



MARINE ENERGY WALES

MARINE ENERGY TEST AREA (META)

Environmental Impact Assessment

Chapter 4:

Environmental Assessment Methodology



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Glossary

Term	Definition
Annex II protected species	Endangered, vulnerable, rare and/or endemic species which are listed under Annex II of the Habitats Directive. Core areas of the species' habitat must be protected under the Natura 2000 Network and the sites managed in accordance with the ecological requirements of the species.
Habitats Directive	The Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, known as the Habitats Directive, is the means by which the European Union meets its obligations under the Bern Convention. The Directive applies to the UK and to its Overseas Territory of Gibraltar.
The META project	Warrior Way (site 6), Dale Roads (site 7) and East Pickard Bay (site 8).

Acronyms

Acronym	Description
ADCP	Acoustic Doppler Current Profiler
BAP	Biodiversity Action Plan
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
DETR	Department of the Environment, Transport and the Regions
DMRB	Design Manual for Roads and Bridges
ES	Environmental Statement
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMMP	Environmental Mitigation and Monitoring Plan
GHG	Green House Gases
IEMA	Institute for Environmental Management and Assessment
ISMP	Invasive Species Management Plan
NRW-MLT	Natural Resources Wales – Marine Licensing Team
MCA	Maritime and Coastguard Agency
META	Marine Energy Test Area
MEW	Marine Energy Wales
MHPA	Milford Haven Port Authority
MHUA	Milford Harbour Users Association
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
MOD	Ministry of Defence
NRW-MLT	Natural Resources Wales Marine Licensing Team
PCC	Pembrokeshire County Council

Acronym	Description
PCF	Pembroke Coastal Forum
PCNPA	Pembrokeshire Coast National Park Authority
PDE	Project Design Envelope
PDM	Pembroke Dock Marine
RNLI	Royal National Lifeboat Institute
SAC	Special Area of Conservation
SPA	Special Protected Area
UK	United Kingdom
VER	Valued Ecological Receptor
WFA-CPC	Welsh Fishermen's Association - Cymdeithas Pysgotwyr Cymru

4. ENVIRONMENTAL ASSESSMENT METHODOLOGY

4.1 Introduction

4.1.1.1 This chapter of the Environmental Statement sets out the approach taken for the Environmental Impact Assessment (EIA) of the META project. The chapter also includes details of the consultation undertaken to date and the overall approach to the assessment of the likely effects of the META project. Further details of topic specific methodologies, such as survey methods or assessment of significance where this differs from that set out in this chapter, are provided in each topic chapter (chapters 5 - 16) of this Environmental Statement.

4.2 Purpose of this chapter

4.2.1.1 The primary purpose of the Environmental Statement is to support the marine consents and planning application for the META project, which are outlined in chapter 1: Introduction.

4.2.1.2 It is intended that the Environmental Statement will provide statutory and non-statutory consultees with sufficient information to determine the potential likely significant impacts of the META project on the receiving environment and will inform the issue of appropriate consent and/or licences by regulatory authorities. It will also inform any consent and licence conditions.

4.2.1.3 In particular, this Environmental Statement chapter:

- Presents the assessment methodology used to determine potential impacts on receptors, including outlining the assessment of magnitude of impact, sensitivity of receptors and the significance of effect;
- Presents the methodology used for Cumulative Impact Assessment (CIA); and
- Presents the methodology used for inter-related and transboundary assessments.

4.3 Background

4.3.1 Scoping

4.3.1.1 Scoping is the process of identifying the issues to be addressed during the EIA process. Though not a statutory requirement, scoping is a very useful preliminary procedure, which sets the context for the EIA process.

4.3.1.2 Regulation 13 of the Marine Works (EIA Regulations) 2007 (as amended, 2017), Regulation 14 of the Town and Country Planning (EIA) (Wales) Regulations 2017 (as amended) and Regulation 15 of the Electricity Works (EIA) (England and Wales) Regulations 2017 allows an applicant to request that the competent authority sets out its opinion (known as a Scoping Opinion) as to the issues to be addressed in the Environmental Statement. Whilst there is no formal requirement in the EIA Regulations to seek a Scoping Opinion prior to submission of an Environmental Statement, it is recognised as best practice to do so.

4.3.1.3 A Scoping report and request for a Scoping Opinion was submitted to the following regulatory authorities (16 November 2018):

- Natural Resources Wales Permitting Services (NRW PS);
- Marine Management Organisation (MMO);
- Milford Haven Port Authority (MHPA);
- Pembrokeshire County Council (PCC); and
- Pembrokeshire Coast National Park Authority (PCNPA).

4.3.1.4 The proposed scope of the assessment was informed by the nature and scale of the proposed development and its location, as outlined below and in chapter 2: Project Description:

- Marine Energy Wales (MEW) proposed the META project as part of Pembroke Dock Marine (PDM), a £76 million project to develop a world class centre for marine energy development, fabrication, testing and deployment, in Pembrokeshire. It is one of 11 projects included in the Swansea Bay City Deal signed in 2017; and
- The META project will support developer testing of marine energy components, sub-assemblies, instrumentation and marine renewable devices, including trialling installation, retrieval and decommissioning methodologies, and operation and management activities. These will be undertaken in a wide range of environmental conditions, including sheltered marine environments as well as larger full-scale marine testing areas.

4.3.1.5 A Scoping Opinion was provided by Natural Resources Wales – Permitting Services (PS), and the Marine Management Organisation (MMO) (Appendix 4.2) on the 28 March 2019 (NRW ref: SC1817; MMO ref: EIA/2018/00059). The following consultees/ organisations responded as part of the scoping consultation process:

- Department for Business, Energy & Industrial Strategy (BEIS)
- Dyfed Archaeological Trust (DAT)
- Maritime and Coastguard Agency (MCA);
- National Air Traffic Services (NATS Safeguarding);
- NRW – PS (ABPmer provided advice on underwater noise);
- NRW – Advisory Services;
- Pembrokeshire County Council (PCC);
- Royal Society for the Protection of Birds (RSPB);
- Royal Yachting Association (RYA);

- Trinity House;
- UK Chamber of Shipping; and
- Welsh Government.

