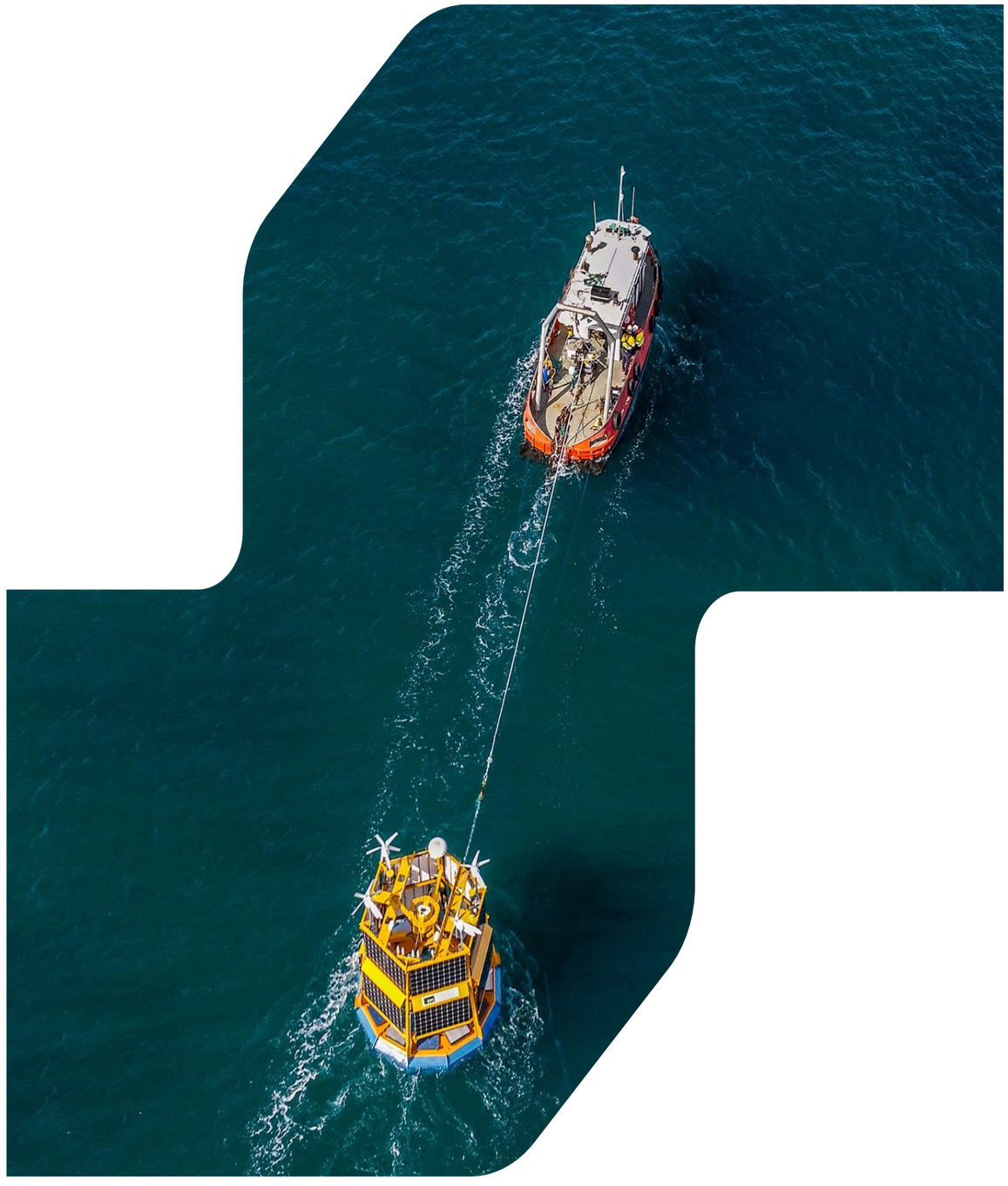
MARINE ENERGY WALES

MARINE ENERGY TEST AREA (META)

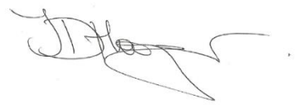
Invasive Non-Native Species Management Plan (PEMP Annex 5)



EOR0730
Marine Energy Test Area
Rev: 04
January 23, 2024

rpsgroup.com

Document status					
Version	**Purpose of document**	**Authored by**	**Reviewed by**	**Approved by**	**Review date**
Rev00	Internal Draft	AC	RDS		17/07/19
Rev01	Client Review	AC	RDS	RDS	31/07/19
Rev02	Post consent update	AC	AC/AP/RDS	JH	31/03/21
Rev03	NRW comments and annual update	SY	TH	SY	27/01/22
Rev04	Carpet Sea Squirt Didemnum vexillum now referenced	SY	TH	SY	23/01/24

Approval for issue		
Jessica Hooper		1 March 2021

Prepared by:	Prepared for:
RPS Energy Ltd.	**Marine Energy Wales**

Table of Contents

1 INTRODUCTION 1
1.1 Background 1
1.2 Purpose of this Invasive Non-Native Species Management Plan 2
2 PROJECT DESCRIPTION 4
2.1 Overview 4
2.2 Site Locations 4
2.2.1 Carr Jetty (site 1) 4
2.2.2 Mainstay Quay (site 2) 4
2.2.3 Ferryside (site 3) 4
2.2.4 Quay 1 (site 4) 4
2.2.5 Criterion Jetty (site 5) 4
2.2.6 Warrior Way (site 6) 4
2.2.7 Dale Roads (site 7) 4
2.2.8 East Pickard Bay (site 8) 5
3 INVASIVE NON-NATIVE SPECIES MANAGEMENT PLAN METHODOLGY 10
3.2 Step 1: Understanding your site 10
3.3 Step 2: Understand how INNS may be introduced or spread to your site 10
3.4 Step 3: Understand the site activities 11
3.5 Step 4: Biosecurity control measures 11
3.6 Step 5: Biosecurity surveillance, monitoring and reporting procedures 11
3.7 Step 6: Contingency Plan 11
3.8 Evaluation and Review 11
4 META INVASIVE NON-NATIVE SPECIES MANAGEMENT PLAN 12
4.1 Step 1: Understanding your site 12
4.1.1 Environmental conditions affecting biosecurity 12
4.1.2 Information related to any slow or stationary periods or climatic conditions that may increase biosecurity risk? 12
4.1.3 INNS in the Waterway 12
4.2 Step 2: Understand how INNS may be introduced or spread to your site 13
4.3 Step 3: Understand the site activities 17
4.4 Step 4: Biosecurity control measures 17
4.4.1 Provision of temporary moorings 17
4.4.2 Installation/presence of man-made structures 17
4.4.3 Using vessels from outside of the Waterway 17
4.4.4 Maintaining/presence marine energy devices, ancillary equipment and pontoon 18
4.4.5 Removal of marine energy devices and ancillary equipment 18
4.4.6 Cleaning and disposal of biofouling from marine energy devices and ancillary equipment. 18
4.4.7 Biosecurity Action 18
4.5 Step 5: Biosecurity surveillance, monitoring and reporting procedures 19
4.6 Step 6: Contingency Plan 19
4.7 Evaluation and Review 20
4.7.1 Biosecurity logbook 20
4.7.2 INNSMP Review Date 20
5 USEFUL SOURCES OF INFORMATION 21
6 REFERENCES 22

Table of Figures

Figure 1.1: Location of the META sites. 3
Figure 2.1: Location of sites 1 - 5. Note: All sites lie out-with any designated sites. 6
Figure 2.2: Location of Warrior Way (site 6). 7
Figure 2.3: Location of Dale Roads (site 7). 8
Figure 2.4: Location of East Pickard Bay (site 8) 9
Figure 3.1: Six steps used to produce this INNSMP for the META project (Cook *et al.* 2015). 10

Table of Tables

Table 1.1: Biosecurity consent conditions of the META Phase 1 and Phase 2 Marine Licences. 1
Table 1.2: Biosecurity plan overview. 2
Table 3.1: Example of low and significant risk sites (Cook *et al.*, 2015) 10
Table 3.2: Example questions and risk to consider whilst creating an INNSMP (from Cook *et al.*, 2015). 11
Table 4.1: Non-native species known to be present throughout the Milford Haven area. 13
Table 4.2: Vessel/equipment types using the site and/or involved in the operation. 14
Table 4.3: Site activities which have a significant risk of introducing or spreading INNS. 17
Table 4.4: Instructions for Staff/ Contractors/ Site Users. 19

1 INTRODUCTION

1.1 Background

1.1.1.1 This Invasive Non-Native Species Management Plan (INNSMP) has been prepared by RPS for Marine Energy Wales (MEW), for the Marine Energy Test Area (META) project, led by Pembrokeshire Coastal Forum (PCF) Community Interest Company (CIC) (the Licensee). This INNSMP provides a framework through which the risks associated with invasive non-native species (INNS) resulting from the installation, operation and maintenance, and decommissioning of marine renewable devices and ancillary equipment as part of the META project within Milford Haven and adjacent waters, in Pembrokeshire, Wales, are assessed. This INNSMP covers META Project Phase 1 and 2 sites.

1.1.1.2 The META project provides marine renewable energy device developers with pre-consented testing sites, which reduces the consenting burden on device developers. The aim of the META project is therefore to provide a series of pre-consented, non-grid connected, marine energy test areas that allow for the deployment and testing of devices, components and subassemblies, and ancillary activities and equipment, in support of marine energy testing. Thereby de-risking marine energy projects prior to larger scale or array deployments.

1.1.1.3 META phase 1 comprises fives sites located in close proximity (< 1,000 m) to Pembroke Dock: Carr Jetty (site 1); Mainstay Quay (site 2); Ferryside (site 3); Quay 1 (site 4); and Criterion Jetty (site 5). META phase 2 comprises three sites: Warrior Way (site 6); Dale Roads (site 7); and East Pickard Bay (site 8). The location of these sites is shown in Figure 1.1. The Waterway has known INNS (NBN Gateway, data obtained 2021). The Marine Licence for Phase 1 (DEML 1875) and the Marine Licence for Phase 2 of the META project (ORML 1957) include a number of conditions relating to biosecurity, including the development and implementation of an INNSMP, as outlined in Table 1.1.

