winds results in the coastline of the proposed Eastern Inshore Route being a lee shore, i.e. wind and waves will push a vessel towards the coastline. The combined factors of a narrow navigation channel adjacent to the MDZ Area to Be Avoided in south-westerly wind and wave conditions will make the Eastern Inshore Route extremely dangerous for maritime traffic, particularly recreational boats, during bad weather and/or if a craft is disabled and adrift (as demonstrated in Tables 5.2 and 5.3 of the Coastal Processes report). The situation is exacerbated by the narrowness of the channel which reduces sea-room and time for crews and SAR responders to react before a craft grounds on the rocky shore of Anglesey. The severity of the potential impact on maritime safety is illustrated by Figure 5.13 of the Coastal Process report, which states that large waves from the SW “carry large amounts of energy which can result in coastal erosion, structural damage and even coastal flooding. The extreme waves are most dominant from 210 °N as the wave is not fetch limited. The RYA notes that the current NRA omits the implications to maritime craft, as the coastal process report was published after the NRA and ES and is therefore not considered within the documents supporting this application. It is inexcusable that an inshore civil engineering project has undertaken an EIA without being informed by a coastal processes report (see Section 7.3.14).</p>	<p>This is full considered within the NRA Addendum:</p> <p><i>“The results of the predicted changes to tidal streams induced by the scheme were presented as differences in maximum flow speeds and differences in average flow speeds. The study found that the difference in maximum speeds at spring tides varies between a decrease of 0.7 m/s (1.3 knots) within the MDZ sub-zones and an increase of 0.3 m/s (0.6 knots) between the MDZ and the shore (inshore route). The difference in average speeds is mostly a decrease up to 0.2 m/s (0.4 knots) within the MDZ.</i></p> <p><i>Presuming that the Eastern Inshore Route is between the MDZ and the coast, then the worst-case differences in maximum flow speeds are a reduction of up to 0.3m/s and an increase up to 0.3m/s across the length and width of the Route (Figure 1). The largest area of change south of South Stack is a decrease and north of South Stack is an increase. With respect to average speeds, the changes are much smaller both in magnitude and spatially. Most of the Route is affected by changes to currents of +/- 0.1m/s with small areas where the speeds reduce or increase by up to 0.2m/s.”</i></p> <p>Inshore route has also been extended to a minimum of 1km wide and UKC>8m.</p> <p>The NRA Addendum updated the risk assessment for the MDZ. The results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p>
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Marico Report Section	RYA Report section	Objection Text	Reply
			<p>Evidence located: Marico report NRA Addendum [MMC196], Section 9.1 HR Wallingford Coastal Processes Modelling Report.</p> <p>Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone. Marico report NRA Addendum [MMC196], Section 12 Navigation Risk Assessment Results.</p>
2.33	8.5.19	The danger will also exist for the Western Offshore Route, as the proposed arrays along the western side of the MDZ effectively become a floating “lee shore”. Craft will be able to “stand off” to the west of the array in bad weather, however this will not be possible within the Eastern Inshore Route with arrays on one side and the shoreline on the other. Another issue that does not appear to be considered is if an array severs its moorings and becomes a hazard to navigation by drifting into the proposed Eastern Inshore Route.	<p>Contact with floating arrays is considered in both the original NRA (2019) and the NRA Addendum (2020).</p> <p>The risk scoring process in both reports demonstrated the results fell within ALARP or lower regions of the risk category definitions indicating an acceptable level of risk.</p> <p>Evidence located: Marico Report 18UK1479_MorlaisNRA Marico report NRA Addendum [MMC196].</p>

2.34	8.5.20	<p>In addition, at the meeting on 10th December 2018, the RYA raised the issue of hazards to small craft due to wash deflecting from the coastline. This issue has also not been included either in the further information, current NRA assessment or the ES. We note that the proposed tidal array structures themselves could cause changes in the set and rate of the tidal stream and /or could create problems in the area for vessels under sail, such as wind masking, turbulence or shear. Although required by Annex 2 of MGN 543, none of these issues are identified within the Morlais NRA, although the HR Wallingford Morlais Coastal Process Report does indicate an increase in tidal velocity and variation in wave height due to the project.</p>	<p>The HR Wallingford report notes:</p> <p><i>“The results of the predicted changes to tidal streams induced by the scheme were presented as differences in maximum flow speeds and differences in average flow speeds. The study found that the difference in maximum speeds at spring tides varies between a decrease of 0.7 m/s (1.3 knots) within the MDZ sub-zones and an increase of 0.3 m/s (0.6 knots) between the MDZ and the shore (inshore route). The difference in average speeds is mostly a decrease up to 0.2 m/s (0.4 knots) within the MDZ.</i></p> <p><i>Presuming that the Eastern Inshore Route is between the MDZ and the coast, then the worst-case differences in maximum flow speeds are a reduction of up to 0.3m/s and an increase up to 0.3m/s across the length and width of the Route (Figure 1). The largest area of change south of South Stack is a decrease and north of South Stack is an increase. With respect to average speeds, the changes are much smaller both in magnitude and spatially. Most of the Route is affected by changes to currents of +/- 0.1m/s with small areas where the speeds reduce or increase by up to 0.2m/s.”</i></p> <p>In addition, the Inshore route has been extended to a minimum of 1km wide and UKC>8m.</p> <p>The NRA Addendum updated the risk assessment for the MDZ. The results fell within the ALARP or lower</p>
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			<p>regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Section 9.1 HR Wallingford Coastal Processes Modelling Report.</p> <p>Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone.</p> <p>The NRA was then updated with results shown in Marico report NRA Addendum [MMC196], Section 12 Navigation Risk Assessment Results.</p> <p>Marico report NRA Addendum [MMC196]. Table 11-1 Hazard Categories details the Hazards considered during the Risk assessment process;</p> <ul style="list-style-type: none">• Contact;• Collision;• Grounding / Forced Ashore;• Swamping / Capsize; and• Snagging / Obstruction All Vessel Types.
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Marico Report Section	RYA Report section	Objection Text	Reply
			The results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.
2.35	10.1	<p>In respect to subsurface/ submerged devices and structures, the RYA agrees with the finding of the NRA that in order “to ensure continued safe navigation through the Morlais Zone:</p> <ul style="list-style-type: none"> • A minimum 8m UKC would be required to ensure continued safe navigation of vessels draught <3m through the Morlais Zone; • A minimum UKC of 20m would be required to ensure continued safe navigation of ferries and vessels draught >3m through the Morlais Zone. Where this is not possible, alternative routes, including ferry poor weather routes should be provided to ensure safe passage during adverse weather conditions.” (NRA p 3 and 76). <p>Incorporation of these recommendations would address the RYA’s Under Keel Clearance (UKC) concerns.</p>	<p>This has been considered and the Inshore route extended to a minimum of 1km wide and UKC>8m.</p> <p>The is also a zone that runs from the north, through the western and along the southern boundary of the MDZ which must maintain an UKC of 20m.</p> <p>Evidence located:</p> <p>Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone.</p>

2.36	10.2	<p>The RYA notes that due to not being able to mitigate against snagging/ obstruction of gear, the NRA recommends fishing vessels be excluded from the MDZ (NRA Section 13.2). However, the NRA does not appear to consider the impact to levels of traffic, particularly collision/ entanglement risk, from the displacement of fishing vessels or their gear to the reduced sea room of the Eastern Inshore Route between the MDZ and coast, and the reduced sea room passage between the MDZ and the Deep Green area to the west. Similarly, if surface or emergent arrays are used, the NRA does not appear to consider the impact of displacement and collision risk from small craft/ large vessel traffic conflicts to the north of the site if recreational craft are excluded or need to avoid the MDZ.</p>	<p>This has been considered and taken account of in the NRA Addendum.</p> <p>The results continued to fall within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>Evidence located:</p> <p>Marico report NRA Addendum [MMC196]. Table 11-1 Hazard Categories details the Hazards considered during the Risk assessment process;</p> <ul style="list-style-type: none"> • Contact; • Collision; • Grounding / Forced Ashore; • Swamping / Capsize; and • Snagging / Obstruction All Vessel Types. <p>Marico report NRA Addendum [MMC196]. Table 11-2 Vessel Categories details the vessel types considered during the Risk assessment process;</p> <ul style="list-style-type: none"> • Commercial Vessel • Passenger Vessel • Project Vessels (Construction phase only) • Fishing Vessel • Powered Recreational Vessel • Un-Powered Recreational Vessel
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Marico Report Section	RYA Report section	Objection Text	Reply
			<p>Other Vessel</p> <p>Marico report NRA Addendum [MMC196], Annex B Hazard log Construction Phase and Annex C Hazard Log Operational Phase.</p>
2.37	10.4	The RYA notes that the Possible Additional Risk Control Measures and Embedded Risk Controls – assumed to be in place for the risk assessment (Table 9-5) provided by the NRA, meet most of our concerns with respect to subsurface arrays. It is our view that our recommendations (above) and the NRA recommendations would be a sensible way forward with respect to subsurface arrays with UKC of >3 metres, and should be embedded into order conditions.	<p>This has been considered and the inshore route has been extended to a minimum of 1km wide and UKC>8m.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone.</p>

2.38	11.1	<p>The current Marine Plan, which covers the MDZ, “acknowledges the importance of ... recreational boating activity.” (Welsh National Marine Plan, Paragraph 477, p138). It should be noted that RYA representatives within the area have identified an existing recreational craft cruising route as the Western Offshore Route, in accordance with RYA AIS and boating area data. This in turn accords with Figure 22(c) of the Welsh National Marine Plan (below). This map indicates that the proposed Morlais site lies within a defined boating area with a high comparative intensity of use in relation to elsewhere along the Welsh coast.</p>	<p>The risks associated with recreational vessels in close contact with each other have been considered in both the NRA and NRA Addendum.</p> <p>Evidence located:</p> <p>Marico reports; 18UK1479_MorlaisNRA; and NRA Addendum [MMC196]:</p> <p>Section 7.2 Vessel Track Analysis, 7.3.7 Recreational Vessels:</p> <p><i>“The tracks of recreational vessels are given within Figure 11. Most tracks are concentrated close to shore with small recreational craft, including yachts, primarily utilising the inshore passage to the east of the MDZ.”</i></p> <p><i>“The presence of a western route was noted by local recreational stakeholders and the RYA in consultation.”</i></p> <p><i>“Western Offshore route is normally used as part of passage planning from Liverpool and Holyhead to Bardsey Bay Recreational vessels are noted in Figure 11 transiting NE/SW through the MDZ, however, by comparison to the inshore route, vessel transit density in the western route is noted to be low. This is in-keeping with the feedback obtained during</i></p>
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Marico Report Section	RYA Report section	Objection Text	Reply
			<p><i>consultation with local recreational representatives that 'usage of this route is limited in comparison to the inshore route. The primary concern is the restriction of the inshore passage which is essential to recreational vessels' (Annex E)."</i></p> <p>NRA Addendum [MMC196], Table 7-4: Recreational Vessel Transits from RADAR and AIS – Summer and Winter Surveys;</p> <p>Note an average daily vessel transit in the summer of 116 vessels and in the Winter 59 vessels.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.39	11.2	<p>The Morlais Project Navigation and Shipping Response (MOR/RHDHV/DOC/0124) states that “It is also acknowledged that this is a novel project, with spacing between devices that is much smaller than the spacing between wind turbines. The project is not looking to exclude navigation from the area, but rather, following discussions with the MCA [Maritime and Coastguard Agency] and TH [Trinity House], it is likely that the area will need to be marked as an Area to be Avoided on navigational charts, but within which the right of navigation will remain. It is anticipated that navigation through the site will still be possible between groups of devices, to a certain extent, dependent on the final layout of the devices. However, there will be safety zones around devices, as with other offshore renewable energy installations, that should be avoided and so navigation will be restricted.</p>	<p>This is correct. However, to inform and improve safety of navigation, the Applicant has agreed to undertake device specific NRAs in advance of their emplacement.</p> <p>Extracted from consultation minute notes with the RYA on 9 October 2020:</p> <p><i>“Device deployment will happen in a phased order. Each time a new phased deployment is planned a device specific NRA will be conducted. The deployment plan along with the NRA will be submitted to the MCA, as the authority, for approval to continue. No device will be deployed without MCA approval. The device specific NRA will risk score and hazard and assess the distances between devices to ensure the risk is ALARP or lower.”</i></p> <p>Evidence located: Menter Mon-RYA Morlais MDZ project meeting minutes 09 Oct 2020.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.40	11.7	<p>As demonstrated above, the order application associated NRA fails to consider all the potential impacts to recreational boating, as it does not include sufficient information to determine the safety of marine users. The RYA therefore does not agree with the findings of the applicant's Welsh National Marine Plan Comparison (MOR/RHDHV/DOC/0128) particularly with respect to no further consideration being required for policy SOC_02. (see Section 11.9).</p>	<p>The MCA, as the statutory authority, has indicated that the NRA conforms with the stipulations of MGN 543 and is fit for purpose.</p> <p>This includes confirmation of acceptance of the Preliminary Hazard Assessment (PHA) approach and acceptance of Vessel Traffic Data for the MGN 543.</p> <p>Those elements of MGN 543 that pertain to device specific aspects, will be assessed within separate device specific NRA's that will be undertaken prior to initial device deployment.</p>

2.41	11.8	<p>The proposal fails to promote safe access as it:</p> <ol style="list-style-type: none"> 1. Obstructs safe access by placing navigation hazards (floating and emergent/ surface piercing arrays) within an area of recognised recreational boating use; 2. Prevents health and well-being benefits from recreational boating by excluding boat users from part of the boating area; 3. Undermines safe access by restricting recreational boating to an area of navigational hazards, the proposed Eastern Inshore Route; 4. Obstructs safe access to places of refuge by vessels using the Western Offshore Route, particularly those wishing to cross the MDZ in order to avoid the shipping lane, to access the refuge of Holyhead or shelter along the Anglesey coast in times of bad weather and reduced visibility. 	<p>The NRA Addendum fully satisfies the concerns raised here where the inshore route has been extended to a minimum of 1km wide and UKC>8m.</p> <p>Table 11-1 Hazard Categories details the Hazards considered during the risk assessment process;</p> <ul style="list-style-type: none"> • Contact; • Collision; • Grounding / Forced Ashore; • Swamping / Capsize; and • Snagging / Obstruction All Vessel Types. <p>These were considered for both the Construction and Operational phase of the project.</p> <p>The results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p><i>“Device deployment will happen in a phased order. Each time a new phased deployment is planned a device specific NRA will be conducted. The deployment plan along with the NRA will be submitted to the MCA, as the authority, for approval to continue. No device will be deployed without MCA approval. The device specific NRA will risk score and hazard and assess the distances between devices to ensure the risk is ALARP or lower.”</i></p>
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Marico Report Section	RYA Report section	Objection Text	Reply
			<p>Evidence located:</p> <p>Marico report NRA Addendum [MMC196]. Table 11-1 Hazard Categories.</p> <p>Marico report NRA Addendum [MMC196], Annex B Hazard log Construction Phase and Annex C Hazard Log Operational Phase.</p> <p>Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone.</p> <p>Menter Mon-RYA Morlais MDZ project meeting minutes 09 Oct 2020.</p> <p>Note 11.8 number 2 relates to the health and wellbeing of an individual not navigational safety and therefore is not dealt with here.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
2.42	13.1.7	<p>The wave “worst case scenario” consists of:</p> <ul style="list-style-type: none"> • 60 floating devices; • 310 seabed-mounted devices; • 60 electrical seabed hubs; • 8 surface piercing hubs.” (HR Wallingford Morlais Demonstration Zone Coastal Processes Report p 7.) <p>This information was not included as a worst case scenario within the NRA, with the NRA indicating, that “a finalised device specific layout was not available for the assessment” (Morlais NRA, p14). This demonstrates there is not a consistency of approach across project documents. There is also a lack of clarity between the worst case scenario set out in the HR Wallingford Coastal Processes Report and Chapter 4 of the ES with the NRA. This demonstrates that planning advice has not been followed.</p>	<p>This was fully considered within the NRA Addendum (2020).</p> <p>Consideration of both the Construction Phase and Operational phase took account of, HR Wallingford Coastal Processes Modelling Report during the risk scoring process therefore this information was included.</p> <p>Evidence located: NRA Addendum [MMC196], Annex b Hazard Log – Construction Phase and Annex C Hazard Log Operational Phase.</p>
2.43	13.3.2	<p>Within the NRA clarification note submitted for the marine licence (MOR/RHDHV/DOC/0136), the applicant states: The project has committed to undertake device specific NRAs prior to initial deployment of specific device types i.e. once exact locations and scale/type of device</p> <p>deployment is known and this has been agreed as an additional mitigation measure with the MCA and TH and would be undertaken post consent. The RYA is not aware of any offshore renewable project in UK waters that has taken such an approach to post-consent device specific NRAs.</p>	<p>Marico report 19UK1560 Bombora Wave Power. Deployment of mWave subsea wave powered energy generation device located in the East Pickard Bay Marine Energy Test Area.</p> <p>An overarching NRA (not device specific) was completed for the area before a device specific NRA was completed for the mWave deployment. Dated Aug 2019.</p>

3 RYA STATEMENT OF CASE OBJECTION 2: VESSEL MOVEMENT DATA USED TO SUPPORT THE NRA

“The use of AIS and radar data to advise the Navigation Risk Assessment, Environmental Statement and Interactive Boundary Assessment do not fully include the peak recreational period and do not appear to consider non-AIS equipped recreational craft or small craft without radar reflectors.”

Marico Report Section	RYA Report section	Objection Text	Reply
3.1	6.4.3	<p>Number of Recreational Craft Equipped with AIS;</p> <p>Clubs were asked to confirm how many of these craft were equipped with AIS. Clubs indicated that approximately 35 had AIS (4.6% of the total).</p>	<p>For just this reason, a combination of AIS data and RADAR data was utilised to inform the vessel traffic data analysis within the original NRA. This was further expanded to include additional data and the RYA’s Coastal Atlas in the NRA Addendum.</p> <p>This ensured the applicant fully considered the impact to navigation of all vessel types within the proximity of the MDZ and provided the most accurate picture of recreational vessel traffic in the area</p> <p>Evidence located: Marico report 18UK1479_Morlais_NRA. Marico report NRA Addendum [MMC196].</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.2	6.4.7	Recreational Activity; Clubs were asked to confirm if the applicant's NRA showed all member activity within the area. 80% (4) of the clubs confirmed that it did not.	Stakeholders were consulted as documented in the NRA Addendum. This document includes RYA feedback during consultation with regards to traffic levels and activities. Evidence located: Marico report NRA Addendum [MMC196].
3.3	6.4.9	Important Periods for Activity; The clubs ranked mid-July to mid-August as the most important period for boating activity, with mid June to mid July and mid-August to mid September being seen as secondary.	The NRA Addendum includes RYA feedback received during consultation with regards to peak summer traffic levels. This was considered alongside the AIS, RADAR and Coastal Atlas data already collected. Evidence located: Marico report NRA Addendum [MMC196].