4.3.1.6 Appendix 4.3 of this Environmental Statement provides an overview of the key points raised in the Scoping Opinion or by consultees for each topic area, together with a response to these. The Environmental Statement topic chapters (chapters 1-16) provides a summary of the key points raised during consultation with both statutory and non-statutory consultees and the points raised through the Scoping Consultation process relevant to each chapter.

4.3.1.7 The scoping exercise highlighted a number of areas that consultees wished to see addressed within the Environmental Statement. Taking into account the nature, size and location of the project, the information provided within the Scoping Opinion and other consultation responses provided throughout the EIA process, the following topics have been identified as requiring consideration within this Environmental Statement:

- Coastal processes;
- Underwater noise;
- Benthic subtidal and intertidal ecology;
- Fish and shellfish ecology;
- Marine mammals, basking shark and otters;
- Marine ornithology;
- Commercial fisheries;
- Shipping and navigation;
- Marine archaeology;
- Seascape;
- Socio-economic and tourism; and
- Other users.

4.3.2 Consultation

4.3.2.1 A summary of the key issues raised during consultation relating to chapter 4: Environmental Assessment Methodology are outlined below in Table 4.1, together with how these issues have been considered in the production of this Environmental Statement chapter.

4.3.2.2 Meetings have been undertaken throughout the EIA and design process in order to agree methodologies and request and share information regarding existing environmental conditions. In addition to the organisations listed in Table 4.1, the applicant has held meetings to develop links with relevant regulatory authorities, fisheries interests, Ministry of Defence (MOD), navigational interests, public interest groups and device developers.

Table 4.1: Summary of key consultation issues raised during consultation activities undertaken for the META project relevant to the Environmental Assessment Methodology.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
10 January 2019	NRW - Advisory Services	Advice on benthic ecology baseline and assessment approach. Advice on potential changes to site boundaries to reduce concern over potential impacts on Annex 1 habitat – 'Reef'.	META sites re-defined to reflect advice, and advice on assessment approach included in Benthic and Subtidal Ecology chapter technical assessment (chapter 7). Warrior Way (site 6) and East Pickard Bay (site 8) were re-defined so that the site boundaries do not overlap with known areas of Annex 1 habitat 'reef'. Chapter 3: Need and Alternatives describes the changes to the site boundaries at Warrior Way (site 6) and East Pickard Bay (site 8).
10 January 2019	NRW - Advisory Services	Surveys of Warrior Way (site 6) and Dale Roads (site 7) required to determine location and extent of habitats of conservation interest (reef) at both sites.	Pre-device deployment surveys proposed and designed in mitigation includes commitment to avoid deployment on areas of reef in these areas should pre-deployment surveys identify these within Warrior Way (site 6) and Dale Roads (site 7).
10 January 2019	NRW - Advisory Services	Survey of cable route at East Pickard Bay should cover cable route through reefy habitat and no surveys needed of cable route through sandy habitat within East Pickard Bay (site 8)	Marine cabling is no longer within the scope of the META project and as such this advice is no longer relevant.
15 January 2019	RSPB	Regard should also be had to Natural Resources Wales' emerging Area Statements (Marine and South West Wales Areas).	It is our understanding that the Area Statements referred to are not finalised and not available for use in the Impact Assessment for the META project. Reference has therefore not been made to these Area Statements within the Environmental Statement
28 March 2019	NRW/MMO – Scoping Opinion	We consider that the applicant could have been more clear on what future survey work is proposed and where. For example we know that a bathymetry survey has been undertaken at East Pickard Bay but we are not sure whether surveys are also planned at the other Phase 2 test areas.	A draft Environmental Management Plan (EMP) and an Environmental Mitigation and Monitoring Plan (EMMP) will be submitted with the consent and licence applications. These will summarise the proposed approach to any survey or monitoring work deemed necessary. Chapter 2: Project Description, Section 2.8 outlines the proposed approach to these plans. Chapter 7: Benthic and Subtidal Ecology will also detail benthic surveys undertaken.
28 March 2019	NRW/MMO – Scoping Opinion	Multi-beam bathymetry survey of Dale Roads and Warrior Way to inform baseline characterisation of the test areas. This should be further supported by ground truthing of the areas with either drop-down video or grab samples (further detail provided in the benthic ecology comments)	The EMP and EMMP outlined above will detail this information. Chapter 7: Benthic and Subtidal Ecology also details benthic surveys undertaken (Appendix 7.1).
28 March 2019	NRW/MMO – Scoping Opinion	We consider that the potential for impacts under two different scenarios should be considered within the EIA:	This approach has been considered by the Applicant, however the Benthic and Subtidal Ecology chapter (chapter 7) has assessed these