1.1.1.4 Many INNS, including the slipper limpet *Crepidula fornicata*, *Pacific oyster Crassostrea gigas*, soft shelled clam *Mya arenaria*, oyster thief *Colpomenia peregrina* and Darwin's barnacle *Austrominius modestus* have been recorded throughout the Waterway (NBN Gateway, data obtained 2021). This INNSMP assesses the risk of introduction and spread of INNS associated with the META project and identifies the appropriate measures to be implemented to minimise these risks as much as possible following best guidance (Cook *et al*. 2014). This document should be read in conjunction with the META 'Environmental Appraisal Phase 1 sites' document, supporting the META Phase 1 Marine Licence (DEML1875) and the META Environmental Statement, supporting the META Phase 2 Marine Licence (ORML 1957).

Table 1.1: Biosecurity consent conditions of the META Phase 1 and Phase 2 Marine Licences.

Consent number	Condition detail
MARINE LICENCE (DEML 1875)	
8.4	The Licence Holder must produce and implement a Biosecurity Action Plan. The Biosecurity Action Plan must be available for inspection at all reasonable times at the locations detailed in paragraph 3 by NRW acting on behalf of the Licensing Authority and/or Marine Enforcement Officers.
8.5	The Licence Holder must ensure all equipment, materials, machinery and PPE used are in a clean condition prior to their arrival on site, and upon removal from site, to minimise risk of introducing non-native species into the marine environment.
MARINE LICENCE (ORML 1957)	
3.24.1	The Licence Holder must ensure all equipment, materials, machinery and Personal Protective Equipment used as part of the Licensed Activities should be thoroughly washed and air dried before deployment and thereafter before moving between locations to minimise risk of introducing non-native species into the marine environment.
3.24.2	An Invasive Non-Native Species Management Plan (INNSMP) for the Project is submitted to the Licensing Authority for written approval a minimum of 8 weeks prior to the commencement of works. No Licensed Activities may be undertaken prior to written agreement from the Licensing Authority. The Licence Holder must ensure that any actions outlined in the INNSMP are implemented as approved in writing by the Licensing Authority. Any proposed changes to the actions outlined in the INNSMP must be submitted to and agreed in writing by the Licensing Authority prior to any changes being enacted.
3.24.3	The Licence Holder must submit an updated INNSMP to the Licensing Authority for written approval by the 31 January each year, starting January 2022.
MARINE WORKS LICENCE	
	TBC – MEW is awaiting this licence. Conditions from this licence which the INNSMP addresses will be updated here.
PLANNING PERMISSION (Warrior Way only)	
	TBC – MEW is awaiting this permission. Conditions from this permission which the INNSMP addresses will be updated here.

1.1.1.5 A biosecurity plan overview has been provided in Table 1.2.

Table 1.2: Biosecurity plan overview.

Development Activity	META project detail
Description of Operation:	Testing, including deployment, installation, operation and maintenance, and decommissioning of marine renewable energy devices and ancillary equipment.
Site/Operation Location:	Milford Haven Waterway, Pembrokeshire, Wales.
Plan Period:	Intermittent activity over 10 years for Phase 1 (sites 1 – 5), and over 15 years for Phase 2 (sites 6-8) commencing in 2021.
Risk:	The META Project is at risk of introducing or spreading INNS within the Milford Haven Waterway
META Operations Manager:	Responsible for ensuring compliance with all plans, licenses and conditions for the META.

1.2 Purpose of this Invasive Non-Native Species Management Plan

1.2.1.1 The European Union (EU) Invasive Alien Species regulation came into force in January 2015, which requires action plans to control the introduction and spread of INNS. This regulation indirectly affects the Water Framework Directive (WFD)[1], the Wildlife and Countryside Act 1981[2] and the Marine Strategy Framework[3], ensuring compliance, follows best practice and aids in the protection of Great Britain's waters. This INNSMP ensures compliance with relevant legislation and international commitments for the META Project.

1.2.1.2 The purpose of this INNSMP is to ensure all procedures pertaining to marine device deployments and retrievals, ancillary support structures, and maintenance operations follow best guidance, preventing and reducing the risk of possible spread or introduction of INNS into the Waterway and waters beyond. The method employed follows the GB Invasive Non-Native Species Framework Strategy which has a three-tier approach (GB NNSS, 2008):

- Prevention: Prevent all INNS from entering the waterbody in question;
- Rapid response: Detection of INNS as early as possible, monitor and possible eradication INNS present; and
- Control and containment: Should proliferation of INNS be too great for eradication, control and containment of populations will be required.

1.2.1.3 This INNSMP focuses on "Prevention", in line with the INNS Framework Strategy, thereby negating the need for 'rapid response' and 'control and containment' methods. This document is a 'live' document which will be reviewed and updated, by the META Operation Manager, in accordance with the requirements of the Marine Licence (see Table 1.1 and Section 4.7: Evaluation and Review).

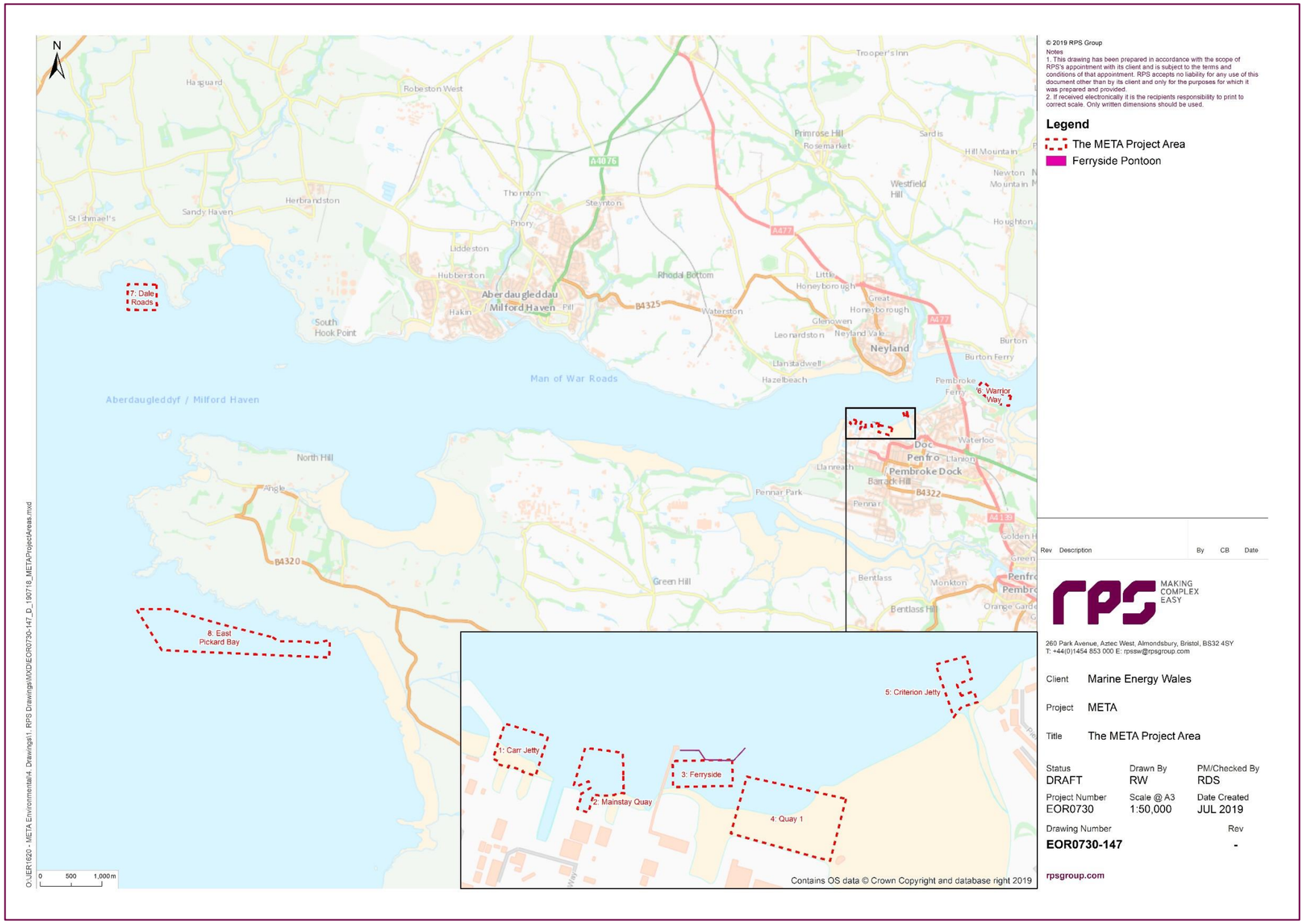
1.2.1.4 This report is set out as follows:

- Section 2: Summary of the META project description;
- Section 3: Summary of INNSMP methodology;
- Section 4: The META INNSMP; and
- Section 5: Useful sources of information for META project management.

[1] The WFD requires all European member states to aim for good chemical and ecological status (ecological status takes into account INNS present, which can reduce a waterbodies status).

[2] It is illegal under section 14 of the Wildlife and Countryside Act 1981 (as amended) to release or allow to escape into the wild any animal which is not ordinarily resident in Great Britain and is not a regular visitor to Great Britain in a wild state or is listed in Schedule 9 to the Act.

[3] The Marine Strategy Framework Directive requires Member States to put in place measures to achieve good environmental status in their marine waters by 2020.



Notes
1. This drawing has been prepared in accordance with the scope of RPS's appointment with its client and is subject to the terms and conditions of that appointment. RPS accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared and provided.
2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.