Marico Report Section	RYA Report section	Objection Text	Reply
3.4	7.3.4	<p>The Wave and Tidal Action Report informed the Demonstration Zone Manager responsible for providing environmental data to individual developers. Recreational boating relevant data issues that developers should be made aware of “with regards to EIA and HRA in the context of the consenting process,” included:</p> <p>Impacts on shipping and navigation</p> <ul style="list-style-type: none"> • Further baseline data to inform cumulative aspects of Marine Navigational Impact Assessments [NRA] • Uncertain risks to navigation that may arise from a number of wave and tidal projects and therefore difficulties with assessing and mitigating the potential cumulative impacts 	<p>The NRA Addendum was commissioned to specifically address navigational concerns raised by the RYA.</p> <p>This showed all hazards to be ALARP or lower indicating an acceptable level of risk.</p> <p>Note: This report can only answer the part of objection relating navigational safety.</p> <p>Evidence located:</p> <p>Marico report 20UK1647_MM_Morlais_NRAAddendum_20-Issue0.2</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.5	8.1	<p>The RYA does not agree with the further information statement in the CIA Signposting Document (ORML1938 9_MOR-RHDHV-DOC-0134) submitted for the marine licence that “The NRA has been designed to give as accurate a representation of all traffic types across the MDZ as is possible. And the NRA is compliant with MCA requirements as specified within MGN 543.” The RYA also considers, set out below (see also Section 6), that there is poor consideration of impacts to recreational boating within the NRA, ES and Interactive Boundary Assessment. Our reasons to continue our objection as a result of the further information are set out below:</p>	<p>Recreational boating has been fully considered as part of the navigational risk appraisal for this project. The applicant further commissioned an NRA Addendum (2020) to consider concerns raised by the RYA. No appreciable difference in risk profile was found between the two NRAs.</p> <p>The MCA as the marine authority have confirmed that the NRA and NRA Addendum are compliant with MGN 543.</p> <p>Evidence located:</p> <p>Marico report 18UK1479_Morlais_NRA.</p> <p>Marico report NRA Addendum [MMC196].</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.6	8.2.1	In response to the 2018 scoping consultation, the RYA indicated that: "We recommend that 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.	<p>Despite recreational boating having been assessed within the original NRA (2019), the Applicant took note of the RYA's concerns and reassessed recreational boating using their RYA's AIS intensity data (RYA Coastal Atlas) in the NRA Addendum (2020).</p> <p>Originally AIS class A and B and RADAR data for the periods 26 Aug 17- 09 Sep 17 and 05 Apr 19 – 19 Apr 19 were assessed in the original NRA (2019). For the NRA Addendum, additional AIS data for the period 01 Oct 17-31 Mar 18 was used as well as the RYA Coastal Atlas.</p> <p>No significance was observed in resulting risk profiles. The results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>The MCA as the Marine authority has confirmed that this is compliant with MGN 543.</p> <p>Evidence located: Marico report NRA Addendum [MMC196].</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.7	8.2.2	<p>Whilst the RYA's initial response at scoping agrees that AIS may not form a complete picture, (as confirmed by the applicant's consultation), the failure to utilise the RYA's AIS intensity data to inform the licence application NRA may be a serious oversight. Our GIS analysis indicates that:</p> <ol style="list-style-type: none"> 1. Recreational craft use the whole of the proposed marine licence area, particularly the northern part of the MDZ, and are not currently restricted to navigational channels, and; 2. In addition to the eastern inshore route identified by the Navigational Risk Assessment, there is a western offshore route for recreational craft navigating from west of South Stack to north west of Bardsey Sound. 	<p>Despite recreational boating having been assessed within the original NRA (2019), the Applicant took note of the RYA's concerns and reassessed recreational boating using their RYA's AIS intensity data (RYA Coastal Atlas) in the NRA Addendum (2020).</p> <p>Originally AIS class A and B and RADAR data for the periods 26 Aug 17- 09 Sep 17 and 05 Apr 19 – 19 Apr 19 were assessed in the original NRA (2019). For the NRA Addendum, additional AIS data for the period 01 Oct 17-31 Mar 18 was used as well as the RYA Coastal Atlas.</p> <p>No significance was observed in resulting risk profiles. The results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>Evidence located: Marico report NRA Addendum [MMC196].</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.8	8.2.3	<p>The failure to consider recreational craft using the Western Offshore Route is apparent in the Morlais Project Navigation and Shipping Responses (p 2) which states “The western offshore route between South Stack and NW Bardsey Sound was identified and assessed within the NRA. Recreational stakeholders reported in consultation that ‘Tracks transiting SW / NE through site are from Bardsey Island and Cork. Usage of this route is limited in comparison to the inshore route.” Consultation with our member clubs and organisations in the area indicates that they are not aware of any Bardsey Island and Cork route. Members indicate that the Western</p> <p>Offshore route is normally used as part of passage planning from Liverpool and Holyhead to 22 Bardsey Bay. This accords with the RYA Coastal Atlas data (as used by Natural Resources Wales within the Welsh Marine Plan).</p>	<p>The Western Offshore Route was originally discussed during consultation under the first NRA (2019). Therefore, it would have been assessed as part of that NRA. Subsequently, it was reassessed as part of the NRA Addendum in line with changes made to the MDZ extents.</p> <p>Evidence located: Marico report 18UK1479_Morlais_NRA, Annex D, Minutes of Meeting Held on 21 Nov 2018 Marico report NRA Addendum [MMC196].</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.9	8.2.4	<p>Due to inshore tidal streams, our members indicate that recreational craft from Liverpool, Holyhead and on transit from the Isle of Man and Scotland use the route to avoid navigational hazards associated with the west Anglesey coast (the location for the proposed Eastern Inshore Route). The RYA notes that the Bardsey Island and Cork route comment appears to be an unattributed remark from minutes of a meeting held on 20-11-2018 (Morlais NRA p. 121-124) with recreational users, rather than by actual AIS, radar or visual assessment. The RYA further notes that Section 6.3.7 of the Morlais NRA makes no reference to a Western Offshore Route, although Figure 12 does show tracks for recreational craft, originating from the north of the site, transiting offshore. The Morlais NRA, Section 13.1.1 (Baseline Marine Environment), Section 13.1.2 (Navigation Risk Assessment), Tables 11-1 (Possible Additional Risk Control Measures) and 12-3 (Cumulative Risk Assessment) do not identify the Western Offshore Route, only the Eastern Inshore Route is noted.</p>	<p>The Western Offshore Route was originally discussed during consultation under the first NRA (2019). Therefore, it would have been assessed as part of that NRA. Subsequently, it was reassessed as part of the NRA Addendum in line with changes made to the MDZ extents.</p> <p>Evidence located:</p> <p>Marico report 18UK1479_Morlais_NRA, Annex D, Minutes of Meeting Held on 21 Nov 2018</p> <p>Marico report NRA Addendum [MMC196].</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.10	8.2.5	The RYA is concerned that no assessment of the Western Offshore Route appears to have been undertaken. The NRA instead concentrates on the Eastern Inshore Route. The RYA indicated to the applicant that the inshore route “would be difficult /unsafe to navigate in poor weather and at night” (Morlais NRA p.131-132), resulting in the possibility that craft would avoid the Eastern Inshore Route in favour of the Western Offshore Route, particularly if the waters of this boating area are marked on charts as an “Area to be Avoided”.	<p>Further analysis has been undertaken in the form of an NRA Addendum. This incorporated the Western Offshore Route.</p> <p>Utilising AIS class A and B and RADAR data for the periods 26 Aug 17-09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used as well as the RYA Coastal Atlas.</p> <p>Despite this, the results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>Evidence located: Marico report NRA Addendum [MMC196], Section 2.1 Study area shows the area the traffic survey was completed for.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.11	8.2.6	Acknowledging that AIS is not an “absolute measure of recreational traffic”, it is likely that during operation the intensity of recreational and other use will be greater within the Eastern Inshore Route, the northern part of the proposed MDZ and the western offshore route than indicated. The RYA recommends that the NRA should be revised to account for the implication of the MDZ on recreational small craft use within the area of the proposed MDZ and along the western offshore route.	<p>Further analysis has been undertaken in the form of an NRA Addendum.</p> <p>Utilising AIS class A and B and RADAR data for the periods 26 Aug 17-09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used as well as the RYA Coastal Atlas.</p> <p>Despite this, the results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>Evidence located: Marico report NRA Addendum [MMC196].</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.12	8.2.7	<p>The RYA can see no evidence within the NRA to support the applicant's assertion that the Western Offshore Route has been assessed. It should be noted that the Interactive Boundary Assessment (2020), see below, still uses the 2017 AIS recreational boating data used in the original NRA.</p> <p>The RYA recommends that further navigation safety analysis should be undertaken to determine the risks/ hazards from:</p> <ul style="list-style-type: none"> a. displacing recreational small craft from the MDZ and concentrating these into the area between the MDZ and the shipping route from/ to Holyhead, and; b. displacing recreational craft from the Eastern Inshore Route (if the MDZ impacts are not mitigated – to the Western Offshore Route, particularly the implications of driving small craft offshore and increasing the distance to safe havens and places of refuge. 	<p>Further analysis has been undertaken in the form of an NRA Addendum. This incorporated the Western Offshore Route.</p> <p>Utilising AIS class A and B and RADAR data for the periods 26 Aug 17-09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used as well as the RYA Coastal Atlas.</p> <p>Despite this, the results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>Evidence located:</p> <p>Marico report</p> <p>NRA Addendum [MMC196], Section 2.1 Study area shows the area the traffic survey was completed for.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.13	8.3.1	<p>The RYA notes that MGN 543 requires that “An up to date traffic survey of the area concerned should be undertaken within 12 months prior to submission of the Environmental Statement. This should include all the vessel types found in the area and total at least 28 days duration but also take account of seasonal variations in traffic patterns ... in the event of location specific issues being identified by the existing traffic survey and/or through consultation, additional surveys beyond the minimum outlined above may be required in order to support assessment of such issues (MGN 543 Annex 1, Section 2).</p>	<p>The NRA Addendum fully reconsidered navigational risk across the MDZ in response to concerns raised by the RYA</p> <p>Utilising AIS class A and B and RADAR data for the periods 26 Aug 17-09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used as well as the RYA Coastal Atlas.</p> <p>Despite this, the results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>The MCA as the Marine authority has confirmed that this is compliant with MGN 543.</p> <p>Evidence located: Marico report NRA Addendum [MMC196].</p>

3.14	8.3.2	<p>The recreational boat users highlighted location specific issues throughout consultation, as stipulated by MGN 543). On 20th November 2018, at a meeting with the applicant it was stated that “recreational traffic was under represented in the plot” used for the NRA and the peak period for recreational boating was “the last weekend of July to the bank holiday weekend of August” (Morlais NRA p121, see also Section 6.3.2). Further consultation with our membership indicates that the peak recreation boating period is between mid-July and mid- August. Section 6.1.4 of the NRA indicates that the summer recording period for AIS and radar was two weeks from 26th August until 29th September 2017. The recording therefore did not include the peak recreational boating period, it is therefore insufficient to determine patterns and densities of recreational craft, equipped with AIS/ radar. The RYA notes that the ES is informed by the NRA submitted for the TWA order application and is based upon an AIS and radar summer survey undertaken in August and September 2017. It should be noted that the ES (Section 15.6.3.6, paragraph 141) identified part of the correct period for monitoring and concludes that the vessel track analysis used in the NRA “underrepresents the recreational vessel activity in the summer months and vessel traffic may be more numerous around late July and August”.</p>	<p>These concerns have all be addressed in the NRA Addendum.</p> <p>AIS class A and B and RADAR data for the periods 26 Aug 17- 09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18.</p> <p>Alongside that information from the RYA Coastal Atlas, which presents peak summer AIS data was obtained for the NRA Addendum, and RYA feedback during consultation with regards to peak summer traffic levels was taken into consideration within the NRA Addendum scoring.</p> <p>The results fell within the ALARP or lower regions of the risk category definitions, detailed in the same section of the NRA addendum, indicating an acceptable level of risk.</p> <p>Evidence located: NRA Addendum [MMC196].</p>
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Marico Report Section	RYA Report section	Objection Text	Reply
3.15	8.3.3	In addition, Section 6.5 strongly indicates the need for visual observation to be undertaken to ensure craft not equipped with AIS and radar reflectors (the majority of recreational craft) or with a low radar silhouette are accounted for.	<p>The NRA Addendum analyses a number of datasets including AIS class A and B and RADAR data for the periods 26 Aug 17- 09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17- 31 Mar 18.</p> <p>Alongside that information from the RYA Coastal Atlas, which presents peak summer AIS data was obtained for the NRA Addendum, and RYA feedback during consultation with regards to peak summer traffic levels was taken into consideration within the NRA Addendum scoring.</p> <p>The results fell within the ALARP or lower regions of the risk category definitions, detailed in the same section of the NRA addendum, indicating an acceptable level of risk.</p> <p>Evidence located: NRA Addendum [MMC196]</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.16	8.5.2	Annex 2 of MGN 543 indicates that proposals should determine whether: The set and rate of the tidal stream, at any state of the tide, has a significant effect on the handling of vessels in the area of the OREI site.	<p>This is correct. And is addressed within the HR Wallingford Coastal Processes report which is further considered under the NRA Addendum:</p> <p><i>“The impacts of the MDZ on the tidal streams in the area are assessed within the HR Wallingford CPMR and the predicted changes are assessed to be of low significance in terms of impact to navigation risk across all vessel types. The effect of the tidal set and rate on the handling of vessels in the area of the MDZ are considered to be of similar impact as the current baseline. The effect of the tidal streams should be considered as part of normal passage planning.”</i></p> <p>Evidence located: NRA Addendum [MMC196]. Table 9.1.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.17	9.1	<p>The RYA notes that the applicant has not submitted an MDZ assessment of interactive boundaries as additional information to the application but has submitted it for the marine licence. We feel that it is important to bring this document to the attention of the consent process. The RYA has reviewed the Morlais Assessment of Interactive Boundaries (26/06/2020</p> <p>– document reference: ORML 1938 13 20UK1619_RN_MM_VTS02-02_MM). We note the</p> <p>distinction made that “the northern interactive Morlais Development Zone boundary adjacent to the ferry route utilised by Irish Ferries and Stena Line and the eastern interactive boundary adjacent to the inshore route utilised primarily by small fishing, recreational and occasionally survey vessels.” (20UK1619_RN_MM_VTS02-02_MM pp. 2). The RYA considers this statement misleading, as it implies that recreational craft only utilise the Eastern Inshore Route. This indicates a failure to address the concerns with respect to over reliance on AIS and radar data that were raised by consultation in 2018 (see Sections 6.3.2, 6.4.2 and 6.4.3).</p>	<p>Section 7 of the NRA addendum discusses the MDZ and the different vessel types navigating through it. It discusses which parts different vessels use based on AIS, RADAR and the RYA Coastal Atlas data.</p> <p>Evidence Located: NRA Addendum [MMC196], Section 67</p> <p>The vessel traffic survey that was undertaken as part of the NRA was completed not only to assess how many and what types of vessels were navigating in the area but also whereabouts those vessels are navigating.</p> <p>The project team listened to the concern raised about AIS data not being sufficient due to most recreation craft not having it fitted so purchased additional data from the RYA Coastal Atlas. This Data was then used alongside AIS and RADAR in the NRA addendum.</p> <p>This should be sufficient to show where the recreational vessels are navigating and in what numbers.</p> <p>Evidence Located: NRA Addendum [MMC196], includes AIS class A and B and RADAR data for the periods 26 Aug 17- 09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used. RYA coastal Atlas, which presents peak summer AIS data, was obtained for the NRA, and RYA feedback during consultation with regards to peak summer traffic levels was taken into consideration within the NRA.</p>

Marico Report Section	RYA Report section	Objection Text	Reply
3.18	9.2	<p>Prior to the MDZ EIA process, the previous Minesto Deep Green ES (2016) had already identified the area between the Holyhead Deep and Holy Island (i.e. the area that includes the entirety of the MDZ) as “a recognised general sailing area” and “a medium use recreational cruising route. Minesto also stated that the “RYA published data shows a good agreement with the marine traffic survey data collected for their NRA and EIA. The RYA Coastal Atlas shows that the MDZ is within a Recreational Boating Area (also identified within the Welsh Marine Plan).</p>	<p>The NRA Addendum fully reconsidered navigational risk across the MDZ in response to concerns raised by the RYA</p> <p>Utilising AIS class A and B and RADAR data for the periods 26 Aug 17-09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used as well as the RYA Coastal Atlas.</p> <p>Despite this, the results fell within the ALARP or lower regions of the risk category definitions, indicating an acceptable level of risk.</p> <p>Evidence located: Marico report NRA Addendum [MMC196].</p>

3.19	9.8	<p>The RYA has reviewed the Morlais Interactive Boundaries Assessment to determine if there is any reason for the contradiction between how both projects regard the safety of recreational craft. We note a series of flaws which effectively exclude recreational craft safety issues and use from the MDZ interactive boundary assessment:</p> <p>The assessment is based upon AIS and radar data. The RYA estimate that <20% of recreational craft engaged in cruising passages will be fitted with AIS in this region. With respect to general recreation, only <5% of recreational craft using waters around Anglesey are fitted with AIS (see Section 6.4.3), whilst <8% are fitted with radar reflectors (see Section 6.4.5). It is therefore unlikely that the either the assessment, or NRA it is based upon, give an accurate indication of actual recreational boating activity. As a result it will be impossible to identify “the 100% traffic route - as the assessment relies on AIS and radar data and not visible observation;</p> <p>The boundaries of the MDZ are “designed to deconflict vessel / device interactions along the northern and eastern boundaries. This demonstrates that the MDZ is not designed to safeguard against grounding, overfall navigational hazards within the proposed eastern inshore route or vessel on vessel conflicts due to displacement from the MDZ into the inshore route;</p>	<p>The MDZ Project team Reconsidered recreational boating activities in light of comments received from the RYA. They purchased additional data from the RYA Coastal Atlas to evidence what they had been told and commissioned the NRA addendum to update the risk profile.</p> <p>Evidence Located:</p> <p>Marico Document: NRA Addendum [MMC196] Marico report NRA Addendum [MMC196]. Table 11-2 Vessel Categories details the vessel types considered during the Risk assessment process;</p> <ul style="list-style-type: none"> • Commercial Vessel • Passenger Vessel • Project Vessels (Construction phase only) • Fishing Vessel • Powered Recreational Vessel • Un-Powered Recreational Vessel • Other Vessel <p>NRA Addendum [MMC196], includes AIS class A and B and RADAR data for the periods 26 Aug 17- 09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used. Alongside that information from the RYA coastal Atlas, which presents peak summer AIS data, was obtained for the NRA, and RYA feedback during consultation with regards to peak summer traffic levels was taken into consideration within the NRA scoring.</p>
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Marico Report Section	RYA Report section	Objection Text	Reply
		<p>The assessment focuses primarily on commercial shipping activity and routes “as opposed to poorly defined routes typically utilised by smaller craft;</p> <p>The analysis used for the assessment “also removed ... any non-commercial vessels operating perpendicular to or not in adherence to the [commercial shipping] lane, such as fishing or recreational vessels. As a result the assessment fails to include recreational craft on passage through the area or engaged in general recreation, as common practice and basic safety training for recreational boat crews dictates that shipping routes should be avoided and, when necessary, crossed perpendicular to the lane;</p>	

3.20	9.9	<p>Due to these flaws, the Morlais Interactive Boundaries Assessment is of little use in determining how recreational activity will be impacted upon. To base any decision concerning recreational boating safety on this assessment would be irresponsible as it does not take significant account of recreational activity and, indeed, uses an analysis that actually excludes recreational boating from consideration. The conclusion of the assessment that the Eastern Inshore Route is “intolerable” demonstrates the dangers of this route even without properly taking account of recreational boating.</p>	<p>Section 7 of the NRA addendum discusses the MDZ and the different vessel types navigating through it. It discusses which parts different vessels use based on AIS, RADAR and the RYA Coastal Atlas data.</p> <p>Evidence Located: NRA Addendum [MMC196], Section 67</p> <p>The vessel traffic survey that was undertaken as part of the NRA was completed not only to assess how many and what types of vessels were navigating in the area but also whereabouts those vessels are navigating.</p> <p>The project team listened to the concern raised about AIS data not being sufficient due to most recreation craft not having it fitted so purchased additional data from the RYA Coastal Atlas. This Data was then used alongside AIS and RADAR in the NRA addendum.</p> <p>This should be sufficient to show where the recreational vessels are navigating and in what numbers.</p> <p>Evidence Located: NRA Addendum [MMC196], includes AIS class A and B and RADAR data for the periods 26 Aug 17- 09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used. RYA coastal Atlas, which presents peak summer AIS data, was obtained for the NRA, and RYA feedback during consultation with regards to peak summer traffic levels was taken into consideration within the NRA.</p> <p>The NRA addendum details the vessel types and hazard types used for risk scoring.</p>
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Marico Report Section	RYA Report section	Objection Text	Reply
			<p>Evidence Located:</p> <p>Marico report NRA Addendum [MMC196]. Table 11-2 Vessel Categories details the vessel types considered during the Risk assessment process;</p> <ul style="list-style-type: none"> • Commercial Vessel • Passenger Vessel • Project Vessels (Construction phase only) • Fishing Vessel • Powered Recreational Vessel • Un-Powered Recreational Vessel • Other Vessel <p>Marico report NRA Addendum [MMC196]. Table 11-1 Hazard Categories details the Hazards considered during the Risk assessment process;</p> <ul style="list-style-type: none"> • Contact; • Collision; • Grounding / Forced Ashore; • Swamping / Capsize; and • Snagging / Obstruction All Vessel Types.

4 RYA STATEMENT OF CASE OBJECTION 3: NAVIGATION RISK ASSESSMENT/MGN 543

“The Navigation Risk Assessment on which the application is based has failed to follow the guidance of Maritime Guidance Note (MGN 543): Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response leading to an incomplete and inaccurate Navigation Risk Assessment which subsequently fails to support the Environmental Statement.”

Marico Report Section	RYA Report section	Objection Text	Reply
4.1	7.3.13	Importantly, given that in 2015 the applicant recognised the need to undertake a navigational safety assessment in parallel with the consenting process (Section 6.2.2); and that the 2018 consultation (see Section 6.3.2) indicated that assessment was not addressing recreational boating concerns; the applicant should have ensured that the NRA supporting the ES was accurate in respect to recreational boating safety.	<p>Whilst recreational boating safety was considered within the original NRA (2019), the NRA Addendum was commissioned to expand on this and respond specifically to concerns raised by the RYA.</p> <p>The Applicant is confident that the NRA Addendum and updated Shipping and Navigation ES Chapter satisfies their concerns.</p> <p>The MCA as the marine authority has confirmed that the NRA Addendum undertaken by the applicant are fit for purpose and meet the requirements of MGN 543.</p> <p>Evidence located: Marico report 18UK1479 Morlais NRA Marico report NRA Addendum [MMC196].</p>

Marico Report Section	RYA Report section	Objection Text	Reply
4.2	7.3.7	<p>In 2017 the Offshore Renewables Joint Industry Programme (ORJIP), partly sponsored by NRW and The Crown Estate, undertook The Forward Look; an Ocean Energy Environmental Research Strategy for the UK. This report established priorities for addressing consenting risks with respect to EIA3 for wave and tidal energy (i.e. it informs the Wave and Tidal Current Leasing Process). Key strategic consenting issues and risks identified for the report cover the ecological environment, human environment, physical environment and regulatory aspects. With respect to impacts on shipping and navigation, the report recognises “Difficulties with assessing and mitigating the potential cumulative impacts on shipping and navigation due to uncertainty around risks that may arise from a number of projects, and the need for the “development of agreed methods/processes for assessing, mitigating and managing potential impacts on shipping and navigation”</p>	<p>The NRA Addendum was commissioned to expand upon and fully consider navigational risks in light of updated made to the MDZ boundary.</p> <p>Note: this addresses only the part of the objection relating to navigational safety.</p> <p>Evidence located: NRA Addendum [MMC196].</p>

Marico Report Section	RYA Report section	Objection Text	Reply
4.3	7.3.9	<p>In 2016, the UK Department of Energy and Climate Change (DECC) published an Offshore Energy Strategic Environmental Assessment (OESEA3). The OESEA3 recommended that:</p> <p>“leasing/licensing and any subsequent consenting of activities should ensure the minimisation of disruption, economic loss and safety risks to other users of the sea and the UK as a whole. It is recognised that individual projects will be assessed on a case by case basis through the relevant planning process. However, in advance of formal and spatially explicit marine planning for most UK seas, and recognising the overarching policy of the UK Marine Policy Statement, developments (individually or cumulatively) should aim to:</p> <ul style="list-style-type: none">• avoid causing alteration to the ease and safety of navigation in port approaches or reduce the commercial attractiveness of the ports e.g. through increases in vessel insurance premiums, and;• avoid causing significant detriment to tourism, recreation, amenity and wellbeing as a consequence of deterioration in valued attributes such as landscape, tranquillity, biodiversity and hydrographic features;”	<p>The NRA Addendum was commissioned to expand upon and fully consider navigational risks in light of updated made to the MDZ boundary.</p> <p>Note: this addresses only the part of the objection relating to navigational safety.</p> <p>Evidence located: NRA Addendum [MMC196].</p>

Marico Report Section	RYA Report section	Objection Text	Reply
4.4	7.3.11	<p>The RYA has reviewed this information and finds it, albeit incomplete, to be part of the necessary baseline socio-economic, navigation and coastal process information that was identified by the Wave and Tidal Action Report (2014) and ORJIP (2017) to fulfil the policies of OESEA3 (2016) before the ES was written. As such, the applicant should have been aware of what information and data should have been provided before the Environmental Impact Assessment was undertaken. This is very apparent with respect to recreational boating, where consultees indicated in 2015 (Section 6.2) and again in 2018 (Section 6.3.2) that there were data gaps in the use of the proposed MDZ and surrounding Boating Area for existing recreation. The failure to address issues identified by recreational users (Section 6.0) demonstrates that the applicant has failed in their undertaking to inform an assessment of what would be acceptable in terms of maintaining navigational safety (Section 6.2.2), large due to an over reliance on short-term AIS data which is of limited use for identifying recreational use (see Sections 6.3 and 6.4).</p>	<p>All concerns raised by the RYA have been responded to in a standalone document.</p> <p>Evidence located: Menter Mon document MOR-MM-DOC-011 Morlais RYA concerns and project responses.</p> <p>With regards to data, includes AIS class A and B and RADAR data for the periods 26 Aug 17- 09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used. Additionally, information from the RYA Coastal Atlas, which presents peak summer AIS data, was obtained for the NRA Addendum.</p> <p>Consequently, RYA feedback during consultation with regards to peak summer traffic levels was taken into consideration within the NRA scoring.</p> <p>Note: these address only the part of the objection relating to navigational safety.</p> <p>Evidence located: Marico report NRA Addendum [MMC196]</p>

Marico Report Section	RYA Report section	Objection Text	Reply
4.5	8.1	The RYA does not agree with the further information statement in the CIA Signposting Document (ORML1938 9_MOR-RHDHV-DOC-0134) submitted for the marine licence that “The NRA has been designed to give as accurate a representation of all traffic types across the MDZ as is possible. And the NRA is compliant with MCA requirements as specified within MGN 543.” The RYA also considers, set out below (see also Section 6), that there is poor consideration of impacts to recreational boating within the NRA, ES and Interactive Boundary Assessment. Our reasons to continue our objection as a result of the further information are set out below:	<p>The MCA as the marine authority has confirmed that the traffic surveys undertaken by the applicant are fit for purpose and meet the requirements of MGN 543.</p> <p>Evidence located: Marico report 18UK1479 Morlais NRA Marico report NRA Addendum [MMC196].</p>
4.6	13.3.8	In addition, given the failure to carry issues from consultation (Section 6.0) into the existing NRA and ES; the RYA is of the view that any review will not identify all pertinent maritime safety issues. Similarly, any array specific NRA based upon the ES and existing NRA will suffer the same problem. It is the RYA’s view that there is not a clear framework to ensure navigation/ maritime safety mitigation is carried out post-consent, as the applicant has not shown how post-consent NRAs will inform the EIA and consenting process. We had hoped to be able to review the applicants proposed addendum to the NRA and revised Shipping and Navigation Chapter of the ES to see if this problem had been resolved, we note that the proposed order memorandum text does not address this issue by demonstrating how post-consent NRAs inform the consenting process.	<p>All concerns raised by the RYA have been responded to in a standalone document.</p> <p>Evidence located: Menter Mon document MOR-MM-DOC-011 Morlais RYA concerns and project responses.</p>

5 RESPONSES TO STATEMENT OF CASE CONCLUSIONS AND RECOMMENDATIONS

This section responds to the conclusions and recommendations relevant to the NRA and navigational safety made as part of the RYA Statement of Case.