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
		<ul style="list-style-type: none"> - Multiple deployments over the same area of seabed and cumulative impacts on the habitat over the length of the project - Multiple deployments over different parts of the leasing zone with potentially shorter, but more extensive impacts over a wider area. 	<p>scenarios in the information presented in the technical assessment therefore it is not considered necessary to present the impact as two separate scenarios. The information presented in chapter 7: Benthic and Subtidal Ecology will emphasise the information presented in relation to these scenarios.</p>
28 March 2019	NRW/MMO – Scoping Opinion	<p>The following data sources may provide useful information for the assessment of cumulative effects:</p> <ul style="list-style-type: none"> • Marine Licence applications: http://lle.gov.wales/catalogue/item/MarineLicences/?lang=en • The Nationally Significant Infrastructure Projects register: https://infrastructure.planninginspectorate.gov.uk/projects/register-of-applications/ • The Developments of National Significance Register: http://gov.wales/docs/desh/publications/180312-dns-register-en.pdf • Planning Policy e.g. Local Development Plans, Transport Plans (National and Local) and National Policy Statements. 	<p>The data sources provided have been utilised in undertaking the CIA.</p>
			<p>This chapter (chapter 4: Environmental Assessment Methodology) outlines the approach taken to impact assessment (section 4.4.2). This approach has been applied across the technical chapters, and amended where appropriate to the technical assessment. The parameters listed have been considered in the assessment methodology.</p>
28 March 2019	NRW/MMO – Scoping Opinion	<p>The Environmental Statement must include:</p> <ul style="list-style-type: none"> • A description of the likely significant effects of the project, whether direct, indirect, secondary, cumulative, transboundary, short-term, medium-term, long-term, permanent, temporary, positive and negative. • A description of the methods used to make the assessment of the significant effects and difficulties encountered in compiling the information, and uncertainties involved. • A description of measures to avoid, prevent, reduce or offset identified significant adverse effects, and proposed monitoring arrangements. • A description of the expected significant adverse effects of the project on the environment resulting from the vulnerability of the project to risks of major accidents or disasters 	<p>A description of the methods used in the assessment is outlined in section 4.4.2. Each technical chapter (chapters 5 – 16) describe any limitations or difficulties encountered when compiling the information in each technical assessment.</p> <p>Each technical chapter (chapters 5-16) describes the measures taken to avoid, prevent, reduce or offset identified significant adverse effects and outlines any proposed monitoring. Chapter 2: Project Description, section 2.8 summarises the measures adopted as part of the project. These are detailed further in associated draft plans (Environmental Management Plan (EMP), Environmental Mitigation and Monitoring Plan (EMMP), and Invasive non-native species Management Plan (INNSMP)).</p> <p>Chapter 2: Project Description, section 2.5.2 describes the vulnerability of the META project to accidents and disasters. Chapter 12: Shipping</p>

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
			<p>and Navigation, and chapter 16: Other Users, describes measures taken to minimise the potential for accidents or disasters.</p>
28 March 2019	NRW/MMO – Scoping Opinion	<p>Where possible, other environmental assessments should be coordinated with the EIA process. However, it is important to note that HRA and WFD (and any other assessment) are separate processes to the EIA.</p>	<p>The WFD and HRA assessments have been undertaken in parallel with the EIA process, and have taken into consideration the conclusions of the Environmental Statement.</p>
28 March 2019	NRW/MMO – Scoping Opinion	<p>The UK is due to leave the EU on 29 March 2019. –Regardless as to whether the UK leaves the EU with a deal or without a deal, all legal obligations relating to compliance with environmental licences/permits and legislation will continue to apply. NRW on behalf of Welsh Ministers will continue to issue licenses in line with our current practice.</p>	<p>The EIA has been undertaken taking into consideration current legislation. The consents and licences that have been considered for the META project are outlined in chapter 2: Project Description, and Appendix 3.1.</p>
28 March 2019	NRW/MMO – Scoping Opinion	<p>The EIA/Environmental Statement must consider the potential for impacts on other European States.</p>	<p>Transboundary impacts have been considered in each technical chapter (chapters 5-16). This is outlined in section 4.4.2.43</p>
28 March 2019	NRW/MMO – Scoping Opinion	<p>The description of the physical baseline environment within the three test areas is quite limited at present, as is the information on the future survey works proposed. More detailed information describing the baseline environment must be presented in the Environmental Statement, informed by site-specific monitoring.</p>	<p>Detailed information describing the baseline environment pertinent to each technical assessment is presented in each technical chapter (chapters 5-16). Future survey and monitoring is outlined in the draft EMMP accompanying this application.</p>
28 March 2019	NRW/MMO – Scoping Opinion	<p>The Cumulative Impact Assessment (CIA) must as a minimum consider the cumulative effects of META phase 2 with:</p> <ul style="list-style-type: none"> • META phase 1; • Dredging activities; • Disposal activities • Egnedol Wales Ltd 350MW land based green energy scheme • Draft Welsh National Marine Plan (dWNMP) 	<p>The CIA projects considered in this Environmental Statement are outlined in Table 4.6 and Figure 4.1. The projects listed have been considered in the CIA. In addition, chapter 3: Need and Alternatives outlines how the META project complies with the dWNMP</p>

4.3.3 Legislative/policy context

4.3.3.1 The Environmental Statement provides an overview of relevant legislative and/or policy context within each topic chapter. General policy that relates to the META project as a whole is summarised in chapter 1: Introduction. The assessment has had regard to national and local policy documents, where relevant.

4.3.4 Climate change

Climate change resilience

4.3.4.1 Resilience to future climate change is built into the concept of the META project. The aim of the META project is to support the development of marine renewable energy to reduce future reliance on traditional energy sources, thereby reducing the potential for climate change. Resilience to future climate change has been considered during the design process by marine testing areas and cabling from East Pickard Bay to Mean High Water Springs (MHWS), taking into account resilience to extreme weather events. Further details are provided in chapter 2: Project Description and chapter 5: Coastal Processes.

Changes to future environmental conditions

4.3.4.2 Consideration of predicted changes in baseline environmental conditions, including changes resulting from climate change, has been set out within each Environmental Statement topic chapter as appropriate (chapters 5 to 16), where robust information is available at the time of writing.

4.3.4.3 Where appropriate, the assessment of effects for each topic has considered identified trends or changes predicted to arise as a result of climate change.

Effects of the project on climate

4.3.4.4 As outlined in paragraph 4.3.4.1, the aim of the META project is to support the development of marine renewable energy to reduce future reliance on traditional energy sources, thereby reducing the potential for climate change. The prototypes intended for testing at the META project on their own, are expected to have a negligible impact on climate change therefore this topic has not been given its own chapter within the Environmental Statement. However, climate change will be considered within topic Environmental Statement chapters as appropriate, and consideration in these assessments will be relevant and proportionate to the development proposed.

4.3.5 Topics scoped out of the EIA process

4.3.5.1 Effects on other aspects of the environment are not likely to be significant. The topics scoped out of the assessment are summarised below.