Legend

- The META Project Area
- Ferryside Pontoon

Rev	Description	By	CB	Date

260 Park Avenue, Aztec West, Almondsbury, Bristol, BS32 4SY
T: +44(0)1454 853 000 E: rpssw@rpsgroup.com

Client	Marine Energy Wales
Project	META
Title	The META Project Area

Status	Drawn By	PM/Checked By
DRAFT	RW	RDS
Project Number	**Scale @ A3**	**Date Created**
EOR0730	1:50,000	JUL 2019

Drawing Number	Rev
EOR0730-147	-

rpsgroup.com

Figure 1.1: Location of the META sites.

2 PROJECT DESCRIPTION

2.1 Overview

2.1.1.1 The proposed META project forms part of Pembroke Dock Marine, a £76 million project to develop a world class centre for marine energy development, fabrication, testing and deployment, in Pembrokeshire[4]. This is one of 11 projects included in the Swansea Bay City Deal signed in 2017. The four pillars of the Pembrokeshire Dock Marine Project include:

- The META Project;
- Marine Energy Engineering Centre of Excellence (MEECE);
- Pembroke Dock Infrastructure; and
- Pembrokeshire Demonstration Zone (PDZ).

2.2 Site Locations

2.2.1 Carr Jetty (site 1)

2.2.1.1 Carr Jetty (site 1) encompasses the Carr Jetty within Pembroke Dockyard and the waters to the east of it. It is located to the north of the dry dock and west of the ferry terminal. The site offers a water depth of between -3 m CD and - 4 m CD (Chart Datum) with a sheltered tidal resource (approx. 1.7 knots (Tidal Atlas)), in an accessible environment. Carr Jetty (site 1) encompasses an area of 7,100 m^2 (0.71 Ha).

2.2.1.2 Figure 2.1 illustrates the location and extent of Carr Jetty (site 1) in relation to environmental designated sites.

2.2.2 Mainstay Quay (site 2)

2.2.2.1 Mainstay Quay (site 2) lies within Pembroke dockyard immediately to the west of the ferry port and adjacent to existing quayside operations at Mainstay Quay. Mainstay Quay (site 2) has mild wave conditions and is dredged to a depth of between - 3.9 m CD and - 5.0 m CD. The site encompasses an area of 8,700 m^2 (0.87 Ha). Figure 2.2 illustrates the location and extent of Mainstay Quay (site 2) in relation to environmental designated sites.

2.2.3 Ferryside (site 3)

2.2.3.1 Ferryside (site 3) lies within Pembroke dockyard immediately to the south of the Pembroke Dock-Rosslare ferry pier and Ro-Ro berth, and immediately north-east of Quay 1 (site 4). Ferryside displays mild wave conditions and has a water depth between - 2 m CD and - 5 m CD. The site encompasses an area of 5,900 m^2 (0.59 Ha).Figure 2.2 illustrates the location and extent of Quay 1 (site 4) in relation to environmental designated sites.

2.2.4 Quay 1 (site 4)

2.2.4.1 Quay 1 (site 4) lies within Pembroke Dockyard to the east of the ferry port and adjacent to Ferryside (site 3). This area is actively used as part of the Pembroke Dockyard operations and is in use for general cargo/offloading. The quayside accommodates vessels up to 164 m in length and has a 6.8 m control depth. Water depth on site is between - 6.8 m CD to - 8 m CD. The site encompasses an area of 23,900 m^2 (2.39 Ha).Figure 2.2 illustrates the location and extent of Quay 1 (site 4) in relation to environmental designated sites.

2.2.5 Criterion Jetty (site 5)

2.2.5.1 Criterion Jetty (site 5) is an area of reasonable tidal flow adjacent to the existing, but not currently operational, criterion jetty, which is to the east of Pembroke Dockyard. Milford Haven Port Authority (MHPA) is considering reinstating this jetty for operation activities to expand current Port facilities. Criterion Jetty (site 5) offers a tidal flow of between 0.3 m/s and 0.6 m/s during peak spring tidal conditions, however, access is only via vessels as onshore health and safety concerns limit access by land. Water depth on site is between - 13.3 m CD to - 7.4 m CD. The site encompasses an intertidal area of 4,800 m^2 (0.48 Ha) below MLWS (mean low water spring).Figure 2.2 illustrates the location and extent of Criterion Jetty (site 1) in relation to environmental designated sites.

2.2.6 Warrior Way (site 6)

2.2.6.1 Warrior Way (site 6) is located within the Waterway offshore from the Pembrokeshire Science and Technology Park, south east of Pembroke Ferry, and at the mouth of the Cosheston Pill. The site supports the greatest tidal resource in the Milford Haven Estuary (1.2 m/s) and has a depth of between 16-19 m. Warrior Way (site 6) encompasses an area of 93,000 m^2 (9.3 Ha) and lies entirely within the Pembrokeshire Marine Special Area of Conservation (SAC), in close proximity to habitats identified as “Nationally Important Intertidal Habitats”, and immediately adjacent to the Milford Haven Waterway Site of Special Scientific Interest (SSSI). Figure 2.2 illustrates the location and extent of Warrior Way (site 6) in relation to environmental designated sites.

2.2.7 Dale Roads (site 7)

2.2.7.1 Dale Roads (site 7) lies outside the Dale shelf anchorage within the Waterway to the west of Great Castle Head, and south of St Ishmael’s. It is characterised by water depths of between 8 and 12 m and benefits from a significant wind and wave fetch from the south and southwest. The site encompasses an area of 195,565 m^2

[4] For further information on Pembroke Dock Marine projects, visit: http://www.marineenergywales.co.uk/marine-energy-in-wales/projects/pembroke-dock-marine/

(19.56 Ha) and lies entirely within the Pembrokeshire Marine SAC and the West Wales Marine SAC. The coast at Dale Roads (site 7) is part of the Milford Haven Waterway SSSI.

2.2.7.2 Figure 2.3 illustrates the location and extent of the Dale Roads (site 7) in relation to environmentally designated sites. Dale Roads (site 7) benefits from good access and has previously supported wave device developer testing (e.g. wavetricity).

2.2.8 East Pickard Bay (site 8)

2.2.8.1 East Pickard Bay (site 8) lies immediately south of Sheep Island and runs south-eastward parallel to the coast towards Freshwater West bay. The site is exposed to a good wave resource benefiting from a 200 km fetch from the prevailing wind direction and has a water depth of between 10 and 29 m. East Pickard Bay (site 8) encompasses an area of 1,230,000 m^2 (123 Ha) and lies entirely within the Pembrokeshire Marine SAC and the West Wales Marine SAC. Castlemartin Coast Special Protection Area (SPA) lies inland to the north east of East Pickard Bay (site 8). The site also lies adjacent to a Ministry of Defence (MOD) Danger Area. Figure 2.4 illustrates the location and extent of East Pickard Bay (site 8) META marine testing site in relation to the surrounding area and designated sites.

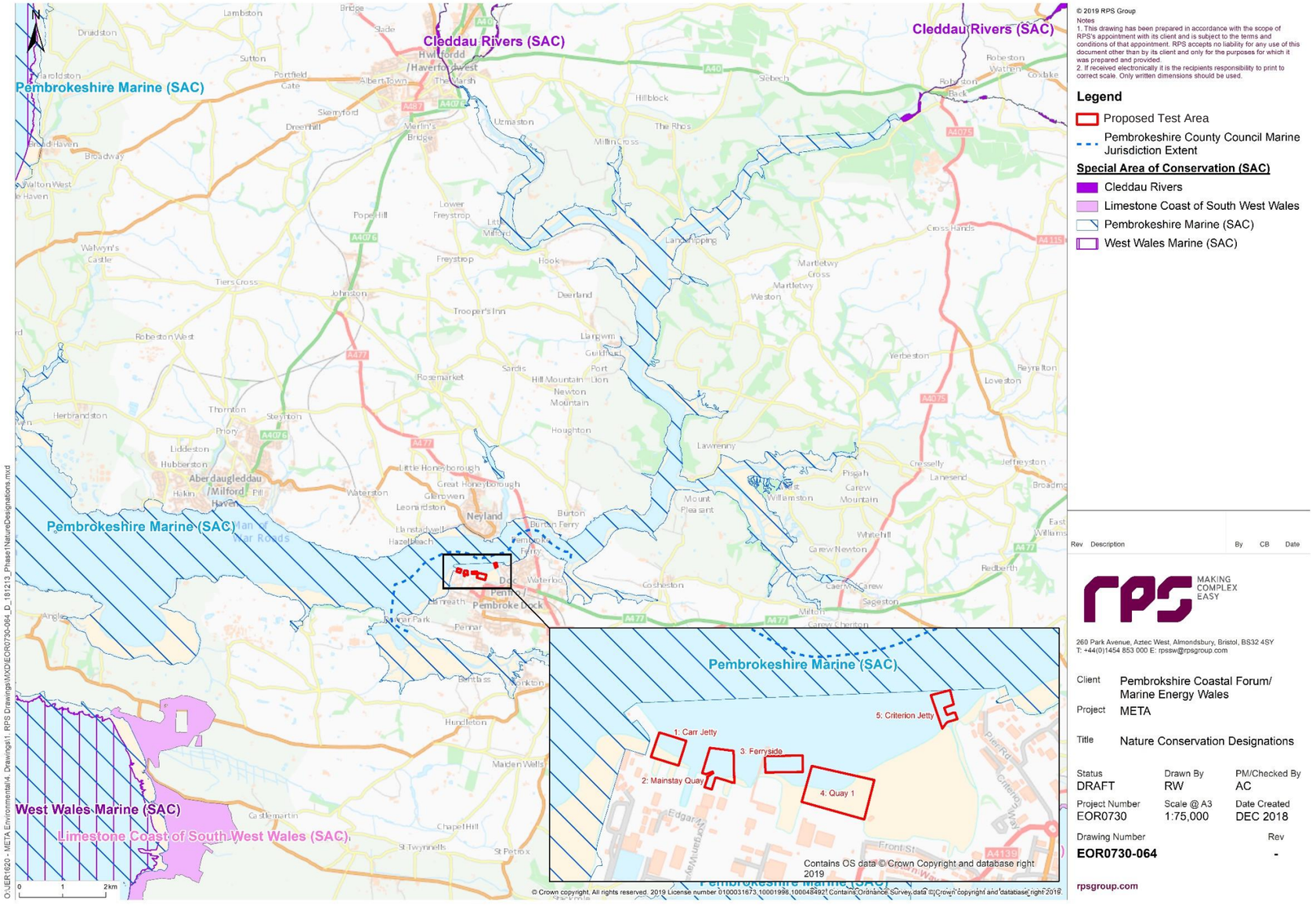


Figure 2.1: Location of sites 1 - 5. Note: All sites lie out-with any designated sites.