Marico Report Section	RYA Report Section	Objection Text	Reply
5.1	15.1	The RYA objects to the Transport and Works Act Order application TWA/3234121. The RYA considers the Navigation Risk Assessment to be incomplete, and we consider that an addendum to the NRA and a revised ES should have been included within the supplementary information to insure an informed decision with respect to the TWAO. It is the view of the RYA that such information has not been satisfactorily supplied to demonstrate that the safety of recreational craft and users have been safeguarded.	<p>Both an NRA Addendum and updated Shipping and Navigation Chapter of the ES have been produced.</p> <p>Note: these address only the part of the objection relating to navigational safety.</p> <p>Evidence located: Marico report NRA Addendum [MMC196]. Published 18 Sep 2020.</p>
5.2	15.4	<p>The RYA has provided the following recommendations as grounds for not making the Order:</p> <ol style="list-style-type: none"> 1. The order should not be made because the Environmental Statement (ES) and supporting Navigational Risk Assessment (NRA) have not: <ol style="list-style-type: none"> a. Examined all data concerning recreational boat use in the area; b. Addressed all relevant concerns raised by recreational consultees in 2018; c. Been based on up to date data AIS and radar data to determine recreational 	<p>*Note: these address only the part of the objection relating to navigational safety. *</p> <p>Section 1a-d: The NRA addendum has taken account of all available data concerning recreational vessel traffic and is based on up to date AIS information.</p> <p>Section 1e: refers to the ES only, not NRA.</p> <p>Section 1f: The MCA as the marine authority has confirmed that the data used complies with the requirements of MGN 543.</p>

	<p>boating patterns and densities;</p> <p>d. Used visual observation to account for majority of craft not equipped with AIS and/or radar reflectors;</p> <p>e. Provided a ES to the standard required by:</p> <ul style="list-style-type: none"> - Rule 11 (1) (b) and (c), (2), (3), (4) and (5), and; Schedule 1 (3), (4) and (5) of Statutory Instrument No.1466 - Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006. - Regulation 4(2) and (3), and; Regulation 17(3) and (4)(d) of The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. <p>f. Provided an NRA to the standard required by MGN 543 (Section 8.5)</p> <p>2. The order should not be made for any marine component of the application (excluding cables) as:</p> <p>a. The applicant has not provided sufficient details of project design of tidal arrays (Section 7.2) in accordance with Rule 11 (1)(a) and Schedule 1, 1(a) of Statutory Instrument No.1466 - Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006, and;</p> <p>b. The use of the Rochdale/ Project Design Envelope is too wide/ indicative to enable a consenting decision based upon an accurate and representative project design</p>	<p>Section 2a-b: The Project is using the Rochdale Envelope system (which is an authorised method) as the final device layout details are not known at this stage. Before deployment of any device a device specific NRA will be completed and forwarded to the MCA for approval.</p> <p>Section 3a-c: The NRA Addendum considers all concerns raised by recreational boaters, Incorporates the findings of the HR Wallingford Coastal Processes report including the effect on overfalls and tidal flow.</p> <p>Sections 4 and 5: Do not relate to Navigational safety.</p> <p>Evidence located:</p> <p>Marico report 20UK1647_MM_Morlais_NRAAddendum_20-Issue02, includes AIS class A and B and RADAR data for the periods 26 Aug 17- 09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used.</p> <p>Alongside that information from the RYA coastal Atlas, which presents peak summer AIS data, was obtained for the NRA, and RYA feedback during consultation with regards to peak summer traffic levels was taken into consideration within the NRA Addendum.</p> <p>Menter Mon document MOR-MM-DOC-011 Morlais RYA concerns and project responses. Published 08 Oct 2020.</p>
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	<p>(Section 13.1 and 13.2).</p> <p>3. The order cannot be made as the proposed changes to the MDZ boundaries and the submitted NRA and ES do not:</p> <p>a. Address the 2018 and 2020 concerns of recreational boaters with respect to preventing access to places of shelter/ safe havens, vessel wash, the narrowness of the channel and navigational squeeze into areas of dangerous overfalls (Sections 6.3 and 6.4);</p> <p>b. Incorporate the findings of the Coastal Process report (Section 8.5) and Interactive Boundaries Assessment (Section 9.0) which validate the 2018 concerns of recreational boating representatives (Section 6.3) about the inappropriate design of the MDZ with respect to the Eastern Inshore Channel;</p> <p>c. Consider the possibility that the single or combined impacts of overfalls, increased tidal velocity and navigational squeeze may prevent the construction of the MDZ at the proposed location (Section 8.5).</p> <p>4. The order cannot be made as the proposal undermines the policies of the existing and proposed Welsh Marine Plan (Section 11)</p> <p>5. The order cannot be made as the Supplementary Tourism and Recreation Assessment has provided insufficient information concerning the socio-economic impacts to the maritime recreation industry (Section 12)</p>	<p>20UK1647_MM_Morlais_NRAAddendum_20-Issue02. Published 18 Sep 2020 meets the requirements of MGN 543.</p> <p>Inshore route extended to a minimum of 1km wide and UKC>8m. Shown in Marico report NRA Addendum [MMC196], Figure 1: Proposed Morlais Development Zone.</p> <p>HR Wallingford Coastal Processes Modelling Report. Included in 20UK1647_MM_Morlais_NRAAddendum_20-Issue02. Published 18 Sep 2020.</p>
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5.3	15.5	<p>Make an order which gives effect to those proposals with modifications: With respect to modifications, the RYA provides the following recommendations:</p> <p>6. That the Order can be made when the applicant:</p> <p>a. Provides a Navigational Risk Assessment (NRA) and Environmental Statement (ES) that addresses the recreational boating concerns raised in 2018 and 2020 (Sections 6.3, 6.4 and 6.5);</p> <p>b. Restricts the marine elements of the Order application to provision of cables until a clear framework for enabling developer array specific NRAs to inform the EIA and consenting process (Sections 7.2 and 13.3);</p> <p>c. Agrees that the current ES should be regarded only as an information/ data gathering (Section 7.3) or scoping document for marine developer array specific EIAs (Sections 13.3 and 13.4);</p> <p>7. That the order can be made when the NRA informs the ES and consenting process of the impact and mitigation measures to address potential conflicts between the MDZ and recreational boating with respect to:</p> <p>a. Displacing recreational craft to the East and West of the MDZ (Section 8.2) and navigational squeeze (Section 8.5);</p> <p>b. The effects of tidal streams, wind masking, turbulence or sheer on small craft handling and manoeuvrability near arrays and within the Eastern Inshore Route (Section 8.5);</p>	<p>* Note This report can only answer the part of objection relating navigational safety*</p> <p>The applicant has demonstrated that they have provided a robust Navigational risk assessment, confirmed that device specific NRA will be complete prior to each phased deployment, has dealt with conflict between navigating vessels producing the overarching NRA and addendum.</p> <p>The applicant has demonstrated that the NRA addendum takes account of capsizing and foundering, tidal flows and overfalls and vessels navigating in close proximity to each other.</p> <p>The applicant has also had confirmation from the MCA that the traffic survey meets the requirements of MGN 543.</p> <p>The applicant has made changes to the mdz taking account of areas requiring 20m UKC and area requiring 8m UKC.</p> <p>Evidence Located:</p> <p>20UK1647_MM_Morlais_NRAAddendum_20-Issue02, includes AIS class A and B and RADAR data for the periods 26 Aug 17- 09 Sep 17 and 05 Apr 19 – 19 Apr 19 plus additional AIS data for the period 01 Oct 17-31 Mar 18 was used.</p> <p>Alongside that information from the RYA coastal Atlas, which presents peak summer AIS data, was obtained for the NRA, and RYA feedback during consultation with regards to peak summer traffic levels was taken into consideration within the NRA Addendum.</p>
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		<p>9. The Order can be made when the ES demonstrates to the consenting process that the MDZ will not have a significant negative impact on maritime recreational industries/ economy (Section 12).</p> <p>10. That the Order can be made when the applicant provides provided a framework to ensure developers identify all relevant maritime safety issues and validate the ES or array specific ESs to inform the consenting process and conditions (Sections 13.3 and 13.4).</p>	
5.4	15.6	<p>As noted previously, the RYA is generally supportive of well-designed offshore renewable energy projects, and recognises their important contribution to sustainable development. If these recommendations are addressed and the Order application and supporting documents (NRA and ES) revised to take account of our concerns, the RYA would be willing to reconsider our objection following formal consultation on Supplementary/ Further Information in accordance with Statutory Instrument No.1466 - Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006, Statutory Instrument 2017 No. 567 - The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations (2017), and; the Marine Works (Environmental Impact Assessment) Regulations (2007), and; the Marine Works (Environmental Impact Assessment) Regulations (2007). However, we note that remedial action may not address all the impacts to the maritime safety of recreational craft from the Morlais Demonstration Zone. If this is the case to not make order may be the only available option. However, if the consent is granted only for subsurface devices, with under keel clearance of 8 to 20 metres to allow freedom of navigation within a smaller redesigned Morlais</p>	<p>*Note This report can only answer the part of objection relating navigational safety.*</p> <p>The applicant has demonstrated they have listened to the concerns of the RYA and adjusted their plans or commissioned additional evidence accordingly.</p> <p>Evidence located:</p> <p>Marico report 20UK1647_MM_Morlais_NRAAddendum_20-Issue02, Published 18 Sep 2020.</p> <p>Menter Mon document MOR-MM-DOC-011 Morlais RYA concerns and project responses. Published 08 Oct 2020.</p> <p>HR Wallingford Coastal Processes Modelling Report.</p>

		<p>Demonstration Zone with a modified eastern boundary or location that:</p> <ul style="list-style-type: none">i. Reduces or mitigates the impact of navigational squeeze into an area of dangerous overfalls;ii. Prevents recreational craft collision hazards with shipping;iii. Ensures recreational craft can readily access safe havens and places of refuge;iv. The role of Morlais as applicant, and; developer as undertaker of duties to safeguard maritime safety are clarified, and;v. recognises that any future use of floating, surface piercing or emergent devices would require a separate Marine Licence application with associated EIA/ES and NRA.	
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Morlais Demonstration Zone

Response to Statement of Case

Snowdonia Canoe Club

Document Title: Response to Statement of Case - Snowdonia Canoe Club

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Response to Statement of Case – Snowdonia Canoe Club

Morlais has received a number of objections to the MDZ project from the Snowdonia Canoe Club (SCC). The SCC's Statement of Case details 116 pages of arguments and representations based on five main concerns, which are summarised and responded to below. A section by section response is also included in Appendix A.

The five primary concerns are;

1. Omission by the Morlais Project of sea kayakers as important 'receptors' of project impacts.
2. Lack of information on potential changes to tidal flow regimes against which to assess impacts on sea kayaking activities.
3. Risk to life from collisions.
4. Degradation of the seascape as seen from sea level close to the MDZ.
5. The application is not compliant with the Well-being of Future Generations (Wales) Act 2015 (WBFG)

Summary response to SCC's five primary concerns

Objection text	Response
1. <u>Omission by the Morlais Project of sea kayakers as important 'receptors' of project impacts.</u> Despite Morlais being advised in November 2018 of the use of the area by many sea kayakers [Page 13 Ref 49], there is no evidence that the potential impacts on sea kayakers, including positioning of tidal devices and restrictions on access during construction, operation and decommissioning activities were considered or even recognised.	<p>Morlais have considered Kayakers at each stage of the process. Our engagement in acknowledgement of their status as key stakeholders and in response to their concerns is summarised below:</p> <ul style="list-style-type: none"> • Local clubs were provided with information and invited to Public Information Days in 2019 [See appendix 5 MMC012] • Kayaking considered in outline Socioeconomic chapter [MMC078] • Considered in Navigational Risk Assessment v3.0 • SCC / Canoe Wales Project Meeting 10/02/20 • Socioeconomic meetings Feb/Mar 2020 Note both Anglesey Adventures and Snowdonia Canoe Club were included in the initial tourism and recreation assessment and will be invited to contribute to the assessment of marine activities. Sea Kayaking UK (based in Holyhead) was also invited to participate in the initial tourism and recreation assessment (and visited by Morlais) but did not provide any feedback. • Considered in MMC132 MOR-BAU-DOC-0001_Supplementary Tourism and Recreation Assessment • Provision of GIS kayaking routes [MMC171] • Provision of Supplementary Kayaking and Sailing Activities Assessment [MMC193]

	<ul style="list-style-type: none"> • Provision of enlarged flow model outputs as requested • Explicit consideration of unpowered vessels considered in NRA Addendum [MMC196] • SCC / Canoe Wales and other kayakers Project meeting 21/09/20 • Added as a specific monitoring receptor in Outline Tourism Monitoring and Action Plan [MMC126] • Provision of hourly flow data as requested [MMC350] <p>The GIS information presented in MM171 demonstrates that the MDZ does not curtail use of the area for kayaking. Further detailed images of hydrodynamic effects and hourly flow data have been provided as requested. Kayakers have been individually considered in the NRA Addendum and ES Chapter.</p>
<p>2. <u>Lack of information on potential changes to tidal flow regimes against which to assess impacts on sea kayaking activities.</u> Morlais has commissioned mathematical modelling to determine how much energy can be extracted from tidal energy devices proposed for the MDZ. However, this does not inform sea kayakers on the potential impact of the MDZ on wave trains and eddies they rely on to safely enjoy the area.</p>	<p>The HRW hydrodynamic models have been designed to assess changes in the hydrodynamic conditions in terms of tidal flows and waves and their impact on the environment, not as SCC state to determine energy extraction. Kayakers exploit features of the ocean environment such as tidal races, eddies and waves to assist with navigation, increase enjoyment and provide rest. These features are created by the combination of a number of complex environmental factors, which are notably hard to predict for marine users. These include wind strength, direction and regularity, wave height, direction, speed and regularity, the phase of the moon, the time of year, the time of day, the height of the tide, the speed and direction of the tidal flow and local bathymetry. These factors do not always occur, meaning that there are times when there are more favourable or less favourable conditions for kayaking off Holy Island. Only when a particular combination of these factors align, will it result in particular condition that are safe and enjoyable for kayakers.</p> <p>Whilst it is possible for a hydrodynamic model to assess general trends and changes, it is not realistic to expect to be able to better understand the coming together of these complex factors. This is the reason that standard navigational directions for all craft give general advice and information, which are intended to provide guidance and are not intended to substitute the navigator's process of constant dynamic risk assessment in responding to environmental conditions. For these reasons, the</p>

	hydrodynamic results presented by Morlais for a full 240MW development in the most extreme wave and tidal conditions provide an indication of the expected impacts of the project on tide and waves, which are expected to be very minor. It remains the responsibility of the recreational users to navigate safely and with respect to the environmental conditions at any given time.
3. <u>Risk to life from collisions.</u> For sea kayakers surfing in the tidal stream wave trains, capsize is likely and in the event of a failed roll, the kayaker becomes a swimmer attached to a 5 m waterlogged kayak taken by the tide. Navigational squeeze within the inshore passage will force together higher numbers of different types of recreational vessels increasing the risk of collisions between boats. Any collision involving a kayaker in fast moving water could prove fatal. This is not recognised in the Morlais Navigational Risk Assessment [20].	The NRA Addendum specifically considers collision risk with respect to un-powered craft. All residual risks are ALARP or lower.
4. <u>Degradation of the seascape as seen from sea level close to the MDZ.</u> The coastline falls within the Holyhead Mountain Heritage Coast. The receptors spending the most time up close to the surface installations on the proposed layout of the MDZ will be sea kayakers and the impacts on seascape from this perspective have not been assessed.	Offshore recreational receptors such as people travelling on recreational vessels have been specifically considered in respect of Viewpoint 14. This viewpoint is located approximately 2.4 km from the MDZ, where it is predicted that there would be a moderate and not significant effect these receptors. However, it is acknowledged that the level of effect on these receptors, at a given location, would vary with distance and greater (and potentially significant) effects would occur at locations closer to the MDZ. However, such effects would be localised and associated with people travelling within approximately 2 km of the Project and lesser (not significant) effects would occur at greater separation distances.
5. <u>Omission of assessment of sea kayak-based enterprise and tourism.</u> The impact of the MDZ as currently proposed, particularly the risk to navigation by sea kayak and degradation of seascape is expected to have a detrimental impact on the local economy.	There is no evidence to suggest that kayaking is going to be negatively impacted in terms of navigation, and the evidence suggests that there will be no effect from visual impact and hence an extensive specific tourism assessment on this subject has not been undertaken. However wider tourism impacts, including these have been assessed and Kayaking businesses will be monitored under the Outline Tourism Monitoring and Action Plan and mitigated via the proposed consent condition on the deemed planning application should unexpected impacts occur [MMC196].

<p>We do not consider that the application is compliant with the Well-being of Future Generations (Wales) Act 2015 (WBFG).</p>	<p>Section 2.3.5 of Environmental Statement (ES) Chapter 2 Policy and Legislation outlines the Projects adherence with the goals of the Well Being of Future Generations (Wales) Act 2015</p>
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In conclusion, Sea Kayakers have been considered by the project and their concerns responded to. Whilst there is no evidence to suggest that their activities are going to be negatively impacted, the project has committed to a programme of socioeconomic monitoring and should it be required mitigation that would be deployed under the Outline Tourism Monitoring and Action Plan. Array Specific Navigation Risk Assessments will be completed prior each array deployment and Sea Kayakers will be consulted at this time. Also Sea Kayakers will be consulted in the definition of Safety Zones in accordance with the relevant provisions of the Energy Act 2004.

A detailed response to the SCC Statement of Case is included in Appendix A.