Climate change

4.3.5.2 An assessment of climate change and Green House Gases (GHG) is required under the EIA Regulations where there is potential for likely significant environmental effects. At present there is no single piece of methodological guidance accepted as standard, although the Institute of Environmental Management and Assessment's (IEMA) guidance on GHG emissions states that, *'in principle, any GHG emissions may be considered to be significant, and advocates as good practice that GHG emissions should always be reported at an appropriate, proportionate level of detail in an ES'* (IEMA, 2017).

4.3.5.3 Paragraph 4.3.4.4 describes how the META project has considered GHG emissions and climate change

Population and human health

4.3.5.4 An assessment of population and human health is required by the 2017 EIA Regulations where there is potential for likely significant effects. Guidance is available from IEMA (Health in Environmental Impact Assessment: A Primer for a Proportionate Approach) (Cave *et al.*, 2017).

4.3.5.5 Population and human health has a broad scope and is in practice considered across a range of other topic areas within the Environmental Statement, in particular Seascape (chapter 14), Socio-Economic and Tourism (chapter 15), and Other Users (chapter 16). The META project will also facilitate the advancement of a green energy resource, leading to less dependency on fossil fuels and thus less pollution adversely affecting the human population. No separate consideration of population and human health is therefore considered necessary and it has been scoped out of the Environmental Statement.

Material assets

4.3.5.6 The EIA Regulations refer to 'material assets', including architectural and archaeological heritage. The phrase 'material assets' has a broad scope, which may include assets of human or natural origin, valued for socio-economic or heritage reasons. Material assets are in practice considered across a range of topic areas within the Environmental Statement, in particular, Marine Archaeology (chapter 13), Socio-economic and Tourism (chapter 15) and Other Users (chapter 16). These topics are included within this Environmental Statement and therefore no separate consideration of material assets is considered necessary and this topic has therefore been scoped out of the Environmental Statement.

Radiation and heat

4.3.5.7 No significant radiation or heat effects are anticipated due to the nature and scale of activities being proposed. An assessment of these effects has therefore been scoped out of the Environmental Statement.

Air quality

4.3.5.8 Due to the location, duration, scale and nature of activities proposed at the META project, there is a low risk of increased air pollution. There will be minimal additional vessel traffic associated with installation, operation and maintenance, and decommissioning activities associated with the META project. Air quality has been scoped out of the Other Users chapter (chapter 16) as follows: *"due to the scale and nature of activities proposed at the META project below MHWS, there is a low risk of impact on air pollution. Emissions from vessels associated with the project are anticipated to fall within background levels experienced in the Waterway and immediate surroundings. This impact has therefore been scoped out of further assessment."* Further consideration of this potential impact has therefore been scoped out of the Environmental Statement.

Hydrology and Flood Risk

4.3.5.9 Due to the nature and scale of activities proposed which are purely marine based, there is considered to be a negligible potential risk of impact on hydrology and flood risk and therefore further consideration of this potential impact has been scoped out of the Environmental Statement.

Geology/ ground Conditions

4.3.5.10 There are no onshore works proposed as part of the consent and licence applications which are supported by this Environmental Statement therefore the risk of impact on geology/ground conditions is considered to be negligible and this potential impact has been scoped out of the Environmental Statement.

4.4 Environmental assessment methodology

4.4.1 Relevant EIA guidance

4.4.1.1 The EIA process has considered relevant government or institute guidance, including:

- Welsh Office Circular 11/99: EIA;
- Department for Communities and Local Government (2014) Planning Practice Guidance at <http://planningguidance.planningportal.gov.uk>;
- Department of the Environment, Transport and the Regions (DETR) (1997) Mitigation Measures in Environmental Statements;
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (2nd Ed.)
- IEMA (2004) Guidelines for EIA;
- IEMA (2011) The State of EIA Practice in the UK. Special Report;
- IEMA (2015a) EIA: Guide to Shaping Quality Development;
- IEMA (2015b) Climate Change Resilience and Adaptation;
- IEMA (2016) EIA: Guide to Delivering Quality Development;
- IEMA (2017) EIA: Assessing Greenhouse Gas Emissions (GHG) and Evaluating their Significance;
- A Review of Assessment Methodologies for Offshore Wind Farms (COWRIE METH-08-08) (Maclean *et al.*, 2009);
- Offshore Wind Farms: Guidance Note for EIA in Respect of Food and Environment Protection Act 1985 and Coastal Protection Act 1949 requirements (Cefas, 2004);
- Cumulative Impact Assessment (CIA) Guidelines - Guiding Principles for CIA in Offshore Wind Farms (RenewableUK, 2013);
- Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects (Cefas, 2012); and
- Department for Communities and Local Government (2014) Planning Practice Guidance at <http://planningguidance.planningportal.gov.uk>;
- DETR (1997) Mitigation Measures in Environmental Statements. HMSO; and

- Highways Agency *et al.* (2008) Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08.

4.4.1.2 Other topic specific legislation and good practice guidance, including the National Planning Policy Framework (DCLG, 2012) has been considered and details of these can be found in the topic chapters within this Environmental Statement.

4.4.2 Key elements of the general approach

4.4.2.1 The assessment of each environmental topic forms a separate chapter of the Environmental Statement. For each environmental topic, the following have been addressed:

- Study area;
- Description of the environmental baseline (including future baseline conditions);
- Limitations of the assessment;
- Key parameters for assessment;
- Measures adopted as part of the project, including mitigation and design measures that form part of the project;
- Impact assessment methodology including assessment criteria;
- Identification of likely effects and evaluation and assessment of the significance of identified effects, considering any measures designed to reduce or avoid environmental effects which form part of the project;
- Identification of any further mitigation or monitoring measures envisaged to avoid, reduce and, if possible, remedy adverse effects (in addition to those measures that form part of the project);
- Cumulative impacts of the META project with other plans or projects within a defined study area;
- Assessment of transboundary effects; and
- Assessment of inter-related effects.