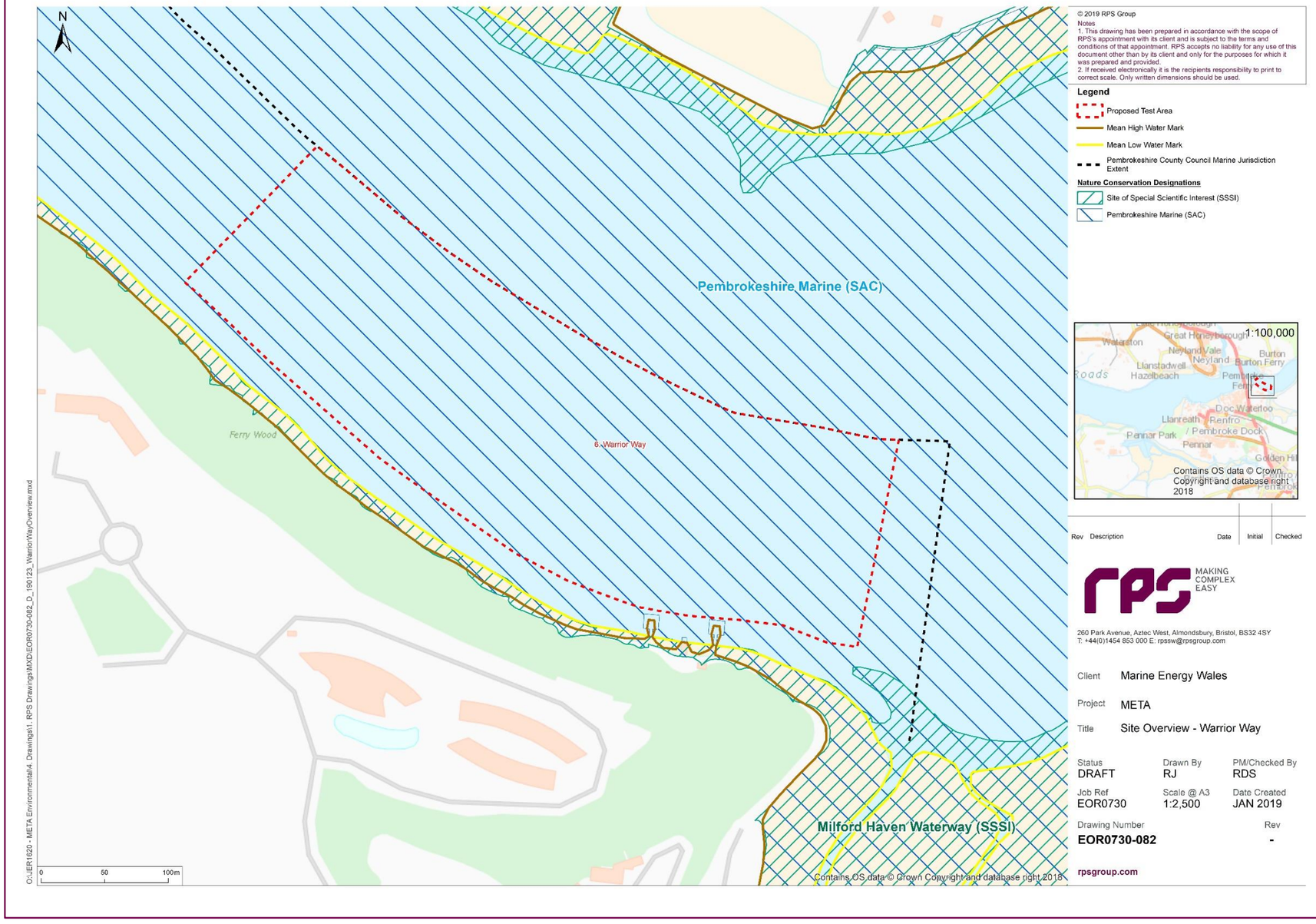


Figure 2.2: Location of Warrior Way (site 6).

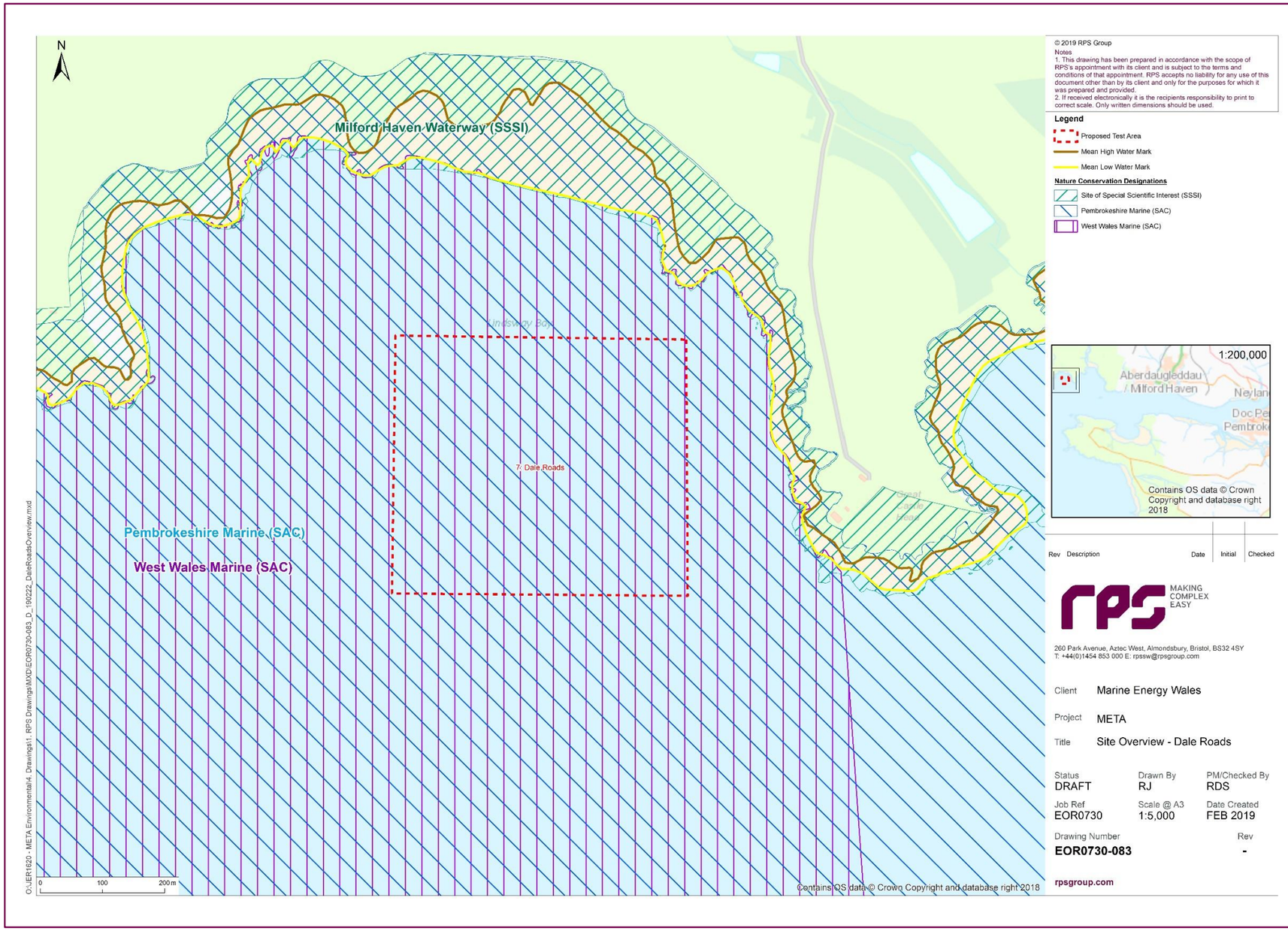


Figure 2.3: Location of Dale Roads (site 7).