Appendix A – Detailed Response to SOC

Section	Objection text	Response
Introduction		
1	1 This Statement of Case (SoC) has been prepared by Snowdonia Canoe Club (SCC) in support of our objection to the granting of a Transport and Works Act Order (TWAo) to Menter Môn for their Morlais Demonstration Zone (MDZ) project. With the support and endorsement of Canoe Wales [2], our national governing body, this SoC should be taken as a representation on behalf of the global sea kayaking community.	We have spoken to a number of Sea kayakers who do not consider the project to be a problem for kayaking.
2	2 We wish it to be understood that SCC is not opposed to the development of tidal power in the seas around Anglesey. The aim of our SoC is to ensure that the impact of the Morlais proposal on sea kayaking is properly considered in the planning and consenting process. This is not yet the case.	The NRA addendum now specifically considers unpowered craft in response to Kayakers representations.
3	3 It is apparent within the documents and reports which make up the Environmental Statement (ES) accompanying this SoC that a general appreciation of sea kayaking on Anglesey by the Morlais project is low. Before being able to have meaningful engagement with the Environmental Impact Assessment (EIA) process which informs the ES it is necessary to develop a common appreciation of the nature and scale of the 'receptors' on which impacts will fall. To this end, in Annex 1, we present a brief account of how kayaks make use of the sea around Holyhead. We have also undertaken rapid informal surveys of sea kayakers to provide evidence for our case that sea kayaking is a robust, growing and significant contribution to the active outdoor recreation economy of Anglesey and North Wales. The report of these surveys is presented in Annex 2. The	<p>The project has consulted with kayakers as follows:</p> <ul style="list-style-type: none"> • Local clubs were provided with information and invited to Public Information Days in 2019 [See appendix 5 MMC012] • SCC / Canoe Wales Project Meeting 10/02/20 • Socioeconomic meetings Feb/Mar 2020 Note both Anglesey Adventures and Snowdonia Canoe Club were included in the initial tourism and recreation assessment and will be invited to contribute to the assessment of marine activities. Sea Kayaking UK (based in Holyhead) was also invited to participate in the initial tourism and recreation assessment (and visited by Morlais) but did not provide any feedback. • SCC / Canoe Wales and other kayakers Project meeting 21/09/20

	<p>team who has prepared this SoC are volunteers and although we can draw on our experience from our professional work the evidence we are providing is not definitive as preparing a formal description of our sector as a baseline against which to assess and monitor project impacts is clearly the responsibility of the project developer [see Chapter 9 socio-economic in Ref 48]. Our offering is intended to make the case that our sector is worthy of full consideration in the seascape, socio-economy and navigation sections of the EIA with proper treatment of risks and potential adverse impacts in the ES.</p>	<p>It is useful that SCC has now provided this information. Morlais welcomes the work done and recommendations by Snowdonia Canoe Club and will invite the club to further discussion in the production of a baseline of marine activities (including kayaking) that can be used as part of the monitoring process. In its ongoing work on analysing socio-economic matters relating to the MDZ, Morlais recognise the importance of marine activities (including kayaking) and has agreed to conduct a survey of activities, in addition to tourism and recreation activities, as part of its monitoring process. Both Anglesey Adventures and Snowdonia Canoe Club were included in the initial tourism and recreation assessment and will be invited to contribute to the assessment of marine activities. Sea Kayaking UK (based in Holyhead) was also invited to participate in the initial tourism and recreation assessment (and visited by Morlais) but did not provide any feedback. Due to covid19 restrictions and subsequent uncertainty, this work will be completed in 2021.</p>
4	<p>4 As is common with large, complex and innovative proposals we would expect extended negotiations between stakeholders, developer and regulators. However, with Morlais this process has been particularly difficult with the application to Natural Resources Wales (NRW) for a Marine license running in parallel with the TWAO application, the public inquiry process and Morlais seeking more intimate engagement. We note that only a sub-set of the documents arising from these processes have been uploaded onto the TWAO website and so only part of the material we consider significant to our SoC is to be considered by the Planning Inspectorate (PINS). There is a lot that is relevant to the Public inquiry and to our SoC in material presented to NRW and directly to SCC. Hence, we wish to submit these as evidence to the inquiry. To facilitate consideration of the full gamut of further discussions and work related to SCC sea kayaking representations to NRW we have tabulated the points in each of the documents we wish you to</p>	<p>Noted</p>

	consider as evidence in the inquiry. In Annex 4 we present material related to the hearing on the Character and appearance of the locality , in Annex 5 that related to Socio-economic matters and in Annex 6 on Marine matters including navigation .	
5	5 This SoC proceeds by outlining our general case, setting up our understanding of how development decisions should be informed and made and then presenting evidence to support our objection to granting a TWAO to Morlais. All references used in the SoC are provided but only those which are not in the public domain have been included in our evidence pack to PINS.	Noted
Context		
6	6 SCC does not have the competence to be able to challenge Morlais on compliance or otherwise with the laws, regulations and rules governing both the proper implementation of EIA procedures or the design and operation of a marine renewable energy installation. These issues we will leave to PINS and other stakeholders to address. However, as citizens of Wales we are aware of and very much wish to support the implementation of the Well-being and Future Generations (Wales) Act (WFGA) [45]. This Act is likely to be unfamiliar to stakeholders outside Wales and indeed there is scant evidence that Menter Môn or its consultants are fully cognisant that 'well-being' in this context is not simply green branding, employment or reduction of waste [11, 12]. The provisions of the Act find full expression in the 2019 Welsh National Marine Plan [21] and the 2020 implementation guidelines [22] for the plan. These are new so we have set out our interpretation of these documents to help establish a common understanding of the framework within which the decisions made by PINS and NRW should be made.	To describe the Morlais project as green branding and employment is false. Menter Mon Morlais is an organisation with embedded social and environmental responsibility at its core. The WFGA has been considered throughout the project design and EIA process. Section 2.3.5 of Environmental Statement (ES) Chapter 2 Policy and Legislation outlines the Projects adherence with the goals of the Well Being of Future Generations (Wales) Act 2015
7	7 It doesn't take recourse to the WBFG to see that early and sympathetic engagement of stakeholders is key to success in	We appreciate that we could have done more to engage with Snowdonia Canoe Club earlier in the process. Note that 5 local

	managing complex projects. The failure of Morlais to engage constructively with our issues is one of our grievances which lies outside the topics of the four public inquiry hearings, We therefore present it as part of the context against which PINS and other stakeholders should evaluate our objection to the granting of a TWAO.	canoe/kayak organisations were invited to the Public Information Days and comments from Kayakers were received and considered at these events (See MMC012). Further to this we have subsequently engaged with SCC and others in the process and have considered their concerns in the NRA Addendum.
Well-being for Future Generations		
8	8 Public bodies and their decisions in Wales are subject to the Well-being of Future Generations (Wales) Act 2015 (WFGA) [45]. The provisions of this Act therefore apply to public bodies such as NRW, PINS and Isle of Anglesey County Council (IoACC) involved in the TWAO application process. Reference to WFGA is especially relevant for complex decisions where trade-offs are required.	Section 2.3.5 of Environmental Statement (ES) Chapter 2 Policy and Legislation outlines the Projects adherence with the goals of the Well Being of Future Generations (Wales) Act 2015
9	9 The WFGA states that sustainable development is fundamental to the decisions and actions of Welsh public bodies. Sustainable development is defined as: <i>the process of improving the economic, social, environmental and cultural well-being of Wales by taking action, in accordance with the sustainable development principle (Section 5), aimed at achieving the wellbeing goals (Section 4).</i> [Part 2 Para 2 Ref 45]	
10	10 The Act requires that all of the following goals are considered: <ul style="list-style-type: none"> • A prosperous Wales • A resilient Wales • A healthier Wales • A more equal Wales • A Wales of cohesive communities • A Wales of vibrant culture and thriving Welsh language • A globally responsible Wales 	

11	<p>11 The detail of what each of these means is explained on the face of the Act.</p> <p>The Future Generations Commissioner requires five ways of working to demonstrate that these goals have been considered:</p> <ul style="list-style-type: none"> • Long term - The importance of balancing short-term needs with the need to safeguard the ability to also meet long-term needs. • Prevention - How acting to prevent problems occurring or getting worse may help public bodies meet their objectives. • Integration - Considering how the public body's well-being objectives may impact upon each of the well-being goals, on their other objectives, or on the objectives of other public bodies. • Collaboration - Acting in collaboration with any other person (or different parts of the body itself) that could help the body to meet its well-being objectives. • Involvement - The importance of involving people with an interest in achieving the wellbeing goals, and ensuring that those people reflect the diversity of the area which the body serves [46] 	
12	<p>12 Any decisions relating to the Morlais TWA proposal must therefore take into consideration the wide WFGA goals and ways of working explicit in the Act for the whole range of impacts. The Wales Marine Plan and the guidance to the Plan clarifies the duties of the relevant public authority: <i>"Decision makers should ensure that any potential adverse impacts resulting from a proposal are justified. In doing so, consideration should be given to the achievement of the Sustainable Management of Natural Resources (SMNR) or Wales' well-being goals under the Well-being of Future Generations (Wales) Act 2015 (WFGA)."</i></p>	
13	<p>13 We do not consider that the applicant is fully aware of the significance of this Act and has not considered all of the goals, in particular we suggest that the applicant failed to include</p>	<p>The Applicant is fully aware of the importance of the Well-being of Future Generations Act. ES Chapter 2, Table 2-2 shows how each goal is addressed by the Project, including with regards to 'A healthier Wales'.</p>

	<p>assessment of the sea kayaking interests in relation to a more prosperous Wales, a more resilient Wales and a healthier Wales. We suggest there are also deficiencies in terms of ways of working, especially prevention, as Morlais is promoting a project which increases risks to human life without any mitigation and although communicating with stakeholders, has failed to treat them or their contributions with respect.</p>	<p>An assessment of the impacts of the project on Health and Socio-economics is provided in ES Chapter 25, Socioeconomics, Tourism and Recreation. ES Chapter 22 considers water sports such as sea kayaking. In addition, in response to representations from Kayakers the project has included specific consideration of unpowered craft in the NRA Addendum. It has provided a plot of kayak GIS data as requested by SCC that shows that the area used by kayakers does not overlap with the MDZ. This is borne out in the data that SCC provides in its Statement of Case. The NRA addendum shows all risk are As Low As Reasonably Possible (ALARP) or below and so there will be no increased risks to human life.</p> <p>Therefore, as presented in the ES, the Project will have no significant negative impact on health and wellbeing, and is expected to have a minor beneficial impact to a number of receptors. During its operation the project would contribute to reaching global, European and national targets on CO2 reduction and renewable energy production. The Applicant has a strong local presence on Anglesey and is committed to developing renewable energy on the Island. The Applicant also has a desire to increase and diversify employment and economic development opportunities across the communities.</p>
Welsh National Marine Plan		
14	<p>14 The Welsh National Marine Plan (WNMP) [21] has been drawn up by the Welsh Government as required under the Marine and Coastal Access Act 2009 [46] and applies to the decisions of public authorities related to activity in the inshore (out to 12 nautical miles) and offshore (12 to 200 nautical miles) of the coast of Wales^a. The WNMP includes many maps which are available in the Marine Planning Portal^b. The Tidal Stream Energy Resource Area map on this portal identifies a wide area from Treaddur Bay to Point Lynas</p>	<p>Section 2.3.7.1 of ES Chapter 2 Policy and Legislation outlines key policies of the Welsh National Marine Plan of relevance to the sustainable development of the Morlais project, and details where these policies are considered throughout the ES. This was based on the draft WNMP at the time of writing the ES. In addition, the Welsh National Marine Plan Comparison Note (document MOR-RHDHV-DOC-0128(03)), submitted by the Applicant in September 2020, provides further information in relation to the 2019 WNMP.</p>

	as a “Tidal Stream Energy Resource” including the area known as the West Anglesey Demonstration Zone (WADZ) initially leased by Crown Estates to Menter Môn. The Implementation Guidance to the WNMP [22] provides that: <i>decisions made by RPAs with the potential to affect the Welsh marine plan area should be in accordance with the Sustainable Development principle of the WFGA.</i> [2.1.1 para 49 Ref 22].	
15	15 The Implementation Guidelines to the to the WNMP state that there is a decision hierarchy relating to adverse impacts: <i>Proposals should seek to address any identified adverse impacts through firstly considering avoidance measures and only progressing through the hierarchy to minimisation and then to mitigation measures where achievement of the previous aim can be demonstrated as not being realistically possible or fully adequate.</i> [1.8.1. para 27 Ref 22]	<p>The Morlais Navigation Risk Assessment and ES Chapter 15 Shipping and Navigation Addendum shows that the Project will not constrain safe access to existing maritime activities.</p> <p>The Morlais application and Further Environmental Information fully assesses potential adverse impacts on each receptor including wildlife, habitats, historic assets, shipping and navigation, and other users, and provides mitigation to ensure all impacts will be non-significant in EIA terms.</p>
	^a See https://gov.wales/marine-planning for all documentation related to the WNMP ^b http://lle.gov.wales/apps/marineportal/	
16	16 The guidance states that: <i>Proposals should not constrain existing access, and/or should seek to facilitate increased access to the marine and/or coastal environment where possible and appropriate.</i> [2.3.1 para 77 Ref 22] and that: <i>RPAs should assess the risks and potential adverse impacts associated with access proposals, such as disturbance to wildlife, habitats, and/or historic assets, safety considerations and conflicts between activities when making their decisions.</i> [2.3.1 para 79 Ref 22]	
17	17 In terms of seascape the guidance states that: <i>Proposals should demonstrate consideration of the existing character and quality of the seascape, its sensitivity and its capacity to accommodate change.</i> [2.3.7 para 115 Ref 22] We consider that	Offshore recreational receptors such as people travelling on recreational vessels have been specifically considered in respect of Viewpoint 14. This viewpoint is located approximately 2.4 km from the MDZ, where it is predicted that there would be a moderate and not

	<p>this includes consideration of the seascape from the viewpoint of the recreational kayaker as well as the seascape as seen from the land.</p>	<p>significant effect these receptors. However, it is acknowledged that the level of effect on these receptors, at a given location, would vary with distance and greater (and potentially significant) effects would occur at locations closer to the MDZ. However, such effects would be localised and associated with people travelling within approximately 2 km of the Project and lesser (not significant) effects would occur at greater separation distances.</p>
18	<p>18 The guidance advises potential for support for the deployment of wave and tidal stream devices including in testing and demonstration zones. It is made clear that the seascape, navigational safety and adverse impacts on existing activities must be properly considered. We do not consider that the proposal has taken sufficient account of these requirements. In addition, the scale of this proposal is beyond that of a <i>small scale demonstration project</i> [3.1.4 para 274 Ref 22] which means that we do not consider that proposal is appropriate for adaptive management where a full approval is proposed. Should the proposal be approved each part of the development should be subject to monitoring and to subsequent further scrutiny.</p>	<p>This is addressed in the OEMMP (MMC175)</p>
19	<p>19 Given our particular concerns about safety we note that the guidance states that: <i>RPA's should only issue consent if they are satisfied that the proposal will not adversely impact on navigational safety ...</i> [3.1.4 para 280 Ref 22] The guidance clarifies that in the case of marine renewable proposals particular consideration must be made to: <i>impacts on UK search and rescue capability and the safety of navigation (Ports and Shipping Policy SAF_01b)</i> We have serious concerns about navigational safety for kayaks and the potential for fatal incidents if the current proposal were to proceed.</p>	<p>Two fully independent navigation risk assessments have been undertaken by the developer supported by interactive boundary assessment and a Coastal Processes report. The conclusion of these NRA's are that navigational risk of this development is ALARP or better and so does not represent a significant risk to navigational safety.</p>
20	<p>20 Overall the guidance relating to the safeguarding of the Tourism and Recreation sector states that: Proposals likely to have a</p>	

	significant adverse impact(s) upon an established activity (whether or not subject to a formal authorisation) must demonstrate how they will address compatibility issues. [3.2.2 para 447 Ref 22] We consider that this has not been addressed satisfactorily for the kayaking sector.	The project does not consider that there is evidence to suggest that kayaking is going to be negatively impacted, however a programme of monitoring and mitigation has been committed to in response to concerns from stakeholders.
Engagement with Morlais		
21	21 Snowdonia Canoe Club (SCC) is a recreational kayak club affiliated to Canoe Wales which has 90 members of all ages and experiences serving North West Wales. We are predominately a club for local paddlers with 95% of our members living within Anglesey (25%), Gwynedd (43%), Conwy (24%) and Denbighshire (3%) alongside a few members (5%) who live in England and join us for weekend events. The majority of our members are sea kayakers and an actively involved in the North Wales sea kayaking scene, well networked with the wider sea kayaking community and visiting clubs and paddlers.	-
22	22 From presentations at local events (e.g. National Eisteddfod 2017 held on Anglesey) and press, SCC members were generally aware that Menter Môn (MM) were developing Morlais as a tide turbine demonstration zone off Holyhead. At this time the proposal was presented as offshore (at the West Anglesey Demonstration Zone (WADZ) and totally sub-surface and deemed to be of little immediate concern. Nevertheless, in order to learn more two of our members attended the Morlais open days in early 2019. Here it became apparent that the proposed array had been relocated (for which we have yet to find any published justification) and could have significant overlap with the areas frequented by sea kayakers. When the public consultation for the MM application to the Planning Inspectorate for a Transport and Works Act Order (TWAo) for Morlais was launched we therefore set out to examine the proposal in more detail. This revealed multiple concerns and SCC	Paddlers have always been included in recreational craft in the NRA but we listened to these comments, meet with local representatives and all three of the bulleted points have been further drawn out in the NRA Addendum. The 'overlap' referred to is not borne out in the GIS data provided. The project also included the commissioning of a Coastal Process report to assess the tidal flow regimes and the impact of these from device deployments.

	sent in an objection to the Planning Inspectorate (PINS) [1] with major concerns related to:	
23	<ul style="list-style-type: none"> Omission of sea kayakers as an important 'receptor' of project impacts 	<p>Morlais have considered Kayakers at each stage of the process. Our engagement in acknowledgement of their status as key stakeholders and in response to their concerns is summarised below:</p> <ul style="list-style-type: none"> Local clubs were provided with information and invited to Public Information Days in 2019 [See appendix 5 MMC012] Kayaking considered in outline Socioeconomic chapter [MMC078] Considered in Navigational Risk Assessment v3.0 SCC / Canoe Wales Project Meeting 10/02/20 Socioeconomic meetings Feb/Mar 2020 Note both Anglesey Adventures and Snowdonia Canoe Club were included in the initial tourism and recreation assessment and will be invited to contribute to the assessment of marine activities. Sea Kayaking UK (based in Holyhead) was also invited to participate in the initial tourism and recreation assessment (and visited by Morlais) but did not provide any feedback. Considered in MMC132 MOR-BAU-DOC-0001_Supplementary Tourism and Recreation Assessment Provision of GIS kayaking routes [MMC171] Provision of Supplementary Kayaking and Sailing Activities Assessment [MMC193] Provision of enlarged flow model outputs as requested Explicit consideration of unpowered vessels considered in NRA Addendum [MMC196] SCC / Canoe Wales and other kayakers Project meeting 21/09/20 Added as a specific monitoring receptor in Outline Tourism Monitoring and Action Plan [MMC126]

		<ul style="list-style-type: none"> • Provision of hourly flow data as requested [MMC350] <p>The GIS information presented in MM171 demonstrates that the MDZ does not curtail use of the area for kayaking. Further detailed images of hydrodynamic effects and hourly flow data have been provided as requested. Kayakers have been individually considered in the NRA Addendum and ES Chapter.</p>
24	<ul style="list-style-type: none"> • Lack of information on potential changes to tidal flow regimes against which to assess impacts on sea kayaking activities 	<p>The HRW hydrodynamic models have been designed to assess changes in the hydrodynamic conditions in terms of tidal flows and waves and their impact on the environment, not as SCC state to determine energy extraction. Kayakers exploit features of the ocean environment such as tidal races, eddies and waves to assist with navigation, increase enjoyment and provide rest. These features are created by the combination of a number of complex environmental factors, which are notably hard to predict for marine users. These include wind strength, direction and regularity, wave height, direction, speed and regularity, the phase of the moon, the time of year, the time of day, the height of the tide, the speed and direction of the tidal flow and local bathymetry. These factors do not always occur, meaning that there are times when there are more favourable or less favourable conditions for kayaking off Holy Island. Only when a particular combination of these factors align, will it result in particular condition that are safe and enjoyable for kayakers.</p> <p>Whilst it is possible for a hydrodynamic model to assess general trends and changes, it is not realistic to expect to be able to better understand the coming together of these complex factors. This is the reason that standard navigational directions for all craft give general advice and information, which are intended to provide guidance and are not intended to substitute the navigator's process of constant dynamic risk assessment in responding to environmental conditions. For these reasons, the hydrodynamic results presented by Morlais for a full</p>

		240MW development in the most extreme wave and tidal conditions provide an indication of the expected impacts of the project on tide and waves, which are expected to be very minor. It remains the responsibility of the recreational users to navigate safely and with respect to the environmental conditions at any given time.
25	<ul style="list-style-type: none"> Risk to life from collisions with project infrastructure 	The NRA Addendum specifically considers collision risk with respect to un-powered craft. All residual risks are ALARP or lower.
26	<ul style="list-style-type: none"> Degradation of the seascape as seen from sea level close to the MDZ 	Offshore recreational receptors such as people travelling on recreational vessels have been specifically considered in respect of Viewpoint 14. This viewpoint is located approximately 2.4 km from the MDZ, where it is predicted that there would be a moderate and not significant effect these receptors. However, it is acknowledged that the level of effect on these receptors, at a given location, would vary with distance and greater (and potentially significant) effects would occur at locations closer to the MDZ. However, such effects would be localised and associated with people travelling within approximately 2 km of the Project and lesser (not significant) effects would occur at greater separation distances.
27	<ul style="list-style-type: none"> Omission of assessment of sea kayak based enterprise and tourism 	There is no evidence to suggest that kayaking is going to be negatively impacted in terms of navigation, and the evidence suggests that there will be no effect from visual impact and hence an extensive specific tourism assessment on this subject has not been undertaken. However wider tourism impacts, including these have been assessed and Kayaking businesses will be monitored under the Outline Tourism Monitoring and Action Plan and mitigated via the proposed consent condition on the deemed planning application should unexpected impacts occur [MMC196].
28	Project impacts on wildlife	The impacts on wildlife are considered elsewhere.
29		-