Methodology and assessment criteria

4.4.2.2 Each topic chapter provides details of the methodology for baseline data collection and where appropriate, provides relevant details of the methodology for baseline data collection and/or collation, and the approach to the assessment of effects.

4.4.2.3 Each topic chapter defines the scope of the assessment within the methodology section, together with details of the study area, and the approach to the assessment of effects. The identification and evaluation of effects have been based on the information set out in chapter 2: Project Description of this Environmental Statement, EIA good practice guidance documents, and relevant topic-specific guidance where available.

Description of the environmental baseline conditions (including future baseline conditions)

- 4.4.2.4 The existing and likely future environmental conditions in the absence of the META project are known as 'baseline conditions'. Each topic-based chapter includes a description of the current (baseline) environmental conditions, and the future baseline without the META project. The baseline conditions at the site and within the topic-specific study area form the basis of the assessment, enabling the likely environmental effects of the proposed works to be identified through a comparison with the baseline conditions.
- 4.4.2.5 The baseline for the assessment of environmental effects is primarily drawn from data from the five years leading up to the main period of the EIA work in 2018, therefore between 2013 – 2018. However, where relevant and appropriate, additional older data has also been used to inform the baseline.
- 4.4.2.6 The baseline for the assessment of environmental effects characterises existing conditions within the proposed META project study areas (defined by each technical chapter). Consideration has also been given to any likely changes between the time of reporting and the likely future baseline.
- 4.4.2.7 The consideration of future baseline conditions also includes the likely effects of climate change, as far as these are known at the time of writing. This will be based on information available from the United Kingdom (UK) Climate Projections project, which provides information on plausible changes in climate for the UK and on published documents such as the UK Climate Change Risk Assessment 2017 (Government, H.M., 2017).
- 4.4.2.8 The likely future baseline has been described in each technical assessment (chapters 5 – 16).
- 4.4.2.9 The anticipated start date for installation works of the META project is 2020, with enabling works likely to occur in early 2020. Installation of devices and ancillary equipment (such as buoys) may take place over the duration of the consented lifetime of the project (15 years) with device deployment, operational testing, and retrieval operations, likely to occur intermittently throughout the consented period. Further information about the installation programme assessed as part of the EIA process can be found in chapter 2: Project Description of this Environmental Statement.
- 4.4.2.10 Consideration has been given to any likely changes between the time of survey/data reporting and the future baseline for the commencement of installation, operation and maintenance, and decommissioning of the META project from 2020. In some cases, these changes may include the construction or operation of other planned developments in the area. Where such developments are built and operational at the time of writing and data collection, these have been considered to form part of the baseline environment. Where sufficient and robust information is available, other future developments have been considered as part of the future baseline conditions. In all other cases, planned future developments are considered within the assessment of cumulative effects.

¹ The term 'important ecological features' used in the latest edition of the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018) is equivalent to the term 'valued ecological receptors' used throughout this EIA and can refer to habitats, species and/or ecosystems and their functions or services.

Valued Ecological Receptors (VER)

- 4.4.2.11 Assessment of species or habitat receptors as Valued Ecological Receptors (VER)¹ will be presented for appropriate ecological receptor groups in the baseline characterisation of each technical chapter (chapter 7: Benthic Subtidal and Intertidal Ecology; chapter 8: Fish and Shellfish; chapter 9: Marine Mammals, Basking Shark and Otter; and chapter 10: Marine Ornithology), following the criteria set out in Table 4.2. Where amendments to these assessment criteria are required to reflect topic-specific interests, these are outlined in each of the technical chapters.

Table 4.2: Valued Ecological Receptors (VER) criteria.

Value of VER	Criteria to Define Value
International	<ul style="list-style-type: none"> Internationally protected species and habitats that are the primary reason for site selection of internationally protected sites (e.g. Annex II protected species designated as features of an SPA); Internationally protected species or habitat, which are not the primary reason for site selection, but are a qualifying interest features of the site; Internationally protected species with known breeding or nursery areas within the Study Area that are considered to be important either nationally or internationally for that species, even where this has not been recognised through designation; or Internationally protected habitats with overlap within the study area that are considered to be important either nationally or internationally for that habitat, even where this has not been recognised through designation.
National	<ul style="list-style-type: none"> Internationally protected species or habitat that are not a qualifying interest features of a Special Protection Area (SPA) or Special Area of Conservation (SAC) but are regularly recorded within the study area. This might be in relatively low densities and therefore the area is not considered to be important for the species or habitat in an international context; and Internationally protected species or habitats that are not qualifying interest features of an SPA or SAC but are recognised as a Biodiversity Action Plan (BAP) or Section 7 priority species or habitat either alone or under a grouped action plan and are listed on the local action plan relating to the Study Area.
Regional	<ul style="list-style-type: none"> Internationally protected species or habitat that are not qualifying interest features of an SPA or SAC and are infrequently recorded within the study area.
Local	<ul style="list-style-type: none"> Habitats or species that are considered of importance in a local context.

Limitations of the assessment

- 4.4.2.12 Each of the topic chapter describes any limitations identified in the available baseline data and whether there were any difficulties encountered in compiling the information required.

Mitigation measures adopted as part of the project

- 4.4.2.13 During the EIA process, environmental issues have been considered as part of an ongoing iterative design process. The process of EIA has therefore been used as a means of informing the design.
- 4.4.2.14 The META project assessed within this Environmental Statement therefore includes a range of measures that have been designed to reduce or prevent significant adverse effects arising. The assessment of effects has taken into account measures that form part of the project.
- 4.4.2.15 The topic chapters set out the measures that form part of the project and that have been taken into account in the assessment of effects for that topic. These include:
- Measures included as part of the project design (sometimes referred to as primary mitigation);
 - Measures to be adopted during installation or decommissioning to avoid and minimise environmental effects, such as pollution control measures. These measures would be implemented through the Environmental Management Plan (EMP), a draft of which will be submitted with the Environmental Statement. MEW will seek to agree and finalise this plan with the regulatory authorities and key consultees during the post-submission process; and
 - Measures required as a result of legislative requirements.
- 4.4.2.16 The measures that have been adopted are described in chapter 2: Project Description, and are summarised here:
- Environmental Management Plan (EMP);
 - Environmental Mitigation and Monitoring Plan (EMMP);
 - Invasive Non-Native Species Management Plan (INNSMP); and
 - Marine Pollution Control Plan (MPCP).