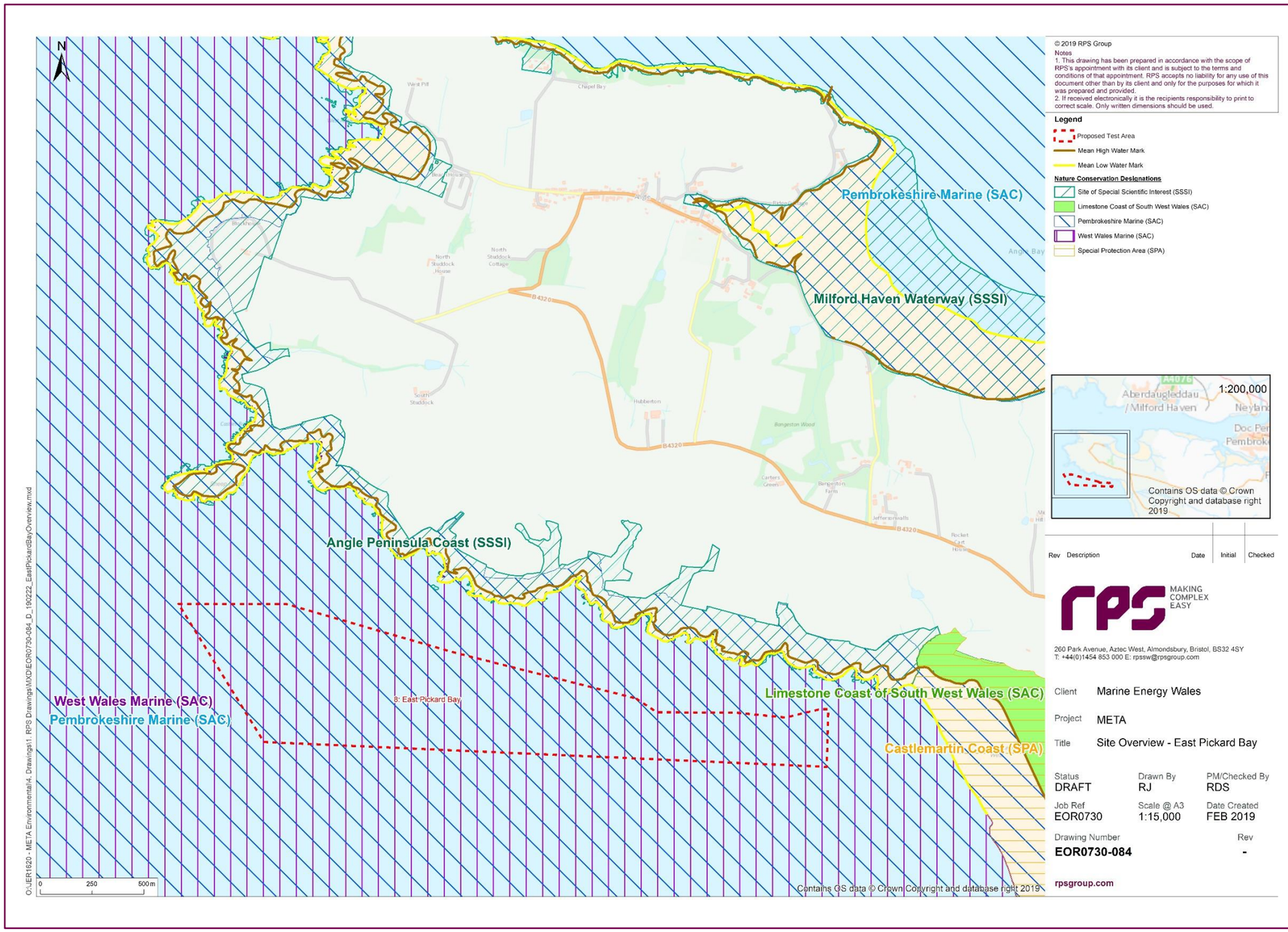


Figure 2.4: Location of East Pickard Bay (site 8)

3 INVASIVE NON-NATIVE SPECIES MANAGEMENT PLAN METHODOLGY

3.1.1.1 This section outlines the process of creating an INNSMP using the best available evidence and following best practice guidance (Cook *et al.,* 2015). An accurate risk assessment of the META project and production of this INNSMP has followed a stepwise approach as outlined in Figure 3.1 and discussed in detail below:

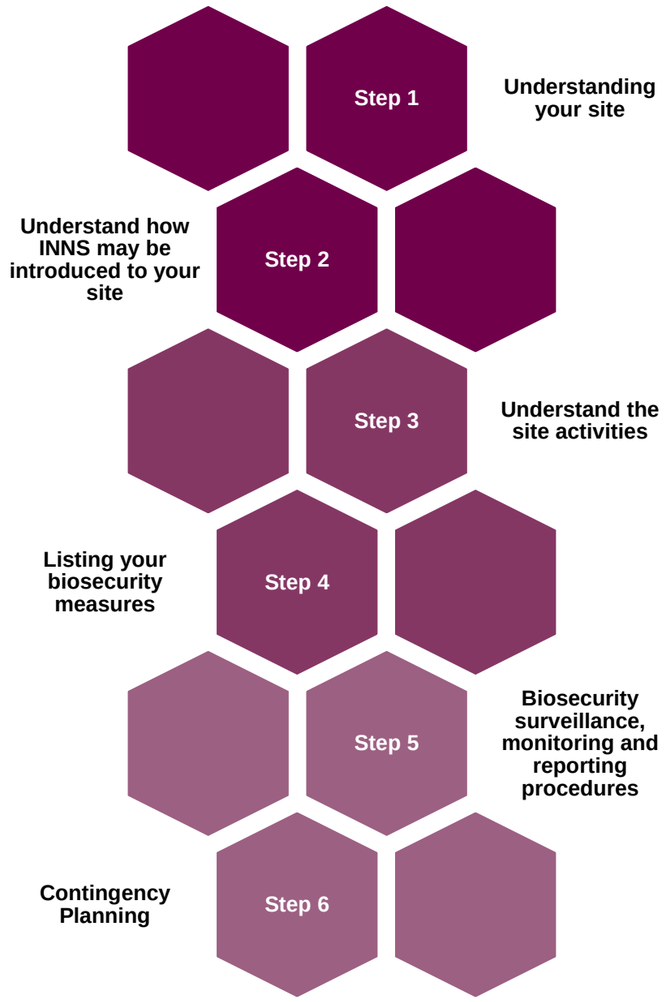


Figure 3.1: Six steps used to produce this INNSMP for the META project (Cook *et al.* 2015).

3.2 Step 1: Understanding your site

3.2.1.1 The first step in creating an INNSMP is to provide a detailed description of the site. This information should include the salinity of the site, any man-made structures and if INNS are present within/on site.

3.2.1.2 Understanding the salinity of the site will determine if INNS are present. The majority of marine flora and fauna are unable to tolerate freshwater due to osmoregulatory effects leading to death (Evans, 1980). The more freshwater flowing into site will result in less hospitable conditions, decrease the risk of INNS on site; conversely a fully marine site represents a greater risk.

3.2.1.3 The presence of artificial structures increases the risk of INNS establishment, even if the structure has only been present for just a few weeks as INNS are quick to establish populations. Information related to any slow or stationary periods of works or climatic conditions that may increase biosecurity risk should be included.

3.2.1.4 If INNS have been found onsite then the INNSMP should focus on reducing the risk of introducing new INNS and consider how to prevent the spread of existing INNS to other sites. Here the precautionary principle should be followed, even if no INNS are present on site.

3.2.1.5 Using this information, a site can be assessed as having **low risk** or a **significant risk** of introducing or spreading INNS (see Table 3.1).

Table 3.1: Example of low and significant risk sites (Cook *et al.*, 2015)

Low Risk Site	Significant Risk Site
• Supply of freshwater from a local river. • Isolated from surrounding environments by walls or breakwaters i.e. closed or semi-enclosed area with little to no flow of water. • Anti-fouling used on artificial structures with periodic removal for air-drying.	• Full salinity with no freshwater inflow. • Artificial structure has no antifouling coating with no management in place for maintenance. • Site has connectivity to similar environments.

3.3 Step 2: Understand how INNS may be introduced or spread to your site

3.3.1.1 In addition to understanding the site, consideration of pathways by which INNS may be introduced or spread are needed. The step should be iterative and revisited when the INNSMP is due for review. The questions and associated risk outlined in Table 3.2 have been adapted from Cook *et al.* (2015) and provide the type of questions to consider when creating an INNSMP.

Table 3.2: Example questions and risk to consider whilst creating an INNSMP (from Cook *et al.*, 2015).

Questions	Yes = High	Yes = Medium	Yes = Low
1. Has the vessel/ equipment just arrived from the local area?			
2. Has the vessel/ equipment had an anti-fouling coating applied to submerged structures within the last 12 months (or time recommended by manufacturer)?			
3. Are all the visible submerged surfaces free of bio-fouling (a green 'slime' is OK)?			
4. Do the visible submerged surfaces have more than a green 'slime' coating?			
5. Does the vessel/ equipment have noticeable clumps of algae and/ or animals clinging to the visible parts?			
6. Has the vessel/ equipment just arrived from another country or region with similar environmental conditions (e.g., seawater temperature)?			
7. Has the vessel/ equipment just arrived from a water body known to have INNS present?			
8. Does the vessel/ equipment spend long periods of time stationary at sites in between anti-fouling treatments?			
9. Is the vessel 'slow moving', such as a construction barge or drilling rig?			

3.3.1.2 For example, a recreational vessel showing no signs of biofouling on the hull or below the waterline would be considered a **low risk** for introduction of INNS; conversely a work vessel/barge that moves from site to site and is present on site for long periods of time may have a **medium – high risk (i.e. significant risk)** of introducing INNS to site. For the purposes of this assessment, any activity that falls within the 'Low' category in Table 3.2 above is assessed as 'Low' Risk. Any activity that falls within the 'Medium' or 'High' categories is assessed as 'Significant' Risk. This is considered to present a conservative approach to assessing risk of introducing INNS for the META Project.

3.4 Step 3: Understand the site activities

3.4.1.1 Often this step involves a simple approach of listing all activities, using information obtained through the first two steps, which may carry a **significant risk** of introducing or spreading INNS. Once this list has been created, the next step is to develop control measures.

3.5 Step 4: Biosecurity control measures

3.5.1.1 It is important that measures to control the introduction or spread of INNS are effective, clear, realistic and easy to communicate to others. These measures also have to take into account how much control is enforceable over the site. A list of example control measures can be found within Cook *et al.* (2015), many of which are included in this INNSMP (see section 4.4). Where possible, biosecurity measures should be included in the in-design stage of a new development and aim to 'design out' any possible significant risk of introducing or spreading INNS.

3.6 Step 5: Biosecurity surveillance, monitoring and reporting procedures

3.6.1.1 This section should outline what procedures should be followed in the event of discovering and positively identifying an INNS on site. All staff and other site users should be encouraged to report any unusual sighting to the biosecurity officer.

3.7 Step 6: Contingency Plan

3.7.1.1 In the event of the 'prevention' and 'rapid response' method fail (section 1.2.1.2) a contingency plan should be created. This document should be short, provide a step-by-step approach of action and be accessible to all staff. This plan should review the identified activities listed and derive actions based on the failure of the biosecurity control measures attributed to the listed activities e.g. a vessel has been wrongly assessed as low risk and has introduced an INNS to site, here the species would be identified, sampled, relevant authorities notified, and further containment measures sought.