	<p>23 The TWAO public consultation period closed on the 31st October 2019. Since then, the parallel application to Natural Resources Wales (NRW) has thrown up two further opportunities for public consultation. The first closed on the 9th January 2020 on the application documents and the second on further environmental information (FEI) submitted by MM in response to a request from NRW based on the first consultation representations on the 9th September 2020. With heightened awareness of the potential impacts of Morlais, there were 22 responses from the sea kayak community to NRW to add to the five that sent in objections to PINS. This wider engagement within the sea kayak community served to confirm and add depth to our initial concerns. With the support and endorsement of Canoe Wales [2], SCC has taken on the role of representing the collective concerns of the sea kayaking community. We therefore wish to include as primary evidence the individual representation from kayakers to PINS [33, 34, 35] and to NRW [9].</p>	
30	<p>24 We also wish to draw the attention of PINS to direct communications arising from engagement with Morlais since January 2020 [28, 29] and to communications between NRW and MM regarding consideration of issues raised by SCC, individual paddlers and sea kayak companies.</p>	-
Character and appearance of the locality		
31	<p>25 In the first consultation SCC along with other representations from kayakers raised concerns about the lack of consideration of the impact on seascape from the perspective of a kayak within the inshore passage. Principally we did not agree with Morlais' assessment that: <i>The tidal energy devices would not become a defining feature of seascape or landscape character and would comprise small components within the open views that can be seen</i></p>	<p>This is a selective extract from the conclusions, which includes a summary of the assessment findings. This paragraph sets out the predicted significant adverse effects on parts of the Holyhead Mountain and Rhoscolyn SCAs. The quote made omits the first part of the sentence: "In the context of the wider Study Area, the offshore components of the Project would frequently comprise relatively small elements in the context of key components of the character types/units</p>

	over the Irish Sea [page 89 para 324 Ref 6]. Annex 3 is a record of the exchange that then ensued on this point.	and the potential effects on seascape/landscape character are not predicted to be significant”.
32	<p>NRW requested additional information on seascape from the viewpoint of small recreational vessels in their letter of the 2 March 2020 [7]. Subsequently the Seascape Landscape and Visual Impact Assessment (SLVIA) photomontages were updated [10] but did not include any on the water viewpoints. Following a reminder from NRW [32] Morlais responded: <i>The offshore component of the Project would not prevent the appreciation of the cliffs and coastal landform and they would remain the dominant features in the views. People travelling on very small vessels, such as sea kayaks, would be positioned at a lower height than the onshore viewpoints and therefore the offshore elements of the Project are likely to be less visible than shown in the visualisations and this may reduce further due to prevailing sea conditions (e.g. wave movement)</i> [37]. We disagree with this assessment of impacts on kayakers. Even from the 1 m high vantage point of a seated kayaker the Morlais above surface installations will be visible from several kilometres away. The larger installations would be imposing if not intimidating from close quarters (the kayak tracks pass within tens of metres of the first structures) especially while rounding South Stack. The iconic views approaching South Stack from both directions would be set against an array of floating devices and electrical hubs which are of the same scale as the lighthouse and buildings (the Orbital barges are 72 m long the lighthouse buildings are estimated to be 37 m long, the electrical hubs could be up to 18 m tall while the lighthouse is 28 m). Furthermore, although the devices may indeed not be visible from the bottom of a deep wave trough they will be visible from crest of the waves and in any case the greatest number of kayakers would be passing in calm conditions (see Figure 1). Many representations from kayakers highlight the importance of the ‘wild’ nature of the seascape in their qualitative experience of</p>	<p>Whilst NRW requested additional information, no additional viewpoints were requested. The response to the request sought to highlight where the potential visual effects on offshore recreational users were included in the SLVIA. Importantly Section 24.6.5.5.5.6 of the SLVIA identified the potential for significant effects on the users of recreational vessels within 2km of the MDZ. Therefore, significant visual effects could apply to the users of recreational vessels between the coastline. This would include kayakers. There has been no attempt to trivialise the potential impacts, the purpose of the response was to identify that significant adverse effects were described in the SLVIA.</p>

	the Stacks and the degradation of the seascape is likely to put people off visiting. We object strongly to the trivialisation of these impacts by Morlais.	
33	26 The perceived wildness of the seascape is a significant component of the qualitative experience of the Heritage Coast seascape. Based on available photomontages and consideration of the scale and alignment of MDZ structures, SCC consider that Morlais will significantly degrade the seascape as viewed from kayaks and other boats passing through the inshore passage. The industrialisation of the MDZ is very likely to deter visitors, especially those from outside the UK who can choose from alternative locations outside Wales. The wild nature of the seascape adds to its aesthetic value and attractiveness. Detractions from the quality of the seascape should be avoided from all angles.	It is agreed that wildness is an important component of the seascape and this is referred to the SLVIA. The SLVIA also sets out the potential for significant visual effects on the users of recreational vessels, including kayakers, in the area surrounding the Project (as described above).
34	The negative impact of the imposition of large visible infrastructure at close quarters to vessels passing the inshore passage must be included in the SLVIA to enable an informed decision to be made	It is agreed that there will be negative visual effects on the users of recreational vessels as a result of the offshore components of the Project and this acknowledged in the SLVIA. The viewpoints included in the assessment were agreed through extensive consultation with NRW and IoACC. This included a wide range of visual receptors throughout the 15km study area.
Socio-economic matters, including tourism and the local economy		
35	27 Chapter 25 of the ES prepared by Aquatera [11] devoted just one paragraph to the use of the MDZ for kayaking and gave the impression that the area is only for the use of experienced kayakers and that all that is required by Morlais is to keep the sea kayak community informed of the development of the site and for some signage. This is counter to good practice in socio-economic and recreational impact assessments in USA [14, 16] as recommended for surfing impacts [15] and in EMEC [47] and as recommended by international good practice guides e.g. the Ocean Energy Systems -	The references provided by Snowdonia Canoe Club are not peer reviewed with the exception of Voke <i>et al.</i> (2013) Economic evaluation of the recreational value of the coastal environment in a marine renewables deployment area, Ocean and Coastal Management, 78, 77-87. Morlais has considered the contingent valuation methodology used by Voke <i>et al.</i> (2013) but believes that the survey approach, coupled with analysing publically available data, and agreed with Isle of Anglesey County Council, is a more suitable approach to achieve to measure tourism and recreation activities. However, Morlais accepts

	Environmental 2020 State of the Science Report [48]. These latter two omissions are particularly surprising given that Aquatera was the socio-economic consultant for EMEC and is a partner in OESEnvironmental.	the conclusion of Voke <i>et al.</i> (2013) that the " <i>results show that only a small number of visitors, 3.5%, would be put off visiting the area again due to marine renewable energy developments</i> " and that " <i>marine energy developments should not affect tourist revenue.</i> "
36	<p>28 The dismissal of the significance of the area for kayaking and its contribution to the local economy engendered a strong representation from the sea kayak community to PINS [1, 2, 34] and the NRW Marine license consultation [9]. NRW [7] requested that: <i>Greater consideration should be given to this recreational activity in terms of potential impacts from the proposal ... Consequently, the ES (and relevant supporting documentation) should be updated with greater recognition to this activity ... We strongly recommend that engagement with these local recreational groups, and associated stakeholders, is initiated at the earliest opportunity while due recognition is given to the public representations received.</i> [7]. Annex 5 gives a full account of exchanges with Morlais related to the socio-economic chapter in the ES. Morlais responded by commissioning the following new work from Bangor University (BU):</p> <ul style="list-style-type: none"> • Supplementary socio-economic assessment [12] • Supplementary tourism and recreation assessment [13] 	<p>Kayaking activities were not dismissed by Morlais; both Anglesey Adventures and Snowdonia Canoe Club were included in the initial tourism and recreation assessment. In its ongoing work on analysing socio-economic matters relating to the MDZ, Morlais recognise the importance of marine activities (including kayaking) and has agreed to conduct a survey of activities, in addition to tourism and recreation activities, as part of its monitoring process. This will also involve producing a baseline of marine activities. Due to covid19 restrictions and subsequent uncertainty, this work will be completed in 2021.</p>
37	<p>29 For these studies two representatives of the sea kayak community were interviewed; - SCC and Anglesey Adventures a kayak guiding outfit. The point was strongly made by SCC that any socioeconomic assessment would require some estimation of the numbers and nature of current employment in kayak-based enterprises along with an assessment of the numbers of kayakers visiting Anglesey. Preliminary numbers on employment were provided at the meeting between Morlais, Marine Space, Canoe Wales and SCC (Swtan, Neuadd y Dref, Llangefni, 10/02/2020) and the minutes note that: <i>all this information is really useful</i> [38]. The</p>	<p>Voke <i>et al.</i> (2013) found "<i>that only a small number of visitors, 3.5%, would be put off visiting the area again due to marine renewable energy developments</i>" and that "<i>marine energy developments should not affect tourist revenue.</i>" Therefore, there is limited impacted expected on marine activities and Morlais initially concluded that there was not a need to produce a stand alone analysis of marine activities. However, its ongoing work on analysing socio-economic matters relating to the MDZ, Morlais recognise the importance of marine activities (including kayaking) and has agreed to conduct a survey of activities, in addition to tourism and recreation activities, as part of its</p>

	<p>consultant should also have had access to the six representations made by commercial guiding providers to NRW's ORML1938 public consultation [9]. SCC offered to assist if further data were required. It was therefore something of a disappointment to find that none of these were referenced in the BU reports which were based entirely on national level standard industrial classification (SIC) based data. This is a very blunt tool to examine the operation of a micro-segment of the outdoor recreation and training sector. It is SCC's view that both Chapter 25 in the ES and the supplementary report by BU are biased towards positive economic impacts arising from Morlais since no negative impacts were included in the assessment.</p>	<p>monitoring process. This will also involve producing a baseline of marine activities. Due to covid19 restrictions and subsequent uncertainty, this work will be completed in 2021. The focus of the supplementary report were (land based) tourism and recreation enterprises and activities. Sea kayak activities were considered in the report. Morlais propose to conduct additional monitoring of marine-related activities (including sea kayak enterprise and tourism), in addition to the analysis of tourism and recreation activities. The impact of the MDZ on marine-related activities will be monitored in conjunction to tourism and recreation activities. This will be completed in 2021.</p>
38	<p>30 The BU reports present evidence gleaned from three case studies to propose that marine renewable energy installations would have minimal impact on tourism. Of particular note is the case study derived from the paper by Voke et al (2013) [16] which considers the tidal demonstration project at St David's Head which concluded: <i>only a small number of visitors, 3.5%, would be put off visiting the area again due to marine renewable energy developments ... These results suggest that marine energy developments should not affect tourist revenue</i>. However, the majority of interviewees at St David's were land based holiday makers – so their response is perhaps not surprising when a view of distant structures is only a very small part of their enjoyment of their holiday. The most local of the case studies provided considered that the imposition of the Gwynt y Mor windfarm (7 miles away across the bay lost in the haze most of the summer) had no discernible impact on the number of people using the Llandudno tram. Although we accept that casual visitors engaged in land-based tourism may hardly notice distant seascapes this does not mean that kayakers and other boat users will be as forgiving and can safely be screened out as only a small proportion of visitors. The Implementation Guidance for the Welsh Marine Plan [21] requires</p>	

	that impacts on tourism and recreation and in particular those in close proximity to the shoreline, should demonstrate how they have considered, and addressed the requirement to avoid, minimise or mitigate, their impact upon the seascape. Morlais' has trivialised rather than address our concerns. At the very least we expected the recreation and tourism report should provide a recognisable description of coastal and marine recreation. The impact analysis should have included a worst-case scenario where the kayakers are displaced elsewhere for training and the guides either lose their livelihoods or have to relocate. We would then have expected some discussion of how to avoid, minimise or mitigate any adverse impacts. If it proceeds as planned we anticipate significant economic losses to arise from imposition of the Morlais scheme.	
39	<p>31 The sea kayak economy has not previously been described so we undertook two short surveys to back up claims made by the sea kayak community's representations of the international status of the Stacks as a premier paddling and training area. There were two online questionnaire surveys, the first, 'Paddler survey' was aimed at individual sea kayakers frequenting Holyhead and ran from 19 Aug to 11 Sept 2020 with 172 returns. The second, 'Guide survey' was directed to a list of local kayak companies and between 13 – 16 September with 15 responses. These surveys are reported in full in Annex 2. These data were summarised to provide a profile of how kayakers use Anglesey and of the structure of the economy this activity supports.</p> <p>,</p>	<p>Morlais welcomes the work done by Snowdonia Canoe Club and will look to incorporate the results of the 'Paddler survey' and 'Guide survey' in the production of a baseline of marine activities (including kayaking) that can be used as part of the monitoring process. In its ongoing work on analysing socio-economic matters relating to the MDZ, Morlais recognise the importance of marine activities (including kayaking) and has agreed to conduct a survey of activities, in addition to tourism and recreation activities, as part of its monitoring process. Both Anglesey Adventures and Snowdonia Canoe Club were included in the initial tourism and recreation assessment and will be invited to contribute to the assessment of marine activities. Sea Kayaking UK (based in Holyhead) was also invited to participate in the initial tourism and recreation assessment (and visited by Morlais) but did not provide any feedback. Due to covid19 restrictions and subsequent uncertainty, this work will be completed in 2021.</p>
Discussion		

40	<p>The sea kayak community does not accept that the Supplementary socio-economic assessment and Recreation and tourism assessments adequately represent the potential negative impact of the Morlais scheme on the local sea kayak-based economy. We recognise that working on microsectors of specialist outdoor activity providers is not straightforward but had made sincere offers to assist Morlais with this so a more complete assessment should have been feasible.</p>	<p>Morlais propose to conduct additional monitoring of marine-related activities (including sea kayak enterprise and tourism), in addition to the analysis of tourism and recreation activities. The impact of the MDZ on marine-related activities will be monitored in conjunction to tourism and recreation activities. This will be completed in 2021.</p>
41	<p>47 The initial representation of SCC [1] to the TWA Order was that Chapter 25 of the ES only made passing mention of the presence of sea kayaks close to the MDZ and no mention of potential impacts on kayaking activities. Grave concerns were raised concerning the potential impacts of hydrodynamic changes arising from introduction of tidal turbines on tidal streams, races and eddies and of the risk to life from collision with surface infrastructure. Since October 2019 there has been several developments as documented in Annex 5. The back and forth on whether there would be an Addendum to the NRA ended with a defence of the original assessment though a new figure of kayak tracks [18] was produced along with an interactive boundary assessment [23]. Given there appears to be no adequate description of sea kayaking in the locality in the ES we start by setting out a brief account of sea kayaking and follow with a critique of the new documents.</p>	<p>The ES has always made reference to kayaks and detailed the consultation with kayakers and responses to their concerns. The amended ES picks up the additional detail in the NRA Addendum on unpowered craft.</p> <p>The “back and forth” on the NRA actually demonstrates our desire to listen and address concerns and the reference to the kayak tracks as a defence of the original assessment is misleading. These were supplied simply to reconfirm that the traffic data shows that recreational users generally stay outside the MDZ.</p> <p>Morlais position, which is supported by the GIS tracks provided by SCC in this representation is that there is not expected to be any significant overlap between the MD and normal kayaking activities. For these reason Morlais is of the opinion that no further quantitative study is required. The NRAA considers unpowered craft and concludes that all risks are ALARP of better.</p>
Marine matters, including navigation		
42	<p>48 With the exception of a relatively small number of sit on tops, the sea kayaks that frequent the seas off Holyhead are generally just over 5 m long, up to 0.5 m wide with a draught of less than 0.15 m. As self-powered paddle craft we have limited forward speed – generally navigation planning would work on a 3 knot cruising speed</p>	<p>Un-powered vessels are explicitly considered in the NRA Addendum.</p>

	(5.5 km/hr or ~1.5 m/sec) [3]. A strong paddler may have a maximum speed of twice this but this can only be sustained for short periods of time. We work at an intimate scale with the water; using eddies for safety and to make progress against the prevailing tide while wave trains in overfalls are used as 'play' features to surf against the flow as well as for passage.	
Sea kayaking to the West of Holy Island		
43	49 Annex 1 describes how the area between Porth Dafarch and Soldier's Point is used by sea kayakers.	-
44	50 In response to concerns that marine traffic surveys using radar and AIS did not include kayaks, a Figure designated 15-14 [18] was prepared by Morlais showing kayak tracks relative to MDZ facilities and operational exclusion zones (see Figure 5).	-
GPS track representation of kayak activity		
45	<p><i>Figure 5: Map of recreational kayaking activity prepared by Marine Space designated Figure 15-14</i></p> <p>The key to the Figure does not contain any sources, but correspondence with Morlais provided the following clarification: <i>The new Figure has been provided which presents GIS routes collected from publicly available leisure activity data collected over the most recent 2 year period</i> [28]. SCC also asked Morlais how their consultants assessed the traffic density on their map as the whole area is indicated as Low recreational activity when it is arguably one of the busiest sea kayak areas in Wales. We have not yet had a response from Morlais on this. SCC recommends that any categorisation of the significance of an activity by Morlais should be made in relation to the overall number of kayakers rather than all traffic.</p>	This refers to the "Sea Kayaking in Vicinity of the MDZ".. As this is a national (perhaps) international database looking at all recreational users then level of recreational activity are coloured based on a national activity hence this area may show as low activity when compared to other areas such as the Solent. The data provides an indication only of the level of activity in this region but has predominantly been used to understand the most commonly used routes that the kayakers take rather than the intensity of activity. From consultation we understand that this area is frequented by a significant number of kayakers and this has been considered in the Navigation Risk Assessment.

46	<p>51 While the envelope of the tracks as shown in Figure 5 does generally define the area most commonly traversed by kayakers from Penrhyn Mawr to North Stack, regularly used routes from South Stack to Carmel Head and the Skerries, circumnavigations of Holy Island and Anglesey and crossings to Ireland, all listed in the Welsh sea kayaking guide are missing (see Annex 1). Most significantly it does not include the tracks that may be taken by kayaks or swimmers that are at the mercy of the tide and winds as a result of actual or simulated (training) incidents.</p>	<p>SCC acknowledge that Figure 5 does generally define the area most commonly traversed by kayakers from Penrhyn Mawr to North Stack. Un-powered vessel risks are considered in NRA, specifically "Set on to device by tidal stream/ pinning" is identified as a causal factor in the assessments of hazards for un-powered recreational vessels.</p>
47	<p>52 Figure 6 (included in the SCC objection to the TWAO public consultation) shows GPS tracks over several years from one Anglesey sea kayaker in the area to the West of Holy Island. Note that these are all actual tracks by an elite kayaker – they do not include tracks by less experienced kayakers or capsized casualties being taken by the tide. These tracks extend significantly further into the MDZ than the tracks shown in Figure 7. One of these widely respected local kayak coaches who has served as cox of the Holyhead lifeboat has advised that a clear 1.5 nautical mile from the coast would be needed to accommodate most sea kayak activity but searches and rescues could take place further out [52 and Box 2]. This confirms that the eastern MDZ is intolerable and consideration should be given to extending the turbine-free area to 1.5 nautical miles from the coast.</p>	<p>The tracks given almost exactly match those provided by Morlais in the GIS figure in MMC171, with the exception of a couple that run through the MDZ east to west. In any case, the project is not seeking to exclude navigation from the MDZ.</p> <p>The 1.5nm figure is not supported by any data and actually for all except a few specific points , 1km is adequate to allow all kayak use.</p> <p>The comment about searches and rescue is incorrect as the project has already committed to aligning and spacing arrays such that search and rescue operations can be undertaken within the MDZ.</p>
48	<p>53 A revised interactive boundary assessment [23] was prepared by Marico Marine following the change to the eastern boundary of the MDZ. However, as can be seen in Figure 5 and Figure 6 there are numerous kayaks which already cross the full width of the inshore passage. Assuming that these activities will continue as they are at present then the imposition of the inshore passage and the congregation of other vessels into water potentially occupied by kayaks creates significant risk of boat on boat collisions. The most</p>	<p>This is misleading and refers to the original IBA prior to the assessment which included the zone with >8mUKC. The navigable width taking this in to consideration is approximately 1,000m at South Stack.</p> <p>The second reference that has been lifted from the IBA also fails to include the following: Given that application of the Interactive Boundary template and guidance relates primarily to the assessment of commercial routeing,</p>

	critical area is the pinch point at South Stack which is considered to have a maximum navigable width of 474 m [page 30 Ref 23] resulting in the conclusion: <i>The updated layout shows some improvement on the IB01 assessed design for the eastern route but remains “intolerable” in line with the MGN 543 tolerability assessment criteria, which requires a minimum 0.5 nm separation between a ‘turbine’ boundary and the nearest 90% traffic level.</i> [Page 2 Ref 23].	which is unrepresentative of the types of vessels utilising the inshore passage and given the proximity of the coastline to the east, opportunities for flexibility are limited and the eastern boundary is unable to satisfy the existing tolerability criteria. Precisely where an interactive boundary should lie requires flexible definition. It is suggested, that the appropriateness of the assessment criteria set out in MGN 543, Annex 3 for assessment of the eastern boundary should therefore be reviewed in discussion with the MCA.
Interactive boundary assessment and navigation squeeze in the inshore passage		
49	<p>54 Navigational difficulties and collision between different classes of recreational boat when transiting between Penrhyn Mawr and Soldiers Point are not currently included in the NRA. The whole of the inshore passage can be used by kayaks – often in groups of up to 20 boats and on busy days, several groups going in different directions. Kayaks are low to the water, invisible to RADAR and do not carry AIS so the risk of encounters could be high if kayakers have to share restricted water with other boats. At the present time encounters are rare as a natural separation takes place with yachts keeping out beyond the tide races and kayaks staying inshore of the tide races. Groups of kayaks can also be encountered ‘playing’ in the tide races and stay there for an hour or so at a time taking turns to surf upstream. If yachts are forced into the races and are coming downstream then there is obviously a risk to both boats.</p> <p>Furthermore, the Anglesey cruising guide [55] advises sailing boats: <i>In the event that there is any sign of a tide race off either Stack, it may be advantageous to stand in close to the cliffs and cut through the race as near as possible to the rocks.</i> While Endean [56] includes photos of yachts close in at Penrhyn Mawr albeit on the ebb when it doesn’t form an overfall and passing close to South Stack through the race. This places yachts in potential conflict with kayaks. Squeezing these very different crafts together between the cliffs and the towering electrical hubs would greatly increase the risks of</p>	<p>The purpose of the NRA is to assess navigational risk for all users and that has been done for all types of vessels using the inshore route including unpowered recreational craft. See Hazard IDs 59-63. The NRA and NRA Addendum assessed the impact to recreational vessels across the entirety of the MDZ. The developer has made significant modifications to the eastern boundary of the development site including a zone of >8m UKC and subsequently amended the western edge of that zone and widened it to increase sea room for users of the inshore channel. These mitigation measures are designed to ensure continued safe access and passage through the inshore route and to avoid displacement of vessels further west or east. SCC make the point that encounters are rare and because of the mitigation measures that have been put in place we are not anticipating that to change.</p> <p>The Anglesey cruising guide advice is an existing piece of advice suggesting sailing craft stand close to the cliffs, and so forms the baseline position. The development of the Morlais site is not going to impact or change this advice and so it is not going to increase risk in the scenario as detailed.</p> <p>We agree that having sufficient room for boats to maintain a safe separation is essential which is why we have redesigned the eastern boundary of the site to include the 8m UKC zone to give all users of the inshore route sufficient room to navigate through it safely.</p>

	boat on boat collision and grounding. Having sufficient room for boats to maintain a safe separation is essential.	
50	Recreational boats are not covered by the methodology used by Morlais and kayaks even less so. In areas with a high density of kayaks, inclusion in the boundary assessment is desirable – if this route based methodology is used then the 100% centile should include all kayak movements to protect areas into which kayaks will drift as kayak incidents in high energy environments are many times more likely than mechanical failure in a larger boat. These races are used for rescue training which needs a long run out.	The tracks provided by Morlais in the GIS figure in MMC171 and those provided by SCC, with the exception of a couple that run through the MDZ east to west, all run within the UKC>8m area. In any case, the project is not seeking to exclude navigation from the MDZ.
51	Consideration should be given to the risk of collisions between different classes of recreational vessels	This is considered in the NRA Addendum
52	55 Sea kayakers would like to know what changes to tidal flows and wave regimes they can expect from the introduction of turbines and other structures into the sea off Holyhead. The only way of getting some idea of this before building the scheme is through the use of mathematical models. Models are simplifications of the real world and only work well within their design limits. No model suitable for examination of hydrodynamic changes on navigation has been provided by Morlais so we have reviewed and extended, within the resources available to us, the modelling and assessment done for other purposes to see what can be gleaned about possible impacts on kayak navigation. This is fully described in Annex 3 and summarised in this section.	The HR Wallingford tidal flow model is designed to provide the required information on changes in tidal flows that may affect navigation, as well as input to sediment transport modelling. A tidal atlas is now available together with existing and post development current patterns (for an extreme development case) so hydrodynamic changes can be examined in detail. While models are indeed simplifications of the real world they do provide a very good representation of it, as shown by the validation exercises carried out as part of the study.
Impact of hydrodynamic changes on kayaking activities		
53	56 The FEI includes additional work by HR Wallingford (HRW) on hydrodynamics and waves [25]. This study was primarily intended to examine the impact of the scheme on coastal process of erosion but	The flow model output is depth integrated which is appropriate except in the very close vicinity of the underwater turbines where the flow above will probably be rather stronger as suggested. The mesh being