Assessment of effects

- 4.4.2.17 The EIA Regulations (as defined in chapter 1: Introduction) require the identification of the likely significant environmental effects of the META project. This includes consideration of the likely effects during the installation, operational and maintenance, and decommissioning phases. The assessment is based on consideration of the likely magnitude of the predicted impact and the sensitivity of the affected receptor. The process by which effects have been identified and their significance evaluated is set out within each individual topic chapter. The overarching principles are set out below.

Magnitude of impact

- 4.4.2.18 Impacts are defined as the physical changes to the environment attributable to the project. For each topic, the likely environmental impacts have been identified. For each topic the likely environmental change arising from the META project has been identified and compared with the baseline (the existing baseline without the project). Impacts are divided into those occurring during the installation, operational and maintenance, and decommissioning phases of the META project.
- 4.4.2.19 The categorisation of the magnitude of impact is topic-specific but generally considers factors such as:

- Extent;
- Duration (whether the impact is short, medium or long term);
- Whether the impact is continuous or intermittent;
- Timing and frequency; and
- Reversibility.

- 4.4.2.20 With respect to the duration of impacts, the following has been used as a guide within this assessment, unless defined separately within the topic assessments:

- Short term: a period of days, up to six months;
- Medium term: a period of more than six months, up to five years; and
- Long term: a period of greater than five years.

- 4.4.2.21 Impacts will be defined as either adverse or beneficial. Depending on discipline, they may also be described as:

- Direct: Impact occurs through the direct interaction of an activity associated with the META project with an environmental receptor. These tend to be either spatially or temporally concurrent; or
- Indirect: Impacts on the environment which are not a direct result of the META project, often produced away from the META project sites or as a result of a complex pathway.

- 4.4.2.22 Impacts will be divided into those occurring during the installation and decommissioning of the META project infrastructure or device testing, and those occurring during operation and maintenance of device testing. However, it should be noted that impacts resulting from installation and decommissioning of device testing and those resulting from operation and maintenance of device testing may occur concurrently throughout the consented lifetime of the META project. Therefore, for some receptor groups, there is no discernible difference in project phase and these project phases have been grouped i.e. all projects phases considered as a single assessment on a receptor group.

- 4.4.2.23 The magnitude of an impact has generally been defined used the following scale:

- Major;
- Moderate;
- Minor;
- Negligible; and
- No change.

- 4.4.2.24 Table 4.3 defines each level of magnitude.

Table 4.3: Definition of terms relating to the magnitude of an impact.

Magnitude of impact	Definition
Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (adverse)

Magnitude of impact	Definition
	Large scale or major improvement or resource quality; extensive restoration or enhancement; major improvement of attribute quality (beneficial)
Moderate	Loss of resource, but not adversely affecting integrity of resource; partial loss of/damage to key characteristics, features or elements (adverse)
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (beneficial)
Minor	Some measurable change in attributes, quality or vulnerability, minor loss or, or alteration to, one (maybe more) key characteristics, features or elements (adverse)
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (beneficial)
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (adverse)
	Very minor benefit to, or positive addition of one or more characteristics, features or elements (beneficial)
No change	No loss or alteration or characteristics, features or elements; no observable impact in either direction

Sensitivity or importance of receptors

4.4.2.25 Receptors are defined as the physical or biological resource or user group that would be affected by a project. For each topic, baseline studies have informed the identification of potential environmental receptors. Some receptors will be more sensitive to certain environmental effects than others. The sensitivity or value of a receptor may depend, for example, on its frequency, extent of occurrence or conservation status at an international, national, regional or local level. Reference will be made to Table 4.2 (Valued Ecological Receptors) when determining sensitivity or importance of ecological receptors.

4.4.2.26 Sensitivity is defined within each Environmental Statement topic chapter and takes into account factors including:

- Vulnerability of the receptor;
- Recoverability of the receptor; and
- Value/importance of the receptor.

4.4.2.27 Sensitivity is generally described using the following scale:

- Very High
- High;
- Medium;
- Low; and
- Negligible.

4.4.2.28 Table 4.4 provides a definition of each level of sensitivity. Where amendments to the value definition has been made in a technical chapter, these will be defined in the 'sensitivity' table associated with that topic chapter.

Table 4.4: Definition of terms relating to the sensitivity of the receptor.

Value (sensitivity of the receptor)	Description
Very High	Very high importance and rarity, international scale and very limited potential for substitution
High	High importance and rarity, national scale and limited potential for substitution
Medium	High or medium importance and rarity, regional scale, limited potential for substitution
Low	Low or medium importance and rarity, local scale
Negligible	Very low importance and rarity, local scale

Significance of effects

4.4.2.29 Effect is the term used to express the consequence of an impact (expressed as the 'significance of effect'). This is identified by considering the magnitude of the impact and the sensitivity of the receptor.

4.4.2.30 The magnitude of an impact does not directly translate into significance of effect. For example, a significant effect may arise as a result of a relatively modest impact on a resource of national value, or a large impact on a resource of local value. In broad terms therefore, the significance of the effect can depend on both the impact magnitude and the sensitivity of the receptor.

4.4.2.31 Unless separately defined in the topic chapters, the assessment of significance takes into account relevant topic specific guidance, based on the following scale and guidance:

- **Substantial:** adverse or beneficial. They represent key factors in the decision-making process with regard to consenting/licensing. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer the most damaging impact and loss of resource integrity;
- **Major:** These beneficial or adverse effects are considered to be very important considerations and are likely to be material considerations in the decision-making process;
- **Moderate:** These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative impacts of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor;
- **Minor:** These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project; and
- **Negligible:** No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

4.4.2.32 Effects may also be categorised as direct or indirect, secondary, short, medium or long term, or permanent or temporary as appropriate.