3.8 Evaluation and Review

3.8.1.1 Following completion of the INNSMP, a clear recording system and review date should be in place to refine and update the INNSMP as required.

4 META INVASIVE NON-NATIVE SPECIES MANAGEMENT PLAN

4.1 Step 1: Understanding your site

4.1.1 Environmental conditions affecting biosecurity

4.1.1.1 The META project Phase 1 sites (site 1 – 5) are located outside of any environmental designated areas.

4.1.1.2 The META project Phase 2 sites (sites 6 – 8) sit within the Pembroke Marine/Sir Benfro Forol SAC, which is designated for a range of Annex I habitats including estuaries, large shallow inlet and bays, and reefs, as well as Annex II species. The Conservation Objectives and Advice on Operations report for the SAC identifies INNS as a key mechanism by which some activities and operations within the SAC may have an adverse effect on features or components of features of the site (NRW, 2018).

4.1.1.3 Dale Roads (site 7) and East Pickard Bay (site 8) also sit within the West Wales Marine/Gorllewin Cymru Forol SAC which is designated for harbour porpoise (*Phocoena phocoena*). The Conservation Objectives and Advice on Operations report (JNCC, 2019) does not list INNS as a concern for this site.

4.1.1.4 The Waterway is a macro-tidal submerged ria with a tidal range of circa 5.5 m and strong tidal flows (≤ 1.2 m/s) near the Cleddau Bridge where the Waterway narrows. However, near Pembroke Dock hydrodynamic regimes are relatively benign due to the presence of geological and manmade features. The water depth ranges from 0 – 30 m throughout the Waterway.

4.1.1.5 The salinity is fully marine from the mouth of the Waterway up to the Daugleddau estuary (beyond Warrior Way (site 6)) and as such all sites can be expected to be fully marine (i.e. around 35 ppt average seawater salinity).

4.1.2 Information related to any slow or stationary periods or climatic conditions that may increase biosecurity risk?

4.1.2.1 Information relating to the environmental conditions of each of the META sites can be found in section 2.2. Due to the location of the META Phase 1 sites (i.e. sites 1 – 5) within Pembroke Dock, tidal flows can be expected to be slow when compared to the rest of the waterway, potentially allowing for INNS to settle within the area and increasing biosecurity risk. The type of testing activities at the META Phase 2 sites (i.e. sites 6 – 8) requires that the marine renewable devices are located within an area of high energy output and as such none of these sites are located within an area of still or slow water flow.

4.1.2.2 Further information for the META Phase 2 sites can be found within the META 'Environmental Appraisal Phase 1 sites' document and for the META Phase 2 sites, further information can be found in the META Environmental Statement 'Chapter 5: Coastal Processes'. Additionally, no climatic conditions have been identified that may increase the biosecurity risk.

4.1.3 INNS in the Waterway

4.1.3.1 Table 4.1 identifies INNS known to occur throughout the Waterway well as identifying the risk of each species represents to Great Britain's native species. Data on the presence of INNS within the Waterway was obtained from the NBN Gateway[5] (latest update in March 2021) and via personal communications with the environmental manager for the Port of Milford Haven (PoMH) in June 2019. The risk of INNS to native Great Britain species is derived from the non-native species risk analysis process[6].

[5] https://wales-records.nbnatlas.org/search#tab_spatialSearch

[6] Further information on this process can be found at http://www.nonnativespecies.org/index.cfm?sectionid=51

Table 4.1: Non-native species known to be present throughout the Milford Haven area.

	Non-native Species[7]	Risk to native Great Britain species[8]
	• Carpet sea squirt *Didemnum vexillum* • Common slipper limpet *Crepidula fornicata*	High Risk
	• Japanese skeleton shrimp *Caprella mutica* • Japweed *Sargassum muticum* • Jenkins' Spire Snail *Potamopyrgus antipodarum* • Pacific oyster *Crassostrea gigas*	Medium Risk
Present throughout the Waterway and at East Pickard Bay:	• Australian tubeworm *Ficopomatus enigmaticus* • Bay barnacle *Amphibalanus improvisus* • Bryozoan *Bugula neritina* • Bryozoan *Bugula simplex* • Bryozoan *Bugula stolonifera* • Bryozoan Tricellaria inoptiata • Bryozoan *Watersipora subatra* • Colonial sea squirt *Aplidium cf. glabrum* • Colonial sea squirt *Botrylloides c.f. diegensis* • Colonial sea squirt *Botrylloides violaceus* • Colonial sea squirt *Perophora japonica* • Compass sea squirt *Asterocarpa humilis* • Crustacean *Eusarsiella zostericola* • Crustacean *Mytilicola intestinalis* • Darwin's barnacle *Austrominius modestus* • Filamentous red alga *Solieria chordalis* • Green sea fingers *Codium fragile fragile* • Japanese algae *Caulacanthus okamurae* • Leathery sea squirt *Styela clava* • Mediterranean mussel *Mytilus galloprovincialis* • Mudshrimp *Monocorophium sextonae* • Orange-striped anemone *Diadumene lineata* • Orange-tipped sea squirt *Corella eumyota* • Oyster thief *Colpomenia peregrina* • Red seaweed *Anotrichium furcellatum* • Red seaweed *Antithamnionella spirographidis* • Red seaweed *Antithamnionella ternifolia*	Risk not assessed / available
	• Red seaweed *Grateloupia turuturu* • Red seaweed *Polysiphonia harveyi* • Soft-shelled clam *Mya arenaria* • Stalked sea squirt *Styela clava* • Wakame *Undaria pinnatifida*	

4.2 Step 2: Understand how INNS may be introduced or spread to your site

Vessels/equipment to be used in the META project

4.2.1.1 Table 4.2 details the vessels and equipment to be used at each site during the META project and provides a 'risk' indicator for the potential to introduce or spread INNS to the Milford Haven area. This risk assessment is based on professional judgement, the project description (section 2 *et seq.*), INNS present within the area (Table 4.1) and available guidance (section 3.3; Cook *et al.* 2014).

4.2.1.2 The risk assessment has been undertaken based on maximum scenario assumptions for the activities licenced in the Marine Licences for the META Project . As stated in paragraph 1.2.1.3, this INNSMP is a 'live' document which will be updated in accordance with the requirements of the Marine Licence (see Table 1.1). The expectation is that Developers will comply with the requirements of this INNSMP. In the event that any activities fall outside the scenarios presented in Table 4.2, then the Developer will be required to produce their own INNMP per deployment.

[7] Sources: GB NNSS (undated): NBN gateway (Undated); PNP (2017); PoMH (pers. comms.).

[8] According to assessment by NNSS (www.nonnativespecies.org/index.cfm?sectionid=51).

Table 4.2: Vessel/equipment types using the site and/or involved in the operation.

Name	Type	Details and risk factors assumptions	Risk: Low/Significant
META Phase 1 sites			
Vessels	Various	• Vessel size for installation, operation and maintenance, and removal of marine energy devices is maximum length of 35 m, and a maximum draught of 6.8 m; • Vessels supporting deployment and retrieval will be sourced from the Milford Haven Waterway; • Frequency of operation and maintenance: twice weekly; • Vessels are expected to have an anti-fouling coating and inspection history; • Vessels are expected to move slowly when installing or removing a marine energy device; and • Up to five vessels may be utilised in deployment and retrieval operations at any one time.	Low
Marine Energy Devices	Various	• One device/component (Carr Jetty and Criterion Jetty) and two devices/components (Ferryside, Mainstay Quay and Quay 1) deployment occurring at any one time within the test area; • Device will be either towed to site or deployed from land; • Device will occupy all or part of the water column; • Seabed footprint: up to 100 m^2 (1,360 m^2 for Quay 1); • Wave energy component: components or subassemblies may be up to 80 m length 17 m width and 5.5 m draught; • Tidal energy component: 5 m x 5 m, rotor diameter up to 5 m with speed of moving part up to 2 m/s; • Any antifoulants or lubricants used will be EU/Internationally approved for use in marine environments; and • Maximum testing duration 6 months (75% of time in water).	Low
Ancillary equipment	Gravity Base	• Restricted area gravity bases may be required; and • Maximum area 25 m^2 in contact with the sea bed.	Low
	Moorings system	• Four-point anchoring system (modular) within maximum seabed footprint per component or subassembly; and • Maximum mooring spread of up to 100-144 m^2 per component/subassembly.	Low
	Pontoon (Ferryside (site 3) only)	• Four pontoons (pontoon) will be tethered to existing dolphins; • Access brow for Pontoon (2 m x 15 m); and • Pontoon (248 m^2) to be in-situ all year round with removals for maintenance every five years.	Significant
META Phase 2: Warrior Way (site 6)			
Vessels	Various	• Vessel size for installation, operation and maintenance, and removal of marine energy devices is maximum length of 35 m, and a maximum draught of 6.8 m; • Vessels supporting deployment, operation and retrieval will be sourced from the Milford Haven Waterway; • Vessels are expected to have an anti-fouling coating and inspection history; • Vessels are expected to move slowly when installing or removing a marine energy device; and • Up to five vessels may be utilised in deployment and retrieval operations at any one time.	Low
Marine Energy Devices	Various	• One device deployment/test occurring at any one time within the test area; • Device will be towed to site; • Device will occupy all or part of the water column; • Device/component sea-surface area: up to 200 m^2; • Seabed footprint: up to 200 m^2: • Dimensions of tidal component: 20 m x 10 m; • Rotor diameter up to 5 m with swept area of up to 19.63 m^2 • Any antifoulants or lubricants used will be EU/Internationally approved for use in marine environments; and • Maximum duration 6 months (100% of time in water).	Low