	<p>includes descriptions of the hydrodynamic model of tidal flow developed to estimate power output from the turbines and parameterisation of the SWAN model for wind-driven waves. Besides not being adapted for our question these models have some general features which limit their utility. Firstly, 2-D depth integrated models characterise the speed of the water column by a single parameter that represents the variation with depth according to a fixed profile which HR Wallingford have calculated based on unobstructed open water. In the presence of tidal energy turbines, the profile will be very different, and the predicted surface speed from the model is therefore unreliable. Secondly, they are built around a mesh which varies in size – being finer within the MDZ and coarser outside. Thirdly, the outputs provided in the report do not show flow direction and are averages over a lunar cycle or only provide mean springs. Nevertheless, some crude interpretation of the model outputs can give some hints of what changes might occur.</p>	<p>variable in size is to allow the model both to cover a large area and to have a fine resolution where most needed. It does not cause a lack of accuracy as the validation against observed data confirms.</p>
54	<p>57 Speed is shown as generally reduced inshore of the MDZ. It could increase in local areas, but these would not be the areas with the fastest flow, so are unlikely to be significant to kayakers. The speed of flow in the areas of the main tide races is predicted to reduce slightly, reducing the value of these tide races to kayakers. The modelling approach was not designed for this purpose and these results are unreliable, but are consistent with what might be expected subjectively and are probably broadly correct.</p>	<p>This response seems to support the model findings, and overall changes to flow in the areas of tidal races used by Kayakers are very small. Contrary to what is stated the model is designed for the present purpose.</p>
55	<p>58 No model output is available to show the effect on surface flow. If this data could be obtained from the model, it would be broadly indicative, although not accurate. It would be useful to have such data to calculate the expected drift paths of kayaks downstream from the tide races engaged in simulated incidents (as in rescue training) and actual rescues. There is a serious concern</p>	<p>Given the highly mixed nature of the boundary layer in high energy marine environments, the surface flow is expected to be very close to depth averaged values depending on the influence of wind and other factors. The risk of being carried into the arrays is considered in the NRA Addendum and is considered ALARP.</p>

	among kayakers that they would be carried into areas of the MDZ where floating and surface piercing devices would be a lethal hazard.	
56	59 The model does not model the inshore areas accurately in terms of mesh size or bathymetry, and is not validated for this application. The degree to which flow inshore of the MDZ will be restricted is crucial to understanding the effect on kayaking, but the model cannot properly represent this. A particular example is the way the flood tide will behave in the area of Penrhyn Mawr.	The model mesh resolution near the coast of Holy Island is about 30-40m, which is a fine resolution. The corresponding bathymetry comes from the Partrac Survey 2018. The flow model simulates correctly the tidal currents in the inshore areas for typical conditions (Mean Spring Tidal cycle)
57	60 Wave heights are predicted to be reduced in general but with possible increases in wave height as a result of local increases in tidal flow. As with the increases in speed, the areas where wave height increases are predicted are not where the biggest waves are. Overall, wind driven wave heights, tidal stream speeds and tide race wave heights are likely be reduced in most of the area.	This is correct, wave heights are likely be generally reduced.
58	61 It is not possible to say from the modelling whether the general pattern of flow and eddies inshore of the MDZ will change. This creates a major problem with the NRA as MGN 543 [26] requires the determination of whether: <i>The set and rate of the tidal stream, at any state of the tide, has a significant effect on the handling of vessels in the area of the OREI site. And if: the maximum rate tidal stream runs parallel to the major axis of the proposed OREI^d site layout, and if so, its effect on vessel handling and manoeuvring.</i> We can see from Figure 4.15 that the tide in the centre of the MDZ does run parallel to the major axis of the array and we can also see that available modelling is insufficient to determine effects on kayak handling. It is appreciated that the MCA did not have kayaks in mind when making these guidelines but the principles of impact assessment should still apply.	MGN 543, Annex 2 – The effects of tides, tidal streams and weather has been assessed in the NRA Addendum Table 9-1. Hourly data has been presented in [MMC350] and it is confirmed that this has not resulted in a change to the assessment of risk in the Navigational Risk Assessment.

59	<p>62 Offshore Renewable Energy Installations (OREI) include offshore wind farms, tidal energy converters (including tidal range devices), wave energy converters and any associated infrastructure with the potential to affect marine navigation and emergency response, proposed in United Kingdom (UK) internal waters. The scope is implied as being all installations including those close or attached to coast (tidal range devices includes tidal lagoons). However, our experience of the application of MGN 543 is that the guidance contained within it is insufficient to accommodate near shore navigation where small recreational vessels are the primary traffic. This is a major failing of the MCA and has the potential to put lives at risk. We suggest this should be addressed at the earliest opportunity through consultation with all relevant stakeholders including paddle craft and surfers as well as members of RYA and commercial boats. Guidance is needed on determination of high use areas, delimitation of activity, determination of general and location-specific safety offsets, risks to enjoyment of the activity as well as navigational risk assessment and impact monitoring.</p>	<p>This is a comment for the MCA</p>
60	<p>64 A missed opportunity in the hydraulic modelling is the comparison between different options for the location of turbines within the MDZ. The currently proposed plans place turbines in the Northeastern area of the MDZ. As well as being the most sensitive area of the MDZ for recreational use, this restricts the flow between the restriction of the MDZ and the coast, resulting in much greater effects on the tidal streams used by kayakers than would be the case if the turbines were further offshore but still within the MDZ. The Deep Green, installation [https://minesto.com/projects/holyhead-deep], by comparison, has attracted little concern, because it is far enough offshore that it does not substantially affect coastal flows.</p>	<p>Tidal stream turbines require areas of high tidal flow and these occur relatively close to the shore. The Minesto project is a different technology that is intended to capture energy from lower tidal flows using an 'underwater kite'. This technology is not proposed for the MDZ as the MDZ is not deep enough.</p>

61	The modelling of changes in tidal stream flow and wave behaviour does not assist sea kayakers in understanding the effects the MDZ may have in this internationally important area of coastline.	Further hourly data has been provided that indicates that the flow patterns are largely unchanged by the full 240MW scheme with only small changes in velocity and wave height. Given that the project is expected to be phased over a number of years, with the first phase being only ~12MW, these are very much a worst case and kayakers will be able to observe any changes over time and gain understanding.
62	The results of further modelling, ideally suited to estimation of changes to tidal flows across the MDZ and up to the coast should be evaluated by the sea kayak community to determine the extent and significance of changes on kayaking before the NRA can be considered complete.	Further information has been provided with respect to the rate and set of tidal streams in [MMC530]
63	65 In our representation to the first public consultation, SCC outlined the findings of three previous hydrodynamic studies for tidal turbines. In order to make the point about the extent of far field impacts we refer again to the paper by Haverson et al (2018) [27] and specifically the figure illustrating the zone of influence for a modelled 10 MW array in Ramsey Sound (Figure 8).	The extent of effects from the MDZ scheme is clearly considered in the HRW report MM134. The zone of influence is clearly shown. This is also considered in the Metocean Supplementary note in MMC136.
64	66 The results of this study indicate a 20% change in tidal constituents with impacts on eddy propagation felt up to 24 km and impacts on bed shear up to 12 km from the array which was deemed at the limit of what might be considered an acceptable impact. Based on these results it seemed to us likely that an array 24 times bigger than that modelled for St David's could potentially cause unacceptable impacts from Bardsey Island to Liverpool Bay. SCC mentioned this study and our concerns to Morlais at the meeting in February and the minutes of this meeting (attached) confirm that Morlais noted an action point for themselves: <i>to look into the St David's Head Tidal Array and look at the data collected.</i> However, we can find no evidence this has been picked up and there has been no modelling of far field impacts provided. Morlais	We have reviewed this report but are not able to comment on the tidal project at St David's Head or the detail of the modelling undertaken in the report, however see response to (65) above.

	has confirmed that: <i>maps previously provided cover the whole extent of the impacts</i> . [Email from Morlais dated 3 Aug 2020 in Ref 28]	
65	67 Nevertheless, despite the revised modelling by HR Wallingford [25] not being appropriate for consideration of far field effects it does nevertheless provide a hint of potential impacts on ebb flow speeds at Carmel Head and the Skerries (Figure 9). Carmel Head and the Skerries are 10 km from North Stack and are both used by kayak guiding companies and individual kayakers.	The effects being referred to here are very localised changes of <c.0.2m/s. No consequence of this is specified by SCC.
66	68 We have established that there are grounds for safety concerns arising from interactions between Morlais and sea kayaks. Despite representations through the TWAO, NRW and meetings with Morlais we are disappointed that our concerns remain unacknowledged or addressed within extant project documentation.	We hope that SCC concerns will have been assuaged when the additional documents supplied to address them have been reviewed.
Treatment of kayaks in Navigational Risk Assessment		
67	69 Much of the NRA ignores kayaks due to Morlais' strict adherence to the letter of the assessment procedures derived from templates and procedures used for commercial shipping. Despite NRW making a direct request that Morlais include canoeists and kayakers in the risk assessment [7] and signs of some further work on this (See Annex 6) the end result was unsatisfactory. By the 25 March 2020 had abandoned work on the NRA: <i>At this stage there is no proposal to revisit the NRA</i> . The justification for this put forward by Morlais in a subsequent NRA clarification note [36] dated 3 July 2020, was that the hazard posed to kayakers of the MDZ infrastructure was subsumed within the existing NRA: <i>the concerns of the Canoeists and Kayakers have been covered within the Navigation Risk Assessment and specifically under 'recreational vessel contact with surface devices'</i> . This considers the	The NRA Addendum now considers un-powered vessels explicitly.

	<i>paddler/people element (in terms of consequence i.e. personal injury to fatality) not just the impact to the recreational vessel. Hazard scoring ... was based on a range of information collected during stakeholder consultation meetings, as well as drawing on the extensive experience of the Consultant Mariner ... erred more towards the cautious i.e. a higher likelihood, resulting in higher risk scores. Despite this, the risk to Canoeists and Kayakers [recreational vessels] navigating in proximity to surface devices remains low. Nevertheless, in wanting to demonstrate a responsible approach here, the developer is interested to further mitigate risk to Canoeists and Kayakers via further consultation and consider whether additional mitigation measures would provide them with the reassurance they seek. Typically measures here may include:</i>	
68	<ul style="list-style-type: none"> • Each device to be fitted with grab chains; and 	The NRA Addendum now considers these mitigations
69	<ul style="list-style-type: none"> • A number of devices in each array to be fitted with a ladder to enable a person in the water to get onboard the device as a refuge in an emergency. 	The NRA Addendum now considers these mitigations
70	70 This confirms that Morlais have no understanding of sea kayaking. We are wary of invocation of an unnamed “Consultant mariner” in the risk assessment for kayaks. There are only a handful of people with sufficient personal experience of kayaking and credibility within and beyond the sea kayak community to be able to make these expert judgements. In the absence of any guidelines from MCA we would need to be able to advise Morlais’ consultant or to endorse the selection of a suitably knowledgeable expert.	Marico is a highly professional and experienced organisation in marine risk consulting. It is not clear from SCC representations whether they have any previous risk assessment experience.
71	71 Regarding the NRA on the NRW Public register and the 3 rd July statements above - SCC does not accept that our concerns are the same as other recreational vessels as sea kayaks are single-person, self-powered, fragile craft and consequently more vulnerable than	We acknowledge these concerns and this was also a reason for revising the NRA using the information that we had been provided by stakeholders such as the SCC. SCC provided their comments to the revised NRA and these were considered and incorporated.

	the general class of recreational vessels which is taken as anything under 3 m draft. SCC rejects the conclusion that the risk to life of contact between a kayak and surface devices is low.	
72	72 This is not an expert opinion but is informed by awareness of what happens locally but we estimate that the risk of capsize of a paddler in a tide race is Frequent (happens between every week and once every year F5) then if the arrays are in the tide race run outs then the probability that capsized paddler hits the array & drowns is Likely (happens between once every year & once every 10 years F4). Consequences would be a single fatality C4. Probability x consequences C4 x F4 = 8 = Significant Risk.	It is not clear which Hazard ID SCC are referring to, but assuming it is Operational Hazard ID62, it appears that the NRA Addendum agrees with the Frequency and Consequence values SCC proposes and has incorporated this in the assessment of risk as per the approved methodology. This results in a residual risk that is ALARP.
73	73 At our meeting in February there was some acknowledgement that there maybe some risks and mitigation was suggested in the form of grab-chains and ladders. At the time we indicated that these would increase ^e rather than diminish risks. We are dismayed that Morlais is failing to listen to the concerns and advice of stakeholders.	We are not failing to listen to stakeholders. There are a range of stakeholder opinions on this point and so we have retained this as a possible additional mitigation measure as we believe it warrants further discussion. It would be more helpful if the SCC could make constructive comments with regard to what they consider may further reduce risk.
74	^e Chains would be an additional snagging hazard, paddlers would not be able to hold their boats against the tide and would be dragged out and into the water, swimmers would not be able to hold on and if they let go would be sucked under the water. Even if they could hold on it would be very difficult to affect a rescue close to a stationary or moored structure in fast moving water and waves. Provision of ladders may also encourage people towards structures but exiting a boat in rough seas and strong currents onto a structure is extremely hazardous. It is by far safer for a kayaker to remain with their boat, allow the tide to carry them into calmer water and to radio the Coastguard for assistance from the RNLI if needed. These are standard rescue procedures and well understood by kayakers.	There are numerous examples of where lives have been saved by a casualty locating and climbing on to a floating structure at sea. The risk of snagging is successfully mitigated in other similar applications and can be addressed in detailed design. Again, it would helpful if the SCC could make constructive comments with regard to what they consider may further reduce risk.
75	74 We are concerned that exclusion zones required during construction could restrict routes through the inshore passage. The	Safety zones during construction will be required but the project is

	pinch point at South Stack where the inshore passage between emergent infrastructure and the coast is just 1 km wide and crowded with installations of undersea devices and multiple export cables all of which would need exclusion zones during installation seems particularly at risk. Exclusion zones for laying nine cables into Abraham's Bosom may also restrict passage. An additional concern during construction of the cable landfall is access to the beach at Abraham's Bosom, an important area of safety as the only emergency landing for kayaks with a landward escape route between Porth Dafarch and Soldiers Point (see Annex 1).	committed to ensuring that the inshore passage remains open or that if it does have to be closed it is only done so for short periods of time. Prior to any array deployment in a particular location, a specific array NRA will be undertaken to consider this issue.
Interruption of passage during construction		
76	75 It is also to be expected that during times of good weather, both sea kayakers and Morlais vessels with potential exclusion zones will need to operate between the coast and MDZ. Wash from large vessels and RIB traffic directly and as clapotis could also increase risk to kayaks. Wash from the high speed ferries has, at times, been a significant hazard to kayakers.	The hazard is considered in the NRA Addendum.
77	76 Contained within the Navigational and shipping responses [Point 5, Page 4 Ref 19] is a statement: <i>We can confirm that there is no intention that by imposing an operational safety zone that this would close off the inshore route. Safety zones will be determined based on risk assessments for the required works and will be minimised to ensure as little disruption as possible to navigation along the inshore route whilst also ensuring the safety of all navigators and offshore works.</i>	This is correct.
78	77 We emphasise that kayaks currently choose safe routes to avoid natural hazards by working with the tidal streams. In many cases, the tide flows faster than a kayak can be paddled. It will not always be possible to plan trips to be confident of avoiding artificially imposed safety zones. Particularly given the proposed	Morlais is not seeking to exclude recreational users from the area. The operational exclusion zones are a maximum of 50m from any device. Safety zones during construction will be required but the project is committed to ensuring that the inshore passage remains open or that if it does have to be closed it is only done so for short periods of time.

	criminal penalties in the requested order, the creating of any exclusion zones is likely to result in cancellation of substantial number of kayaking trips. It would be more reassuring to have some indication of anticipated duration and frequency of the imposition of construction safety zones. Most importantly we expect Morlais to make a commitment to a process of negotiation with all local stakeholders on scheduling and notice periods of restrictions which may require changes to be made to courses and events which are advertised and booked a year in advance.	These will be the subject to a separate application under the Energy Act. Given that kayakers generally navigate within a few hundred metres of the shore, this is expected to be easy to achieve. Morlais is committed to provision of information and notices to recreational users during construction and operation.
79	SCC remains convinced that despite Morlais' best intentions, the scheme would significantly disrupt kayaking activities during construction which is scheduled to extend over several years with laying of the nine export cables alone taking 288 days.	To put it in perspective, the deployment of these cables is envisaged to occur over many years with the majority occurring away from the coast.
80	We request that if the scheme goes ahead that timely stakeholder engagement on construction scheduling is made a condition of the license.	We are committed to the provision of information to stakeholders and would be willing to discuss this further with SCC.
81	83 SCC wishes to reiterate that it is not opposed to the development of marine energy or tidal turbines around Anglesey. Our interest is to ensure that the legitimate interests and concerns of the sea kayak community are properly represented in the consenting process for a Marine License and the TWA Order. Stakeholder engagement and full consideration of both sustainable management principles and well-being goals is enshrined in the National Marine Plan and is a requirement of public bodies under the Environment Act (Wales) and the Well-being of Future Generations Act.	Kayaking activities were not dismissed by Morlais; both Anglesey Adventures and Snowdonia Canoe Club were included in the initial tourism and recreation assessment. In its ongoing work on analysing socio-economic matters relating to the MDZ, Morlais recognise the importance of marine activities (including kayaking) and has agreed to conduct a survey of activities, in addition to tourism and recreation activities, as part of its monitoring process. This will also involve producing a baseline of marine activities. Due to covid19 restrictions and subsequent uncertainty, this work will be completed in 2021.
Recommendations and concluding comments		

82	84 The area inshore of the MDZ is internationally recognised as a premier location for sea kayak training and supports a thriving local economy.	We acknowledge SCC's position and have considered potential impacts on kayakers.
83	85 We also note that the National Marine Plan recognises the area around Holyhead as a General boating area with a high density of AIS records for recreational boating [Figure 22(c) Tourism and Recreation – Recreational Boating in Ref 21]. The Marine Plan policy SAF_01b is intended to safeguard existing activities with a hierarchy of: <i>avoid, minimise or mitigate the identified impacts in a manner that is proportional to their significance</i> [22]. It is acknowledged that the Morlais project has re-designed the eastern boundary to move emergent and floating structures further out to sea. However, SCC consider that the significant risk associated with the potential interaction between sea kayakers and surface emergent structures in the MDZ is still not adequately mitigated.	The risk of potential interaction has been assessed and is considered to be ALARP.
84	86 We consider that if Morlais were to build the scheme presented in the ORML1983 application then there would be significant degradation of the seascape, uncertain and potentially unmanageable changes to sea conditions, loss of utility and reputation of Holyhead as a sea kayaking destination leading to loss of local livelihoods and economy and most significantly a significant risk to life. We therefore object to the granting of a license to Morlais and request that you reject the application.	We recognize SCC's anxiety with respect to changes in the area and have committed to a monitoring plan for related socio-economic effects. Note that evidence from elsewhere such as Orkney shows that marine energy can enhance tourism.
85	87 Our recommendation is that the area is safeguarded for recreational use and that other locations for tidal energy be explored.	Noted.
86	88 If the decision is that other interests override the National Marine Plan safeguarding policy SAF_01b then it may be possible to	

	<p>mitigate the worst of the impacts but only following further investigation and consultation including:</p> <ul style="list-style-type: none"> • Revision of the NRA to include risks to kayakers, utilising an expert witness ideally with practical experience of kayaking in advanced conditions and implementing any identified mitigations, and supported by detailed hydrodynamic modelling suitable for this purpose, 	<p>No significant adverse impact is identified and hence Morlais does not consider that it is necessary to override SAF_01b.</p> <p>In any case Morlais propose to conduct additional monitoring of marine-related activities (including sea kayak enterprise and tourism), in addition to the analysis of tourism and recreation activities. The impact of the MDZ on marine-related activities will be monitored in conjunction to tourism and recreation activities. This will be completed in 2021.</p> <p>The NRAA now explicitly considered non-powered craft.</p>
87	<ul style="list-style-type: none"> • Preparation of a comprehensive Recreational and Tourism Assessment to include all water sports, 	<p>No significant adverse impact is identified. Morlais propose to conduct additional monitoring of marine-related activities (including engaging with sea kayak enterprise and tourism), in addition to the analysis of tourism and recreation activities. The impact of the MDZ on marine-related activities will be monitored in conjunction to tourism and recreation activities. This will be completed in 2021.</p>
88	<ul style="list-style-type: none"> • Preparation of a comprehensive Socio-economic report including all economic impacts associated with use of the MDZ development envelope, 	
89	<ul style="list-style-type: none"> • Engage with the stakeholder's whose livelihoods may be curtailed or threatened by the project to prepare and agree a resettlement plan. 	
90	<p>89 If evaluation of the above is favourable and the following conditions are met we may be able to withdraw our objection:</p> <ul style="list-style-type: none"> ○ give more sea room on the inshore passage with particular regard to the pinch point at South Stack and the need for safety zones, 	<p>The GIS kayak data indicates that the existing routes are easily accommodated within the inshore route.</p>