4.4.2.33 Unless set out otherwise within the chapter, topic chapters use the general approach set out in Table 4.5 for assessment of significance. For some topics, a simplified or quantitative approach is considered appropriate.

Table 4.5: Assessment matrix.

		Magnitude of impact				
		No change	Negligible	Minor	Moderate	Major
sensitivity of receptor	Negligible	Negligible	Negligible	Negligible or minor	Negligible or minor	Minor
	Low	Negligible	Negligible or minor	Negligible or minor	Minor	Minor or moderate
	Medium	Negligible	Negligible or minor	Minor	Moderate	Moderate or major
	High	Negligible	Minor	Minor or moderate	Moderate or major	Major or substantial
	Very high	Negligible	Minor	Moderate or major	Major or substantial	Substantial

4.4.2.34 Unless set out otherwise in each topic chapter, effects assessed as moderate or above are considered to be significant in terms of the EIA Regulations within this assessment.

Further mitigation and future monitoring

4.4.2.35 Where required, further mitigation measures have been identified within topic chapters. These are measures that could further prevent, reduce and, where possible, offset any adverse effects on the environment.

4.4.2.36 Where relevant and necessary, future monitoring measures have been set out within the topic chapters.

4.4.2.37 MEW’s approach to mitigation (measures adopted) is set out in chapter 2: Project Description, section 2.8; and MEW’s approach to strategic survey and monitoring is set out in chapter 2: Project Description, section 2.9. MEW, paragraph 2.9.1.1 and 2.9.1.2.

Cumulative Impact Assessment (CIA)

4.4.2.38 The EIA Regulations require consideration of cumulative impacts, which are effects on a receptor that may arise when the project is considered together with other proposed developments in the area. For the purposes of this Environmental Statement, the cumulative impact assessment in each chapter will assess the META project (Warrior Way (site 6), Dale Roads (site 7) and East Pickard Bay (site 8)) alongside the effect of other developments, on single receptors.

4.4.2.39 The cumulative impacts of the project in conjunction with other proposed schemes have been considered within each topic chapter of the Environmental Statement. Other developments considered within the CIA include those that are:

- Under construction;
- Permitted, but not yet implemented; and
- Submitted, but not yet determined.

4.4.2.40 The types of project that have been considered with the CIA include:

- Other marine renewables projects;
- Other marine and coastal developments; and
- Temporal as well as spatial effects.

4.4.2.41 It is noted that developments that are built and operational at the time of submission are considered to be part of the existing baseline conditions.

4.4.2.42 Details of the developments included as part of the CIA are provided in Table 4.6 below. These are illustrated in Figure 4.1.

Table 4.6: Projects Considered in the META Environmental Statement Cumulative Impacts Assessment (CIA)

Phase	Developer - Reference	Distance from Warrior Way (km)	Distance from Dale Roads (km)	Distance from East Pickard Bay (km)	Spatial/temporal overlap with the META project	Details	Dates of Installation/Operation	Further Consideration in technical chapters required?	Justification
Plans									
Draft Welsh National Marine Plan (dWNMP) (Welsh Government, 2017)	NRW	0.00	0.0	0.0	Spatial overlap and temporal overlap	The dWNMP is being prepared by the Welsh Government in accordance with the Marine and Coastal Access Act 2009 (MCAA). The purpose of marine planning under the MCAA is to help achieve sustainable development in the marine area. Welsh Ministers are the Marine Planning Authority under the MCAA, responsible for creating marine plans for both the inshore region (0-12 nautical miles) and offshore region (beyond 12 nautical miles) of Wales. Plans for both regions will be presented in a single document, the dWNMP. The dWNMP applies to the Welsh marine area which consists of around 32,000 km ² of sea, as well as 2,120 km of coastline.	The dWNMP will be implemented over a 20-year period, with 3 yearly reviews.	Yes – Benthic Subtidal and Intertidal habitats, Coastal and supralittoral habitats, Marine Mammals, Diadromous fish, Pelagic seabirds (breeding and wintering); and Wildfowl and waders (breeding and wintering)	As there is the potential for both temporal and spatial overlap of the META project with the dWNMP, it cannot be excluded from further consideration in the CIA. The dWNMP does not need to be considered further for Coastal Processes, Underwater Noise, commercial Fisheries, Shipping and Navigation, Marine Archaeology, Seascape and Landscape, Socio-economic and Tourism and Other Users as the plan does not cover these interests or they have been screened out on the basis that an assessment would be deferred to the project level, or an assessment was not possible at the policy level (Defence, Dredging and disposal, Energy – Oil and Gas, Fisheries, Subsea Cabling, Surface Water and Wastewater Treatment and Disposal, and Tourism and Recreation).
Dredging sites									
Installation/ Operation and Maintenance	Neyland Yacht Haven Ltd. - DML1743	1.1	12.3	10.5	No spatial overlap with consented areas. Potential for temporal overlap.	Dredge and disposal from Neyland Marina - annual volume 5500 m ³ .	13/12/2017-12/12/2020	Yes	Given the distances to META phase 2 sites and the potential for temporal overlap, these projects cannot be excluded from further consideration in the CIA.
Installation/ Operation and Maintenance	Milford Haven Port Authority - DML1646	1.3	1.5	2.5	No spatial overlap with consented areas Temporal overlap with all sites.	Maintenance dredging throughout the Milford Haven. Annual volume 362500 m ³ .	09/03/2017-08/03/2022	Yes	
Dredge disposal sites									
Installation/ Operation and Maintenance	Neyland dredge disposal site - LU190	0.5	12.4	10.5	No spatial overlap with any of the consented areas.	Location: South of Neyland within the central channel of the Milford Haven, 0.22 nm diameter x 5 m depth.	Not applicable	Yes	Given the distances to META phase 2 sites and the potential for temporal overlap, this projects cannot be excluded from further consideration in the CIA.