Name	Type	Details and risk factors assumptions	Risk: Low/Significant
Ancillary equipment	Gravity Base	• Maximum area 25 m^2 in contact with the sea bed; and • Only deployed for the duration of the testing activity.	Low
	Buoys	• Up to four navigational marker buoys; and • Only deployed for the duration of the testing activity.	Low
	Moorings system	• Mooring spread: 150 m^2; and • Up to four drag anchors with associated slack lines, catenary mooring system.	Low
META Phase 2: Dale Roads (site 7)			
Vessels	Various	• Vessel size for installation, operation and maintenance, and removal of marine energy devices is maximum length of 164 m, and a maximum draught of 6.8 m; • Vessels supporting deployment, operation and retrieval will be sourced from the Milford Haven Waterway; • Vessels are expected to have an anti-fouling coating and inspection history; • Vessels are expected to move slowly when installing or removing a marine energy device; and • Up to five vessels may be utilised in deployment and retrieval operations at any one time.	Low
Marine Energy Devices	Various	• One device deployment occurring at any one time within the test area; • Device will be towed to site; • Wave component testing may occupy a significant proportion of the water column and may include surface-piercing; • Device/component sea-surface area: up to 200 m^2; • Device footprint: up to 600 m^2 on seabed; • Dimensions of component: 30 m x 20 m; • Any antifoulants or lubricants used will be EU/Internationally approved for use in marine environments; and • Maximum duration 12 months (100% of time in water).	Low
Ancillary equipment	Gravity Base	• Maximum area 500 m^2 in contact with the sea bed; and • Only deployed for the duration of the testing activity.	Significant
	Buoys	• Up to four navigational marker buoys; • Only deployed for the duration of the testing activity; and • A test-support buoy capable of dissipating energy at site may also be provided.	Low
	Moorings system	• Mooring spread: 200 m^2; and • Up to 10 drag anchors with associated slack lines, catenary mooring system.	Low
	Pin pilling	• Maximum diameter of the pin piles: 100mm; and • Drilled to a depth of 10 m and 20 m below sea bed.	Low
META Phase 2: East Pickard Bay (site 8)			
Vessels	Various	• Vessel size for installation, operation and maintenance, and removal of marine energy devices is maximum length of 200 m, and a maximum draught of 8 m; • Vessels supporting deployment, operation and retrieval will be sourced from the Milford Haven Waterway and/or local ports (Wales); • Vessels are expected to have an anti-fouling coating and inspection history; • Vessels are expected to move slowly when installing or removing a marine energy device; and • Up to five vessels may be utilised in deployment and retrieval operations at any one time.	Low
Marine Energy Devices	Various	• Up to two marine energy devices may be deployed at any one time (a single device at each of two test berth). • Minimum duration of deployment is up to 6 months therefore up to four test deployment in any 12-month period;	Significant

Name	Type	Details and risk factors assumptions	Risk: Low/Significant
		• Devices may be towed to site or towed on a barge; • Wave component testing may occupy a significant proportion of the water column and may include surface-piercing.; • Device footprint: 33,810 m^2 (sea surface); 8,000 m^2 (seabed) • Dimensions of device/component: 147 m x 230 m; • Any antifoulants or lubricants used will be EU/Internationally approved for use in marine environments; and • Duration of tow testing activity up to three months (50% of time in water); and • Maximum duration 18 months (100% of time in water).	
Ancillary equipment	Gravity Base	• Maximum area 1,125 m^2 in contact with the sea bed; and • Only deployed for the duration of the testing activity.	Significant
	Buoys	• Up to four navigational marker buoys; • Only deployed for the duration of the testing activity; and • A test-support buoy capable of dissipating energy at site may also be provided.	Low
	Moorings system	• Mooring spread: 250,000 m^2 per test activity; and • Up to 3-point catenary mooring system or up to 10 standard drag embedment anchors.	Low
	Pin pilling	• Maximum diameter of the pin piles: 100 mm; and • Drilled to a depth of 10 m and 20 m below sea bed.	Low

4.3 Step 3: Understand the site activities

4.3.1.1 A list of META project activities that may have a significant risk of introducing or spreading INNS has been provided in Table 4.3. These have been derived from information in the project description and from step 1 (section 4.1) and step 2 (section 4.2). Whilst step 2 found that Ferryside (site 3), Dale Roads (site 7) and East Pickard Bay (site 8) represented a potentially significant risk of INNS introduction and spread from marine energy devices, gravity bases and the presence of the pontoon (Table 4.2), step 1 has identified all META Phase 1 and Phase 2 sites as having a **significant risk** of introduction or spread of INNS due to the presence of INNS throughout the Waterway and therefore using the precautionary principle, the biosecurity control measures outlined below (section 4.4) should be applied to all META sites.

Table 4.3: Site activities which have a significant risk of introducing or spreading INNS.

Phase	Activity Description
Installation	• Provision of temporary moorings. • Installation of man-made structures (i.e. marine energy devices and ancillary equipment). • Using vessels from outside of the Milford Haven area.
Operation and Maintenance	• Presence of man-made structures (i.e. marine energy devices and ancillary equipment). • Maintaining marine energy devices and ancillary equipment.
Decommissioning	• Removal of marine energy devices and ancillary equipment. • Cleaning and disposal of biofouling from marine energy devices and ancillary equipment.

4.4 Step 4: Biosecurity control measures

4.4.1 Provision of temporary moorings

Risk

4.4.1.1 Moorings are expected to be in-situ for up to 18 months. The introduction of novel surfaces for these durations may result in INNS colonising mooring structures put in place to support marine energy devices. Any structure that has been in the water for just a few weeks, particularly in the summer months when high risk INNS typically reproduce (Sewell and sweet, 2011; Coutts, 2002; Ram *et al.*, 1992), without an anti-fouling coating, will be at risk from INNS settlement.

Control Measure

4.4.1.2 Any moorings to be used for the META project should be of terrestrial origin (i.e. not coming from another marine environment) or if being re-used for another marine energy device, following removal, should be checked for mud, aquatic animals, or plant material and then cleaned. The moorings should be allowed to fully dry to kill off any organisms that have attached. If possible, a surplus of mooring equipment should be available to allow for a 'rotation' of equipment and to allow sufficient drying time, using the Check, Clean and Dry method[9].

4.4.2 Installation/presence of man-made structures

Risk

4.4.2.1 This may pose one of the greatest risks of INNS introduction or spreading associated with the META project. New or clean surfaces in ports, marinas and waterways are typically the first colonisation sites for INNS due to their ability to settle and rapidly proliferate. Newly available hard surfaces (marine energy devices, ancillary equipment or the presence of a pontoon) associated with the META project may be susceptible to colonisation by INNS in the first few weeks/months after installation. Several INNS are already known to exist in the Waterway and are of high and medium risk to native Great Britain fauna, these include the Common slipper limpet *Crepidula fornicate*, Carpet sea squirt *Didemnum vexillum,* Japanese skeleton shrimp *Caprella mutica,* Japweed *Sargassum muticum*, Jenkins' Spire Snail *Potamopyrgus antipodarum* and Pacific oyster *Crassostrea gigas* (Table 4.1). A risk assessment (NNSS, 2011; Sewel and Sweet, 2011: NNSS, 2005 http://www.nonnativespecies.org/index.cfm?pageid=143) on the threat that these particular organism poses to Great Britain concluded that entry and introduction were very likely, spread would be rapid and the impact would be massive.

Control Measure

4.4.2.2 The control measures for this activity are the same as those presented in paragraph 4.4.1.2, to prevent the introduction or spread of INNS to the area.

4.4.3 Using vessels from outside of the Waterway

Risk

4.4.3.1 Using vessels from outside the Waterway poses a significant risk of introducing INNS to the area, especially vessels coming from areas of similar marine environment (other marine estuaries). The META Phase 1 sites and the META Phase 2 sites, Warrior Way and Dales Roads, will, however, only use vessels based with the Milford Haven Waterway. As such they will not pose a significantly increased risk with regards to the introduction of INNS. Vessels to be used at the META Phase 2 site, East Pickard Bay (site 8), may originate from other Welsh ports, details of which will be added to this INNSMP as they become known.

Control Measure

4.4.3.2 All vessels to be used to transit marine energy devices and ancillary equipment must follow guidance as directed by the 'Guidelines for the control and management of ships' biofouling to minimize the transfer of

[9] See: http://www.nonnativespecies.org/checkcleandry/ for the Check, Clean and Dry Method.

invasive aquatic species'[10], and where applicable, to comply with the 'International Convention for the Control and Management of Ships' Ballast Water and Sediments'[11].

4.4.4 Maintaining/presence marine energy devices, ancillary equipment and pontoon

Risk

4.4.4.1 With operation and maintenance checks occurring intermittently during device testing, there is a possibility to transport INNS from one location to another. INNS during the summer months will reproduce and release eggs and larvae into the water column as plankton. Vessels carrying out operations and maintenance on marine energy devices and ancillary equipment without an anti-fouling coating will be susceptible to INNS attachment.

Control Measure

4.4.4.2 Regular checks of vessel hulls and ensuring an anti-fouling coating has been applied should prevent spread of INNS.

4.4.4.3 Where the pontoon is concerned, regular checks of surfaces should be made. The pontoon should also be removed from the water, on an annual basis, and the Check, Clean and Dry procedure followed. The pontoon infrastructure planned to be installed at META Phase 1 Ferryside (Site 3) will belong to Milford Haven Port Authority (MHPA) who will therefore be involved in implementing control measures

4.4.5 Removal of marine energy devices and ancillary equipment

Risk

4.4.5.1 Over the course of the operational phase, INNS may colonise marine energy devices, ancillary equipment and pontoon.

Control Measure

4.4.5.2 Checks should be in place for INNS prior to removal and reuse, to avoid the spread of INNS. Should these structures have INNS and still require reuse (such as the pontoon), then a clearing and recheck procedure should be agreed with NRW before implementation.

4.4.6 Cleaning and disposal of biofouling from marine energy devices and ancillary equipment.

Risk

4.4.6.1 Following removal of marine energy devices and ancillary equipment, INNS may still be attached to the surface. Should the INNS be removed without due care and washed back into the Waterway, INNS may represent a risk of spreading to areas where INNS were not previously present.