	<ul style="list-style-type: none"> ○ to ideally have all devices sub-surface or, at a minimum restricted to further than 1.5 nm from the coast, ○ maintain emergency egress from the back of Abraham's Bosom at all times, ○ to develop the MDZ in a step-wise fashion subject to consultation and consideration with stakeholders based on monitoring of changes in flow rates around turbines and fixed structures to validate hydrodynamic models that can be used to design the layout of the arrays so as to minimise adverse impacts, ○ Make the establishment of an effective stakeholder liaison group to agree movements and timing of construction vessels and imposition of exclusion zones a condition of the Order. 	<p>Safety Zones will be required to be agreed under the Energy Act 2004 prior to implementation. The project has committed to maintain access for kayakers.</p> <p>It is unclear where 1.5nm has come from, it appears to be unjustified given the GIS kayaking routes provided by SCC and Morlais.</p> <p>The development of the MDZ will be in a phased approach, with array specific NRAs undertaken prior to each new deployment.</p> <p>Provision of information to navigational stakeholders is secured via the requirement for notices to mariners.</p>

Hydrodynamics responses

	Objection text	Response
Background		
91	Menter Môn Morlais Ltd (Morlais) have applied for an Order under the Transport and Works Act (a TWAO) to enable them to develop a tidal power scheme off the West coast of Holy Island. This application	Further detail relevant to kayakers has now been provided in the hourly data in MMC350.

	is supported by a Navigation Risk Assessment (Ref 5) which does not adequately consider the risks to recreational vessels, particularly sea kayaks. The NRA is supported by computer modelling of the tidal streams and wave action in the Morlais Development Zone (MDZ) and surrounding areas. The primary purpose of the models is to estimate the electrical power output from the proposed generating array and the effect of the scheme on sediment movement and coastal erosion.	
92	The area inshore of the MDZ is an internationally important venue for sea kayaking, mainly because of the tidal streams, and contributes significantly to local tourism and employment. Snowdonia Canoe Club are submitting a Statement of Case to the Public Inquiry into the granting of the Order.	-
Objective		
93	The objective of this report is to provide the Inquiry with an understanding of the potential effects of the MDZ on the use and safety of kayaks and other recreational vessels in the surrounding area.	-
94	This report reviews the modelling of tidal flows and wave action which forms part of the Morlais' Environmental Statement. Where the outputs provided in Morlais' reports are insufficient or inappropriate for the above objective, they are extended by subjective logic in order to enable the risks to be bounded. Recommendations are made for mitigation of the risks and for further investigation.	Further information in the form of hourly data has been provided to SCC [MMC350].
95	This report is not intended as a criticism of the hydrodynamic modelling, only of its suitability for predicting effects relevant to recreational use. Although Morlais have referenced it for this, the model does not appear to have been built for this purpose.	The primary concern of SCC appears to be the effect of the scheme on tidal flows. The HRW report is intended to model the effect of the scheme on tidal flows. This is then interpreted in the NRA Addendum with respect to its potential impact on kayaking and safety.
Overview		

96	<p>On behalf of Morlais, HR Wallingford (HRW) have carried out computerised mathematical modelling of the interaction of tidal streams and waves with the proposed MDZ (Ref 3, 'The HRW Report'). The primary purpose of the tidal stream model is to establish how much energy can be extracted by tidal energy devices in the MDZ and to provide input on tidal currents to the wave and sediment models. The primary purpose of the wave model is to identify potential changes in wave action resulting from the MDZ and the effect this may have on coastal erosion and sediment transport. This report reviews the tidal stream and wave models. Sediment transport is not generally relevant to recreational navigation and is not reviewed here.</p>	<p>The secondary purpose of the model, in combination with the NRA is to assess the impact on recreational craft.</p>
97	<p>The baseline versions of the tidal stream and wave models are validated in the HRW Report. That is to say, for the existing situation, in 30-40m deep water at one kilometre offshore, without tidal energy devices present, the results predicted by the tidal stream model have been compared against actual measurements and found to be in good agreement. Similarly, the wave model has been validated against measured wave heights in actual storms. No validation has been presented for the modelling of the tidal energy devices or their effects. Such validation might, for example, have consisted of a comparison between the measured effects of a tidal energy device installed elsewhere, and the modelling of those effects using the techniques used in this model. There is also no validation of the ability of the model to predict tidal flows in shallower water or close inshore, and no consideration of the modification that tidal devices may make to the way tidal current changes with depth. The effect of the tidal devices on wave transmission has been considered based on theoretical consideration and a literature review, but no specific validation of the modelling approach against the behaviour of real tidal devices has been made.</p>	<p>The methods of hydrodynamic modelling tidal turbines are well understood and published in literature. There is no experimental precedent or validation for assessing the effect of tidal turbines on sea kayaking as the effects are expected to be very minor. Kayakers exploit features of the ocean environment such as tidal races, eddies and waves to assist with navigation, increase enjoyment and provide rest. These features are created by the combination of a number of complex environmental factors, which are famously hard to predict for marine users. These include wind strength, direction and regularity, wave height, direction, speed and regularity, the phase of the moon, the time of year, the time of day, the height of the tide, the speed and direction of the tidal flow and local bathymetry. These factors do not always occur, meaning that there are times when there are more favourable or less favourable conditions for kayaking off Holy Island. Only when a particular combination of these factors align, will it result in particular condition that are safe and enjoyable for kayakers.</p> <p>Whilst it is possible for a hydrodynamic model to assess general trends and changes, it is not realistic to expect to be able to better understand the coming together of these complex factors. This is the reason that standard navigational directions for all craft give general advice and</p>

		information, which are intended to provide guidance and are not intended to substitute the navigator's process of constant dynamic risk assessment in responding to environmental conditions. For these reasons, the hydrodynamic results presented by Morlais for a full 240MW development in the most extreme wave and tidal conditions provide an indication of the expected impacts of the project on tide and waves, which are expected to be very minor. It remains the responsibility of the recreational users to navigate safely and with respect to the environmental conditions at any given time.
98	The lack of validation may or may not affect the validity of the models for their primary purposes. It is clear, however, that neither model was constructed, modified or validated for the purpose of estimating the effects of the MDZ on recreational navigation, nor have the reported outputs been selected for this purpose.	The secondary purpose of the model, in combination with the NRA is to assess the impact on recreational craft. It has been used for this purpose and has demonstrated residual risks are ALARP or lower.
99	Following their public consultation and the number of concerns received in relation to the potential impacts on kayaking, Natural Resources Wales (NRW) asked (Ref 6) that "the ES (and relevant supporting documentation) should be updated with greater recognition to this activity".	The NRA Addendum has been submitted with explicit consideration of un-powered craft.
100	<p>Morlais responded (Ref 4) that "Changes in hydrodynamic regime = reduction in amenity value.</p> <p>Changes to the hydrodynamic regime have been further considered in Document MOR/HRW/DOC/0001" [the HRW Report]. None of the changes to the model or the discussion of it, however, relate to kayaking.</p>	Hydrodynamic effects with respect to kayaking are considered in the NRA addendum rather than the Hydrodynamic report.
101	Attempts have therefore been made, by concerned kayakers, to interpret the outputs in the HRW Report and to form a judgement on	Higher resolution files were provided to SCC to assist in this review.

	the possible effects of the MDZ on kayaking. The types of output that are publicly available made this difficult. Having experience of interpreting computer models, the author has sought to assist.	
102	This review is therefore in three parts. The first is an interpretation of the publicly available outputs in the context of recreational use, and specifically sea kayaking. In that part, the validity of the outputs is not discussed. The second is a review of the modelling approach to consider how reliable the outputs are for this purpose. The third is a summary of the potential effects of the MDZ on recreational vessels and sea kayaking, with recommendations for further interpretation, modelling and risk mitigation if the outcomes are uncertain or unfavourable.	The author states that he has no experience in hydraulic modelling.
Summary of conclusions		
103	The proposed Morlais Development Zone is likely to have a significant effect on sea kayaking in the area. The MDZ is too close to the shore and is likely to result in significant changes to tidal currents on the sea surface. These may be dangerous and may damage some of the features of this coast that make it internationally famous as a kayaking venue. The MDZ is also too close to areas currently used by kayakers and there is no confidence that kayaks and kayakers will not be carried into unsafe proximity to the tidal generators.	The project respectfully disagrees, there is no predicted significant impact on kayaking in the area, neither through overlapping of areas of use of hydrodynamic effect. The navigational hazards have been explicitly considered in the NRA Addendum and the risks are considered ALARP or below. Hourly data has been provided to SCC that demonstrates that kayaks are unlikely to be carried into proximity of the tidal generators and in addition the risk of collision has been considered in the NRA Addendum and the risk is considered to be ALARP.
Part 1 – interpreting the output from the models		
104	The scheme was initially modelled in Ref 2. This was updated in the HRW Report (Ref 3) in order to model the worst case scenario of 620 devices (240 MW) and to address points raised by NRW following their public consultation. These included updates to (and validation of) the bathymetry, inclusion of the SWAN wave model, additional ADCP inputs and comparison of surface levels for validation.	-

105	It is not apparent that any changes were made to the model in order to address the concerns raised in the NRW consultation by kayakers or other recreation users.	The secondary purpose of the model, in combination with the NRA is to assess the impact on recreational craft. The hourly outputs and higher resolution model outputs have been provided for this purpose.
1.1 Possible interpretation of tidal flow model		
106	Output from the tidal stream model is available as a series of maps overlaid with colour showing the speed of flow, with and without the tidal energy scheme being in place.	-
107	The most useful outputs for sea kayaking would be the flow speeds on the sea surface at intervals (ideally hourly) during a single flood and ebb cycle with the amplitude of mean springs, for the baseline and scheme cases. This would enable changes in the position of the fastest parts of the stream, and the eddies, to be understood.	Hourly data has been provided as requested [MMC350]
108	<p>Three maps sets are included in the HRW Report:</p> <ul style="list-style-type: none"> a) maximum flow speed over the 29.5 day tidal cycle, for the baseline and scheme cases, and the difference between these (Figure 4.19, Figure 4.20 and Figure 4.21 respectively). This is superficially useful, although the direction of flow is not shown. b) average flow speed over the 29.5 day tidal cycle, for the baseline and scheme cases, and the difference between these (Figure 4.22, Figure 4.23 and Figure 4.24 respectively). This is of no direct relevance to navigation and mainly informs consideration of sediment transport. c) the change between baseline and scheme for mean spring tide peak flow, flood and ebb, both locally to Holy Island (Figure 4.25 and Figure 4.26) and for the western part of Anglesey. These maps are the most relevant to sea kayakers. 	-

	Unfortunately, the actual speeds are not reported, only the difference with or without the effect of the tidal devices.	
109	The model shows that the tidal stream is slowed by passage through the MDZ. Speed drops as the stream progresses through the zone and remains slower for some distance downstream of it. The speed increases offshore of the zone. Both these effects could be expected even if no modelling had been done.	Correct, the model behaves as expected.
110	The changes inshore of the MDZ are more complex. This is reflected in the different conclusions suggested by each map. A comparison between Figure 4.19, maximum baseline speed, and Figure 4.20, maximum speed with the scheme built, show that the speed is reduced across the whole inshore area. Figures 4.25 and 4.26, however, show banners of increased speed in this area during spring tide flood and ebb. Superimposing information from these two sets of plots shows that the banners are immediately adjacent to edge of the areas of strong tidal movement. The area of increased speed shown by FF in Figure 1 below might initially appear to show that the flow speed in the tail of the Penrhyn Mawr race has increased. Comparison with the position of the faster flow, however, shown orange in (a), shows that the increase is due to the edge of the faster flow being moved inshore.	Correct, the location of the tidal stream appears to move by 100m or so inshore. The change in magnitude of the velocities is expected to be very low.
111	This report assumes that the maximum speed occurs at the peak of the flood or ebb. Although this may be incorrect, it is a reasonable assumption, and no better information is available.	Hourly data has now been provided [MMC350]
112	Figure 1(a) The model shows a similar effect across Gogarth Bay on the flood; the tail of the race from South Stack is also shifted inshore.	-

113	The same effect is seen at North Stack on the ebb. The banner of faster flow in Figure 2(c) looks at first sight like the tail of the North Stack race, but in fact is a shift of the eddy line. The tail of the race will remain well into the mass of faster moving water to the North.	-
114	The flow concerned here is the main tidal stream, <u>not</u> the jet of fast disturbed water resulting from flow over the ledge on the North side of North Stack (see Figure 6) and referred to by kayakers as the North Stack race. The model is not sufficiently detailed, in mesh size or hydrodynamic phenomena, to represent any of the tide races which are of such great significance to kayakers (see Annex 1 of the SCC Statement of Case).	To clarify, there is no 'jet' of fast flowing water. As discussed above, this feature is the shifting of the location of the tidal stream inshore by 100m or so. The changes predicted to areas of flow around those used by kayakers are expected to be very minor, and in any case, kayakers rely upon a complex set of meteorological factors coming together which vary with time, season and environmental conditions. The modelled results are necessarily generic in this way and are not intend to replace the process of dynamic risk assessment undertaken by kayakers when navigating in specific environmental conditions.
115	Figure 2(a) The mesh in the model in this area is about 40m. The area of increased speed in Figure 2 is about 280m across, which is therefore 7 elements. The plot shows 10 changes in speed across this area, so the model is quite coarse for that level of detail and can only be considered approximate.	The "speed changes" are a continuous variation of speed that can show many contours if there is strong shear (as in the height contours of a hill). In this case they are resolved by the model mesh.
116	The tide races (see Figures 6 & 7) are not modelled specifically; the mesh size and level of detail in the sea bed are too coarse, and the hydrodynamic formulae in the model for general open water flow are not applicable to water which is moving fast enough to form standing waves (known as 'supercritical' flow). From Figures 4.19 and 4.20, however, the overall reduction in flow speed inshore of the MDZ would be in the region of 10% to 20%.	The North part of the South Stack Bank is located within the MDZ, and the mesh resolution is about 10m. The South part of the South Stack Bank has a mesh resolution between 20 and 40m. A finer mesh might provide greater detail, but the model as it is, shows the significant feature. TELEMAR can simulate supercritical flow if that is occurring here
117	Prediction of standing wave heights in tide races is complex; the SWAN model cannot do it and it is not attempted here. A simpler	As discussed above, the changes predicted to sea conditions around those areas used by kayakers are expected to be very minor, and in any

	interpretation, based on the change in tidal range that would achieve a similar reduction in flow speed, is that conditions in the races at spring tides could become more like those that currently occur 2 or 3 days after springs, with consequent effects on smaller tides.	case, kayakers rely upon a complex set of meteorological factors coming together which vary with time, season and environmental conditions. The modelled results are necessarily generic in this way and are not intended to replace the process of dynamic risk assessment undertaken by kayakers when navigating in specific environmental conditions.
1.2 Possible interpretation of wave model		
118	The detailed output of the wave model is included in Appendix B of the HRW report.	-
119	For wave action alone, the model predicts smaller waves in the area inshore of or downwind of the MDZ. This is as expected, as any obstructions to the waves will dissipate wave energy.	Correct, the model behaves as expected.
120	The model considers what are referred to as 'representative' and 'extreme' waves. These can be characterised by their Significant Wave Height. This is defined as the average height, from trough to crest, of the highest one-third of the waves.	-
121	Representative waves are typical of a moderate sea that will occur frequently. The significant wave height varies slightly depending on the direction of travel but is typically about 2m, with a wave period just under 7s, resulting from a 13m/s wind speed (i.e., the top end of Force 6). For this 'representative' case, ignoring the effects of any tidal current, the wave heights inshore of the MDZ are predicted to be reduced by approximately 0.3 to 0.5m, which is 15% to 25% of the original height.	-
122	Extreme waves represent a 1 in 200 year storm and would typically have a significant wave height of 6-8m and a 10-12s period, generated by a wind of 24-27m/s, i.e., Force 10. Extreme waves are thus not relevant to kayaking, except that the model does show that the	-

	reduction in height for these large waves is proportionately less than for the representative waves. It might therefore be expected that waves smaller than the representative waves could be reduced in height by more than 15-25%.	
123	The wave model also considers the effect of current on waves. This is done by picking up the current speed and direction from the flow model, and comparing that with the wave direction. If the waves travel in the opposite direction to the current this will increase wave height; the effect is referred to in the HRW Report as 'shoaling'.	-
124	The model only predicts wind driven waves, and the effect of current on them. The model does not, and SWAN cannot, predict the standing waves that form in a tide race, with or without the influence of wind. The SWAN wave model does not model the physics of wave propagation directly. It represents the wave field at each point by a statistical approach and uses the factors affecting the waves at that point to modify that prediction for the next point. It starts with a nominal wave pattern at the boundary of the model, which can progressively alter as the waves move across the model. Factors that influence the waves include the depth of water, obstructions to wave movement such as tidal power devices, wind strength and direction and speed and direction of current.	As discussed above and below, the changes predicted to sea conditions around those areas used by kayakers are expected to be very minor, and in any case, kayakers rely upon a complex set of meteorological factors coming together which vary with time, season and environmental conditions. The modelled results are necessarily generic in this way and are not intend to replace the process of dynamic risk assessment undertaken by kayakers when navigating in specific environmental conditions.
125	Increases in the maximum wave height at any point in the tidal cycle are predicted in Gogarth Bay for waves from directions of 210°, 240° and 270° relative to North. (Figures B.11 to B.13). Since the predicted wave heights without consideration of current all reduce, the only way an increase in wave height can occur is where the increased current is opposed to the wave direction. This would occur during the ebb stream from North Stack to South Stack. The model considers the effects of mean spring tides on representative waves and predicts that, in that area, wave height with the tidal devices in place would be	In a similar way to the shifting of the tidal flow inshore as described above in line (89), the apparent increase in wave height is more a shift in location. Note that these changes are also modelled in significant wave height of 2m which is considered to be at the very upper end of the conditions that are suitable for sea kayaking.

	up to 0.4m higher than in the same area without the devices. This is shown in Figure 3.	
126	This plot, however, has the same disadvantage as the speed plots; it only shows the change in wave height at the same point, and not how the waves at that point relate to waves nearby. The area of increased wave height is in the same area that has a reported increase in flow speed, due to shifting of the edge of the main flow. So, while it is predicting an increase in wave height in the area shown, the waves in that area probably won't be any bigger than the existing waves a few hundred metres offshore. This should be more obvious if plots of predicted baseline and scheme wave height were available, rather than just differences.	Agreed, as above, any increase in wave height is expected to be very minor.
127	For modelling the effect of current on waves, a 150m mesh was used. The size of the mesh is shown by the pixilation of the coastline in Figure 3 above. This is very coarse and may explain why the area of increase wave heights doesn't exactly match the area of increased current speed. Alternatively, there may be wave refraction effects from the passage of the waves through the MDZ which have combined to increase wave heights. Such effects would be sensitive to the actual arrangement of devices, which is not represented in the model.	The reason why the area of increased currents does not correspond to the area of increased speed is because it is more dependent on the changes in current direction. The increases in wave heights are due to shoaling up of the waves in an opposing ebb current. The position where this affect occurs is shifted due to changes in wave direction as the ebb tide is diverted by the MDZ. Therefore the main area showing increased waves is an area where the current direction has been altered to now directly oppose the waves. The direct effects of the structures in the MDZ on the waves have been modelled separately (using the same, very finely resolved mesh as in the TELEMAC flow model). This shows that inshore of the MDZ only decreases in wave height are expected due to the blockage effect of the devices (see Figures 5.38 to 5.49).
Part 2. Validity and accuracy of the HRW models for navigation effects		
128	To understand what the flow model is capable of representing, it is useful to review it against the purpose for which it was constructed.	-

	<p>The process starts by modelling the tidal flow across the Irish Sea, with increasing detail around and within the MDZ. The model is built using a package called TELEMAC-2D. The power output from each turbine is then calculated by using the depth averaged stream velocity upstream of it, and applying the assumed power and thrust curves for the turbine characteristics. The electrical power is derived by applying a factor to the hydrodynamic power. The model applies 'sink' terms to drain energy from the downstream flow, based on the extracted power and the drag on the support structures, so that the stream velocity reaching the turbines downstream is reduced. This allows an estimate to be made of the total power that can be extracted from the array. Since the power that can be extracted is related to the cube of the stream velocity, it can't just be scaled down for different stages of each tide or for different spring and neap tides, and has to be modelled for the full range of flow speeds over the 29.5 day tidal cycle.</p>	
2.1 Accuracy of tidal flow model for sea kayaking relevance		
129	<p>There are a number of simplifications implicit in this approach. The model is two-dimensional, so cannot represent the change in stream velocity over the depth of the area; it will be slower at the sea bed and increase towards the surface. HRW have done research to understand how a typical flow speed profile can be modelled by a single representative speed. This analysis has been validated for normal sea conditions, with no turbines present. There is nothing in the HRW Report to show how the speed profile with depth will vary when part of the flow is slowed down by a turbine or its supporting structures. This will vary depending whether the devices are mounted on the sea bed or near the surface, which is not known at this time.</p>	<p>Agreed that the surface flows will be locally affected, over or very close to an underwater tidal turbine.</p>
130	<p>Each turbine has a rated flow speed at which it extracts most power. Flow speeds above this do not result in extraction of any more power. For the purposes of establishing potential electrical output, this is</p>	<p>This is not correct, the turbines are modelled with a drag term that extracts energy proportionate to flow speed. For this reason, flow</p>

	easy to model. Flow speeds above the rated speed do not produce more power, but might very well, through turbulence effects, continue to absorb more power from the stream. This does not appear to be modelled.	speeds above the rated power continue to extract more energy from the flow.
131	The HRW Report does not reference any physical measurements at existing tidal power sites that could be used to verify this theoretical approach. This contrasts strongly with the extensive verification that has been applied to the baseline model. There is no comparison with the numerous published studies of tidal power effects in the Irish Sea, many of which refer specifically to the area off Holy Island.	The methods of hydrodynamic modelling tidal turbines are well understood and published in literature. It has been undertaken by a well respected hydraulic modelling firm (HRW) in line with industry standards. There is no experimental precedent or validation for assessing the effect of tidal turbines on sea kayaking as the effects are expected to be very minor.
132	Every mathematical model of spatial effects works by dividing the space into elements, and calculating the changes between one element and the next. The spacing or size of the elements is known as the mesh. A smaller mesh is used in areas where either the features modelled or the required results need greater precision. Since the main purpose of the flow model is to measure the effects in the MDZ, the mesh is much finer in the MDZ than elsewhere.	-
133	If the validated model were updated only with changes in the arrangement of the existing elements, such as by changes in bathymetry, tidal input, sea bed roughness, etc, it may be argued that it would remain valid. The introduction of different elements, i.e., tidal power devices, using completely different modelling assumptions, is not validated at all.	As above in line 164.
134	The validation for flow velocity in the baseline model is carried out at ADCP (Acoustic Doppler Current Profiler, a device to measure flow speed) locations, a kilometre or more offshore and in water depths of 30-40m. It is not validated to represent the smaller scale tidal flow and eddies that occur in shallower depths and close to coastal features. TELEMAC-2D can be used to model these effects, but this	As discussed above , the changes predicted to sea conditions around those areas used by kayakers are expected to be very minor, and in any case, kayakers rely upon a complex set of meteorological factors coming together which vary with time, season and environmental conditions. The modelled results are necessarily generic in this way and are not intend to replace the process of dynamic risk assessment

	particular model may not be valid for that purpose, given that these effects were not within the original brief to HRW. Discussion on the online user forum for TELEMAC-2D suggests that accurate results are difficult to obtain close to land boundaries, and oscillations (i.e., mathematical instabilities) can occur. The bathymetric detail available may not be sufficient to represent some of the detailed behaviour that is important to kayakers, such as flow over shallow ledges.	undertaken by kayakers when navigating in specific environmental conditions.
135	The potential sources of inaccuracy described above do not mean that the model is necessarily inappropriate for estimating the amount of electrical power that might be produced, or whether it can accurately predict the movement of sediment. Whether or not it does so is not of direct concern to kayakers and is not addressed here. A possible indirect concern would be if sediment movement made a substantial difference to the natural changes in the South Stack Banner Bank, the flow over which forms the South Stack Outer Race.	There are no turbines to be installed at the 'South Stack Banner Bank'
136	Outside of the MDZ itself, however, it is clear that the speed of flow predicted by the model may not be accurate. In addition, the modelling of a 3D flow by a 2D model makes assumptions regarding the variation of flow with depth. For example, a sea bed mounted device is an obstruction to flow at depth, and might produce a similar effect to an underwater ridge, speeding up flow at the surface, while a floating device would slow flow at the surface and possibly speed it up at depth.	The assumption that the vertical profile of current is represented by a $1/7$ power law increasingly gradually towards the surface is indeed valid except over or very close to obstructions (such as turbines).
137	The left side of Figure 4 shows a typical open water depth profile (blue line) with surface flow 1.2m/s, depth averaged to 1.0m/s for modelling (red rectangle). The right side of the figure shows the situation as it might exist with a turbine installed on the sea bed. The HRW report shows that a typical device reduces the model predicted velocity by about 10%, so the red rectangle on the right is reduced in width by 10% to 0.9m/s. The HRW model does not, so far as can be	As above in line 173

	seen from the report, modify the depth profile to allow for the change in speed distribution resulting from the device, so this must be allowed for separately. Maximum energy extraction efficiency occurs when the speed at the rotor is reduced by 1/3 (Ref 7) so it is assumed that a 25% reduction over the obstructed profile is reasonable. To meet the average speed across the profile, the surface speed has to increase, to 1.25m/s. Although the depth averaged speed has reduced, the surface speed, which is what matters for navigation, would actually increase. This is not intended to be a rigorous calculation, just an illustration using scale diagrams of one possible difficulty in using a model for purposes that were not intended when it was built.	
138	Reference is made in the HRW Report to 'worst case' assumptions. These are 'worst case' with regard to electrical power extraction. They may not represent the worst case for the effects on navigation.	This is not correct, the worst case is defined by numbers of devices, the presence of other infrastructure and energy extraction and as such are expected to represent the worst case for navigation in terms of hydrodynamic effects. The Navigational Risk Assessment considers the worst case as if any permissible device is present, so for example in the Green area, risks are considered for all turbine types simultaneously.
139	For navigation purposes, an appropriate model should identify the likely <u>changes</u> as a result of installing tidal power devices. The accuracy of the original tidal stream model is less important, in this context, than the accuracy of modelling the effects of the changes. Yet the former is extensively validated, and the latter is not validated at all.	Change plots are provide in the HRW report. In line 150, SCC criticised the project's use of plots of change plots, this appears to be to be the opposing argument.
140	The tidal flow around North and South Stack and Penrhyn Mawr is complex, with numerous eddies in Abraham's Bosom and Gogarth Bay. Members of the sea kayaking community have developed extensive understanding of these eddies, over many years' experience. Since no plots of actual flow patterns have been	As discussed above, the changes predicted to sea conditions around those areas used by kayakers are expected to be very minor, and in any case, kayakers rely upon a complex set of meteorological factors coming together which vary with time, season and environmental conditions. The modelled results are necessarily generic in this way and

	published, only differences between the baseline and scheme models, it's not possible to compare the model output against this practical knowledge. However, the wave modelling section of the HRW Report indicates (in Figure 5.50) the flow pattern as input to the wave model. Even allowing for the coarse grid of flow indication, this does not represent anything like the complexity of flow as known to local kayakers.	are not intend to replace the process of dynamic risk assessment undertaken by kayakers when navigating in specific environmental conditions.
141	It is clear that the flow model, having been created for power prediction purposes, is not valid or useful for understanding the effects on recreational navigation, for which sea surface effects are more important than for commercial shipping. As a 2D model, with no validation of the depth related speed profile that might apply with the scheme in place, and no validation of the scheme modelling approach, any predictions of surface flow are unreliable at best.	As discussed above, the model is used to assess hydrodynamic effects not only power extraction. The NRA Addendum then interprets this information with respect to Navigation.
142	A standard part of any modelling exercise should be to compare the results predicted by the model with what might be expected from a subjective understanding of the physics. There does not appear to be any discussion of this in the HRW Report.	We find a decrease of the current speed generally in the area with turbines and a weaker increase of the current seaward. This is in agreement with expectation. The model also represents realistically the wake regions behind each structure. Checking model results against what "might be expected from a subjective understanding of the physics" is part of HR Wallingford Quality Assurance procedures (BS EN ISO 9001:2015 certified). Peer review is a very important part of our modelling procedures: models are reviewed by a Technical Director (model setup, model calibration and model results) and reports are reviewed by two different experts.
2.1.1 Subjective expectation of tidal flow changes		
143	The MDZ represents an obstruction to free flow of the tidal currents around Holy Island. This will behave in a similar way to an underwater rock outcrop, except that the obstruction is porous, so part of the flow passes through it and is slowed rather than blocked. As would be	As is commonly understood by hydrodynamists, a high energy marine environment is extremely turbulent and hence the degree of mixing of the boundary layer is extremely high. For this reason local differences caused by the turbine will very quickly resolve into the wider flow. In

	<p>expected, the flow is slowed as it passes each turbine, so becomes slower as it progresses through the MDZ. The position of the slower area within the depth profile is generally unknown, except within the area with no surface piercing devices, where it will be nearer the sea bed. The model, being 2D with a depth related flow profile based on open sea, does not consider this aspect.</p>	<p>addition, the rotor will tend towards being in the centre of the water column independently of the type of mounting structure . For these reasons the exact location in the water column is not expected to be a significant factor in determining hydrodynamic effects.</p>
144	<p>The momentum of the tidal wave moving down the Irish Sea is substantial, and it's unlikely that the MDZ will have a significant effect on this, overall. That is, the amount of water looking for the easiest path to flow round Anglesey will be substantially unchanged by the MDZ, so any slowing of flow through the MDZ must be balanced by increased speed around it. In open water, velocity would increase on each side. An obstruction on the sea bed will result in increased flow at the surface, while an obstruction nearer the surface could result in increased flow near the bed. In the case of the MDZ, flow is easily diverted round the West side, and the model shows the expected increase in speed. The path around the East side is restricted by Holy Island. There is therefore a balance between the tendency to increased speed as flow is displaced from the MDZ, and reduced speed due to the constriction between the MDZ and the coast, particularly at 'bottlenecks' such as South Stack. This balance may be significantly affected by the depth related flow profile in the MDZ, which is not modelled.</p>	<p>See response to 210, the degree of boundary layer mixing in such a high energy site does not appear to have been considered by SCC.</p>
145	<p>As an example, the ebb stream around North Stack curves southwards to follow the coast. The MDZ will apply an additional constraint. As the momentum of the westward going flow reaches the northern end of the MDZ, some of the flow will be deflected inshore, resulting in displacement of the main flow slightly inshore. This is the effect referred to in Figure 1 above and illustrated in Table 1. The model assumes the standard depth averaged speed profile, but in the real world the surface flow will not encounter any obstruction until 500m</p>	<p>Its not clear to which flow, or at what state of the tide, SCC are referring. See response to 210.</p>

	further into the MDZ, and the model may therefore over predict the effect. This is shown graphically in Figure 6.	
146	There will typically be an increase in surface water level upstream of an obstruction. The HRW Report does not mention this effect; it is not easy to estimate subjectively and may or may not be significant. Although the TELEMAC-2D model predicts water surface levels, and they were used for validation, no changes as a result of the MDZ are included in the reported outputs. If the level rise upstream of the MDZ is significant, it could alter the tidal flow across the relatively shallow ledges that form the North Stack and Penrhyn Mawr races.	Any immediate local effect will be restricted to the immediate vicinity of a turbine. Wider scale effects are considered in the TELEMAC-2D model and are used in the prediction of the changes in flow velocities and were considered as part of the model validation process.
147	The wave model considers the effect of two primary inputs. These are the absorption of wave energy by surface breaking elements as waves pass through the MDZ, and changes to current driven wave shoaling effects. The wave model uses output from the flow model for the second of these effects. Since, however, the flow model cannot be depended on for surface flow, the predicted shoaling effects are similarly unreliable.	See above point on boundary layer mixing in high energy marine sites. The flow model can therefore validly be used for surface flow.
2.2 Accuracy of wave model for sea kayaking relevance		
148	There is considerable discussion in the HRW Report about the way the wave climate will change with construction of the MDZ. In this discussion, the output from the model is taken as fact. This is a common fallacy in discussion of modelling results across many disciplines. Any model is only a representation of the real world. Models do not only incorporate simplifications due to mesh size and limitations on which physical effects are represented, but also rely on numerical solution of the equations used in the model. This can introduce behaviour in the model which does not relate to any physical effect.	This is incorrect. Morlais is very aware that 'the model is not the world' as demonstrated in points made above. Checking model results against what "might be expected from a subjective understanding of the physics" is part of HR Wallingford Quality Assurance procedures (BS EN ISO 9001:2015 certified). Peer review is a very important part of our modelling procedures: models are reviewed by a Technical Director (model setup, model calibration and model results) and reports are reviewed by two different experts. The example given identifies HRW's assessment of the model output in terms of a physical effect, doing exactly what SCC are claiming HRW are not doing.
149	An example of this is on page 78:	

	<p>“The effect of the tidal devices on the current causes a shift in the time of maximum wave throughout the tidal cycle at some locations. However the modification in the flow field due to the turbines causes the peak in wave height to occur earlier in the ebb tide (Figure 5.56). At points 2 and 3, the waves have increased in wave height as seen in Figure 5.51 due to the localised area of increased ebb currents between the turbines and the coast causing increased shoaling for a short period of time during the tidal cycle.”</p>	
150	<p>There is no discussion of the hydrodynamic reasons for this, and since the flow patterns for different stages of the tide are not published, it's not possible to speculate on the physics. The curve in Figure 5 shows an oscillation at the start of each ebb phase and there is no obvious reason, in hydrodynamic terms, for such an oscillation. Similar oscillation can be seen at point 3 in figure 5.57 of the HRW Report, for both the baseline and scheme traces. Such oscillation could be a result of model instability or resonance, or it could be real result due to reflected waves or actually oscillation in Gogarth Bay. Before drawing any conclusions, it is essential to establish which effects are modelling artifacts and which represent real physical behaviour.</p>	<p>The apparent phenomenon referred to is as a result of changes in flow timing and direction as shown in the hourly data now provided [MMC350]. It is the relative direction of the flow and the waves that results in this.</p>
151	<p>The modelling of changes in tidal stream flow and wave behaviour does not assist sea kayakers in understanding the effects the MDZ may have in this internationally important area of coastline.</p>	<p>As discussed above, the changes predicted to sea conditions around those areas used by kayakers are expected to be very minor, and in any case, kayakers rely upon a complex set of meteorological factors coming together which vary with time, season and environmental conditions. The modelled results are necessarily generic in this way and are not intend to replace the process of dynamic risk assessment undertaken by kayakers when navigating in specific environmental conditions.</p>
152	<p>The model suggests, as expected, that the tidal devices would be expected to slow the flow in the MDZ and downstream of it, and that</p>	<p>Agreed</p>

	speed increases offshore of the MDZ as the resistance to flow in the MDZ forces the tide to flow around it.	
Part 3. Summary of modelling as it affects kayakers		
153	Speed is shown as generally reduced inshore of the MDZ. Some increase is indicated in local areas, but these would not be the areas with the fastest flow, so are unlikely to be significant to kayakers. The speed of flow in the areas of the main tide races is predicted to reduce slightly, reducing the value of these tide races to kayakers. The modelling approach was not designed for this purpose and these results are unreliable, but are consistent with what might be expected subjectively and are probably broadly correct.	We also consider that the model results are correct.
3.1 Overall conclusion from existing modelling		
154	No model output is available to show the effect on surface flow. It would be useful to have such data to calculate the expected drift paths of kayaks downstream from the tide races engaged in actual or simulated incidents and rescues. The 2D model may overestimate the diversion of surface flow around the MDZ. There is a serious concern among kayakers that they would be carried into areas of the MDZ where surface piercing devices would be a lethal hazard.	The 2D model is valid owing to the high level of turbulence and mixing in the high energy marine environment. The hourly data provided [MMC350] illustrates flow directions. The risk of collision is considered in the NRA Addendum as is considered to be ALARP.
155	Wave heights are predicted to be reduced in general but with possible increases in wave height as a result of local increases in tidal flow. As with the increases in speed, the areas where wave height increases are predicted are not be where the biggest waves are.	-
156	It is not possible to say from the modelling whether the general pattern of flow and eddies inshore of the MDZ will change. Overall, wind driven wave heights, tidal stream speeds and tide race wave heights are likely be reduced in most of the area, but could increase locally.	The changes predicted to sea conditions around those areas used by kayakers are expected to be very minor, and in any case, kayakers rely upon a complex set of meteorological factors coming together which vary with time, season and environmental conditions. The modelled results are necessarily generic in this way and are not intended to

		replace the process of dynamic risk assessment undertaken by kayakers when navigating in specific environmental conditions.
157	This follows from the discussion in section 2.1.1 above. The tidal stream will be obstructed by the resistance of the MDZ and some of the flow will be diverted offshore. At the North end of the MDZ, the surface flow may initially continue, as the devices are submerged. The 'run-out' stream from the North Stack race may therefore run in a similar position to now. Figure 6 shows this, based on the GPS track of a kayak trip by the author which followed this flow, reaches the MDZ in 7 minutes.	The NRA addendum has specifically considered the risk of collision of un-powered vessels and mitigations are also described.
158	There is no confidence that contact with MDZ infrastructure could not occur. The South Stack race, formed by the 'South Stack Banner Bank' is regarded by many expert kayakers as the best tide race, and the run-out leads directly into the MDZ. Unlike many tide races, there is no eddy at the side to give an option for rescues. Any kayaks involved in incidents in the South Stack race, whether present there to surf or just transiting though, <u>will</u> be carried into an area of surface devices.	As demonstrated in MMC350 the vast majority of current flows modelled do not run from the shore into the array. In any case the risk of being carried into the array area is considered in the NRA Addendum and is considered to be ALARP.
159	The flow to the East of the MDZ is currently unpredictable, and may remain so even with use of detailed 3D modelling. There are many variables. It may be speeded up, as occurs offshore, or slowed by the constriction at South Stack; either effect could be detrimental.	It is important to remember that model uses a 240MW deployment and in reality the project deployment will necessarily be phase very slowly over many years. The modelling concludes that changes in conditions will be very small, however in any case there will be time for recreation users to gain new knowledge of any perceptible changes that do occur.
3.2 Overall conclusion from subjective assessment		
160	Figure 7 – Penrhyn Mawr Race and effect of flood tide The flood flow will also be deflected around and slowed, with the inshore effects being even less predictable. Constriction of the inshore channel will exacerbate the way the tide is push offshore by the headland of Penryn Mawr itself, increasing the risk to kayakers using the race. On the end of the ebb, an eddy forms which has the effect that the North going current at Penrhyn Mawr starts several hours	As demonstrated in MMC350 the vast majority of current flows modelled do not run from the shore into the array. In any case the risk of being carried into the array area is considered in the NRA Addendum and is considered to be ALARP.

	earlier than elsewhere. This further complicates predictions, as the MDZ may restrict formation of the eddy.	
161	It is recognised that these conclusions are not underpinned by anything other than speculation. The author does not have the experience or resources available to organisations like HR Wallingford. They do, however, demonstrate that the MDZ is very likely to have a significant effect on recreational boating, particularly sea kayaking. This requires modification to the proposals. As a minimum, if Morlais are not prepared to make changes, it requires proper investigation.	The author of the Statement of Case acknowledges that he is speculating and does not have comparable experience. It is hoped that the detailed and high quality work subsequently submitted by HRW and Marico in assessing the navigational risk to un-powered craft including kayakers will provide the reassurance he is seeking.
162	Morlais should consider moving the location of tidal devices further offshore, using the full Southwestern extent of the licenced MDZ to accommodate them. This would move the devices further from existing recreational areas and reduce the risk of accidental interaction. It would widen the unobstructed area to tidal flow and result in much less change to existing flow around the coast. Based on subjective expectation of the effect on surface currents, a distance of 1.5 nautical miles from the coast would reduce risk to safety of life and disruption to existing activity to a manageable level. These benefits should be confirmed by appropriate modelling, taking due account of the change in depth velocity profile in the presence of devices. It would also reduce the risk of incidents due to congestion in the inshore area.	As discussed elsewhere, tidal stream energy generation relies upon high tidal flows which are located in the area closer to the shore. It is unclear where 1.5nm has come from, it appears to be unjustified given the GIS kayaking routes provided by SCC and Morlais.
163	It is understood that the proposed position of the tidal generators is intended to maximise output power by using the fastest tidal streams (although the fastest streams are not necessarily those with most momentum behind them). As a development project, it is not essential that all tidal generators are located in the optimal position to maximise power. Most locations for commercial generation will not be ideal, and the generating technology should not require ideal conditions to be viable.	It is not clear on what basis SCC is specifying the requirements for tidal energy generation.

164	It is also important that a demonstration project should identify good practice in siting considerations and assessment of conflicting uses. The only documentation in the TWAO Application to justify moving the MDZ from the original West Anglesey Demonstration Zone location, which was further offshore and as originally identified by The Crown Estate, is "Menter Môn consulted stakeholders on the proposed move". (Ref 1)	The boundary change was carefully considered with respect to multiple factors. The full report has been provided to the Inquiry. It is not clear how this statement related to hydrodynamics.
165	If Recommendation 1 is not considered feasible, then to minimise the danger to kayakers and other small boat users, the 500m zone in which surface piercing devices are not permitted should be extended to 2000m. This would reduce the risk to life but the changes to the hydrodynamic regime would be likely to cause loss of amenity and consequent economic loss to kayaking led tourism.	The risk to kayakers from the project is specifically assessed in the NRA Addendum as ALARP. Given the lack of overlap of the project with the GIS tracks as shown, it is unclear where the claimed loss of amenity arises from. There is no evidence to suggest that economic loss will occur and a monitoring and mitigation plan has been committed to.
3.3 Recommendations		
166	Further outputs from hydrodynamic modelling of whatever scheme is taken forward should be made available to sea kayakers. To estimate the effects on navigation, predicted baseline and scheme flow at intervals over a mean spring tide flood and ebb cycle would be most useful. A reduction in model mesh in the inshore areas, particularly around the Stacks and Penrhyn Mawr, would also be helpful, and might assist in considering to effect on the direction and speed of drift of a kayak or group a kayaks following an incident, or practice for an incident, in one of the tide races.	Hourly data has now been provided [MMC350]
167	Discussion of the effects on recreational navigation by the model authors would be valuable.	Marico have undertaken the NRA Addendum and are well respected and highly qualified.
168	Notwithstanding Recommendation 3, if it is not practicable to predict the effects of the MDZ on the tidal flows through the areas around the tide races at North and South Stack and Penrhyn Mawr, or the eddies	A socioeconomic monitoring and mitigation plan has been committed to.

	and complex flows around these races and in Abraham's Bosom and Gogarth Bay, then turbine installation should be implemented in such a way that detrimental effects on these internationally important sea kayaking venues can be monitored, and the turbine installation modified if the effects are severe.	
169	The Morlais project sets out to demonstrate the viability of tidal generation; such a demonstration should also include the reliability of modelling to predict the effect of tidal generation schemes on waves and current. It is important that these aspects are modelled in enough detail so that the predictions can be compared with actual measurements as the scheme is implemented.	Morlais would be very willing to work with qualified organisations to undertake further research on this issue.
170	The consideration given to sea kayaking within the consultations to date, and the application and interpretation of computer models, has created a serious concern among sea kayakers regarding the consequences of the Morlais project. This concern is already registered and is likely to deter kayakers from visiting Anglesey and making use of local accommodation, facilities, kayak coaches and equipment suppliers if the MDZ is operated in any form. Morlais should now engage positively with the sea kayaking community in order to turn this view around.	It is hoped that the detailed and high quality work subsequently submitted by HRW and Marico in assessing the navigational risk to un-powered craft including kayakers will provide the reassurance SCC is seeking. We would be very willing to work with local kayakers positively to improve perceptions and correct any misunderstandings in the kayaking community about the project's effects. We would very much welcome the author to engage with us on this basis.