Control Measure

4.4.6.2 Any material detached or removed from marine energy devices, ancillary equipment and pontoon should be prevented from re-entering the marine environment, taken away and properly disposed of onshore. Control measures taken in relation to disposal of biofouling will be aligned with the Milford Haven Port Authority 'Waste Management Plan' and Annex 4: Waste Management Measures of the Project Environmental Management Plan (PEMP).

4.4.7 Biosecurity Action

4.4.7.1 Prior to any installation/operation of new vessels, marine energy devices and ancillary equipment to site, device developers and their contractors will be required to consider their activities, and assess their risk, in the context of this INNSMP and confirm that they will comply with the requirements and control measures outlined. It is anticipated that developers will sign-up to this META project INNSMP but in any instance where this is not possible, developers will be required to produce and submit their own device-specific INNSMP to the META Operations Manager, for written approval by NRW, at least eight weeks prior to installation/operations. Any device-specific INNSMP, if required, would be documented in the device-specific EMP (see Annex 1: Device-Specific EMP of the PEMP). The developers will be responsible for adherence to the measures outlined within any device-specific INNSMP.

4.4.7.2 Contractors must ensure that all equipment, materials, machinery, PPE and vessels used are in a clean condition prior to their arrival on site to minimise the risk of INNS introduction into the marine environment.

[10] For more information, see: https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/RESOLUTION%20MEPC.207[62].pdf

[11] For more information, see: https://www.imo.org/en/OurWork/Environment/Pages/BWMConventionandGuidelines.aspx

4.5 Step 5: Biosecurity surveillance, monitoring and reporting procedures

4.5.1.1 Instructions for checks of INNS are described in Table 4.4.

Table 4.4: Instructions for Staff/ Contractors/ Site Users.

Who	What	Where	When
META Operations Manager, developers and contractors	• Oversee removal of flora and fauna from marine energy devices and ancillary equipment, ensure material is properly disposed of and that no material is released into the water as per the Milford Haven Port 'Waste Management Plan' and in accordance with Annex 4: Waste Management Measures of the PEMP. • Awareness of INNS, including identification guidance on the key risk species. If not sure follow the contingency plan.	At Port	Beginning of works
META Operations Manager or appropriate contractor	• Oversee installation and removal of marine energy devices and ancillary equipment, check for INNS or unknown organisms. • For operation and maintenance, periodic checks should be carried out after 2 months to ensure no growth/settlement of INNS. • Be aware of any slow moving or inactive craft and take steps to assess risk. • Ensure a Check, Clean and Dry message is sent to any new developers or contractors. • Where possible the META Operation Manager will collaborate with the MHPA and other users of the Waterway to raise INNS awareness.	At Port	Throughout works
Developers and contractors	• Confirm origin of material used in constructing of marine energy devices and ancillary equipment (i.e. terrestrial origin, not previously submerged in marine water). • Encourage 'tool box' talks on INNS prevention and monitoring.	n/a	Beginning of works
META Operations Manager, developers and contractors	• Through collaboration with the Regulators including NRW and Port of Milford Haven META will develop measures appropriate to the individual test deployments specific to the deployment site and nature and duration of testing on a case by case basis	n/a	Prior to works commencing
META team as a member of the Milford Haven Waterway Environmental Surveillance Group (MHWESG)	• Through membership of MHWESG, the META team will contribute to and facilitate ongoing surveillance, monitoring and reporting of INNS within the wider waterway. This will also ensure that any new risks (arising from our location in a busy industrial waterway) and thus potential mitigation requirements are well understood and enacted as soon as possible	n/a	As required

[Live Document: Additional information to be provided by META Operation Manager as and when required]

4.6 Step 6: Contingency Plan

4.6.1.1 This section of the plan details the instructions and procedures that should be followed in the event that the biosecurity measures outlined within the INNSMP fail to prevent the introduction of a new high alert INNS to the Waterway.

Action	Responsibility
Stage One – Suspected arrival of high alert species	
Developer/contractor to alert META Operations Manager of any potential breach of the requirements of the INNSMP or where a suspected high alert species is identified.	Developer/contractor
Take photographs of sample and collect sample in a plastic bag.	META Operations Manager, Developer.
Check organism against identification sheet (available at http://www.nonnativespecies.org/index.cfm?sectionid=47)	
Phone the GB Non-Native Species Secretariat (NNSS) Hotline: 0845 1306 229,	META Operations Manager.
Email alertnonnative@ceh.ac.uk for further information on sending sample and photographs.	
Inform site users and mark the area (e.g. buoys or marker tape).	META Operations Manager
Stage Two – Presence of high alert species confirmed	
Initiate immediate containment measures, including restricted vessel movements.	META Operations Manager
Carry out wider survey of vessels and structures.	META Operations Manager, qualified ecologist.
Email: enquiries@naturalresourceswales.gov.uk and enquiries@mhpa.co.uk to inform them high alert species have been identified	META Operations Manager
Stage Three – Eradication/employ long-term control measures	
Seek advice from NNSS on appropriate eradication and long-term control measures.	META Operations Manager

4.7 Evaluation and Review

4.7.1 Biosecurity logbook

4.7.1.1 A clear recording system (i.e. a biosecurity logbook) will be maintained by the META Operations Manager for the META Project which will detail the following information:

- All routine inspections of equipment and vessels for INNS;
- Description of biosecurity measures taken in the event that INNS are discovered;
- Application of antifouling or cleaning of equipment or vessels at site;
- Inspection of any high 'risk' vessels; including any details of when META Operations Manager has been informed of a potential 'high risk' vessel and the additional biosecurity measures that have been undertaken.

4.7.2 INNSMP Review Date

4.7.2.1 Condition 3.24.3 of the META Phase 2 Marine Licence (ORML 1957) requires that the INNSMP is updated and submitted to NRW, for written approval, by 31 January each year, commencing in January 2022. This INNSMP will therefore be reviewed and updated annually by the META Operations Manager.

4.7.2.2 As discussed in section 4.4.7, the anticipation is that device developers and contractors will assess the risks associated with their activities, in the context of this META project INNSMP, and sign-up to the requirements and control measures outlined within in. In any instances where this is not possible, the developers will be required to produce and submit their own device-specific INNSMP to the META Operations Manager, for written approval by NRW, at least eight weeks prior to installation/operations. Any device-specific INNSMP, if required, would be documented in the device-specific EMP (see Annex 1: Device-Specific EMP of the PEMP). The developers will be responsible for adherence to the measures outlined within any device-specific INNSMP.

5 USEFUL SOURCES OF INFORMATION

- IMO Guidelines for the control and management of ships biofouling to minimize the transfer of invasive aquatic species: https://www.imo.org/en/OurWork/Environment/Pages/BallastWaterManagement.aspx
- Marine Biosecurity Planning Guidance (Cook *et al.*, 2014): https://naturalresources.wales/media/681171/marine_biosecurity_planning_guidance_for_wales_and_england_november_2015.pdf
- GB non-natives species secretariat: www.nonnativespecies.org/
- Non - native species records can be accessed via the local record centres https://www.wwbic.org.uk/
  - or the National Biodiversity Network http://www.nbn.org.uk/
  - or the marine biological Association http://www.mba.ac.uk/
- For Risk Assessments of High and Medium species present in the Waterway. See: http://www.nonnativespecies.org/index.cfm?pageid=143

6 REFERENCES

Cook, E.J., Macleod, A. Payne, R.D., and Brown, S. (2014). edited by Natural England and Natural Resources Wales (2015). Marine Biosecurity Planning – Guidance for producing site and operation-based plans for preventing the introduction and spread of non-native species in England and Wales. Available at: https://naturalresources.wales/media/681171/marine_biosecurity_planning_guidance_for_wales_and_england_november_2015.pdf

Coutts A.D.M., (2002). A biosecurity investigation of a barge in the Marlborough Sounds. Cawthron Report, vol. 744. Cawthron Institute, Nelson, New Zealand. July 2002. 59 pp.

Evans, D. H. (1980). Osmotic and ionic regulation by freshwater and marine fishes. In Environmental physiology of fishes (pp. 93-122). Springer, Boston, MA.

GB NNSS (undated). Great Britain Non-native Species Secretariat. Available online: www.nonnativespecies.org.

JNCC (2019). Harbour Porpoise (*Phocoena phocoena*) Special Area of Conservation: West Wales Marine/Gorllewin Cymru Forol. Conservation Objectives and Advice on Operations.

MarLIN (undated). Marine Life Information Network. Available online: www.marlin.ac.uk

META EIA Scoping Report (2018).

NBN Gateway (undated). National Biodiversity Network. Available online: https://data.nbn.org.uk.

PNP (2017). Species Action Plan: Invasive Non-Native Species (INNS). Pembrokeshire Nature Partnership.

NNSS (2011) UK non-native organism risk assessment scheme: capet sea squirt - Didemnum sp. Risk assessment available via http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1209

NNSS (2005) UK non-native organism risk assessment scheme: Zebra Mussel - Dreissena polymorpha. Risk assessment available via http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1250

NRW (2018) Pembrokeshire Marine / Sir Benfro Forol Special Area of Conservation Advice provided by Natural Resources Wales in fulfilment of Regulation 37 of the Conservation of Habitats and Species Regulations 2017. March 2018.

Ram, J. L., Fong, P.P., Croll, R.P., Nichols, J.S. & Wall, D.M. (1992). The Zebra Mussel (Dreissena polymorpha), a new pest in North America: reproductive mechanisms as possible targets of control strategies. Invert. Rep. Dev. 22, 77-86.

GB NNSS (2008). The invasive non-native species framework strategy for Great Britain. Defra, London.

Sewell, J. and Sweet, N. (2011). GB Non-native Organism Risk Assessment for Crepidula fornicata.www.nonnativespecies.org

Wood, C., Bishop, J., and Yunnie, A. (2015). Comprehensive Reassessment of NNS.