Phase	Developer - Reference	Distance from Warrior Way (km)	Distance from Dale Roads (km)	Distance from East Pickard Bay (km)	Spatial/temporal overlap with the META project	Details	Dates of Installation/Operation	Further Consideration in technical chapters required?	Justification
					Temporal overlap	Status: Open			
Installation/ Operation and Maintenance	Milford Haven dredge disposal site - LU170	15.9	5.2	2	No spatial overlap with any of the consented areas. No temporal overlap as site is closed	Location: South of St Ann's Head at the mouth of the Milford Haven estuary, unknown diameter x 30 m depth. Status: Closed	Not applicable	No	Dredge disposal site is not in use therefore no further consideration required.
Installation/ Operation and Maintenance	St Ann's Head dredge disposal site - LU180	16.6	5.7	2.4	No spatial overlap with any of the consented areas. No temporal overlap as site is closed	Location: Within the Milford Haven dredge disposal site, unknown diameter x 30 m depth. Status: Closed	Not applicable	No	Dredge disposal site is not in use therefore no further consideration required.
Installation/ Operation and Maintenance	Milford Haven Two dredge disposal site - LU169	26.7	20	15	No spatial overlap with any of the consented areas. No temporal overlap.	Location: To the south of Milford Haven dredge disposal grounds, unknown diameter x 50 m depth. Status: Open	Not applicable	No	Dredge disposal site is located at its closest 15 km from the META project, it is therefore highly unlikely to have any impact overlap.
Installation/ Operation and Maintenance	Milford Haven Three dredge disposal site - LU169	48.9	36	34.7	No spatial overlap with any of the consented areas. No temporal overlap.	Location: To the west of Milford Haven dredge disposal grounds, 1 nm diameter x unknown depth. Status: Open	Not applicable	No	Dredge disposal site is located at its closest 34.7 km from the META project, it is therefore highly unlikely to have any impact overlap.
Research									
Installation	Greenlink Interconnector Ltd. - RML1827	10.4	6	0	Spatial overlap with East Pickard Bay (site 8). Temporal overlap with East Pickard Bay.	Ground investigations	07-2018 - no end date given	Yes	Research operations are likely to have vessels present, with equipment for undertaking ground truthing surveys therefore this projects cannot be excluded from further consideration in the CIA.
Installation	University College of Swansea - DEML1861	~4-5	~8-9	~6-7	Location is assumed to be by the Pembroke Power station. No spatial overlap with any of the consented areas.	Pembroke Power bubble barrier experiment Investigation into the effectiveness of bubble curtains in sediment management	Band 2 licence issued 12/12/2018 - three-year study	Yes	to META phase 2 sites and the potential for temporal overlap, these projects cannot be excluded from further consideration in the CIA.

Phase	Developer - Reference	Distance from Warrior Way (km)	Distance from Dale Roads (km)	Distance from East Pickard Bay (km)	Spatial/temporal overlap with the META project	Details	Dates of Installation/Operation	Further Consideration in technical chapters required?	Justification
						Temporal overlap.			
Installation	University College of Swansea - DEML1845	12.7	5.4	0	Spatial overlap with East Pickard Bay (site 8). Temporal overlap with East Pickard Bay.	Deposition and subsequent removal of marker buoys with environmental monitoring and mid-water settlement plates.	30/08/2018-29/08/2019	Yes	Vessels and equipment will be required for the placement of marker buoys. It is highly likely to have temporal or spatial overlap with META phase 2 activities, therefore this projects cannot be excluded from further consideration in the CIA.
Infrastructure									
Installation/ Operation and Maintenance	Neyland Yacht Haven Ltd - CML1658	1.1	12.3	10.5	No spatial overlap with consented areas Temporal overlap with Warrior Way (site 6)	Pile replacement in Neyland Marina.	21/11/2016-20/11/2019	Yes	Pile replacement is currently ongoing until 2019, which does not overlap with the installation and operational phases of the META project. Operational phases of this project may overlap with operation and installation phases of META therefore this project cannot be excluded from further consideration in the CIA.
Installation/ Operation and Maintenance	Mixed use developments - Local Planning Authority Reference: 14/0158/PA	7.3	5.3	5.6	No spatial overlap with any consented areas. Temporal overlap remains unknown due to insufficient information on start and end dates.	Undetermined planning application. Demolition of several existing buildings and the mixed-use redevelopment of Milford Waterfront comprising up to 26,266 m2 of commercial, hotel, leisure, retail and fishery related floorspace. Up to 190 residential properties, up to 70 additional marina berths, replacement boat yards, landscaping, public realm enhancements, access and ancillary works. A decision on this application is yet to be made by the local planning authority.	EIA screening decision was returned on the 30/04/2018 - no further information has been provided	Yes	Given the distance from the project and likely impact pathways, there is potential for cumulative impacts
Installation/ Operation and Maintenance/ Decommissioning	Greenlink Interconnector Ltd. - Government reference: qA1296053	10.4	6	0	Spatial overlap with East Pickard Bay (site 8). Temporal overlap will occur throughout the duration of the META project	The Project is a 500MW subsea electricity interconnector linking the power markets in Ireland and Great Britain and is planned for commissioning in 2023. As an EU Project of Common Interest, it is one of Europe's most important energy infrastructure projects. The interconnector is planned to make Landfall at Fresh Water West beach to the south of the mouth of the Waterway.	07/2018 - ongoing	Yes	Given potential for temporal and spatial overlap with META phase 2 sites this project cannot be excluded from further consideration in the CIA.
Installation/ Operation and Maintenance/ Decommissioning	Valereo - Welsh Government reference: qA1312073	-	-	-	No overlap with the META project as project is assumed to have no marine components.	Development of a cogeneration facility to supplement electrical power and steam demands of the refinery all within the refinery boundaries on land	07/12/2017 - Nationally significant project (ongoing)	No	Project is assumed to have no marine elements to the project, therefore there will be no impact overlap.

Phase	Developer - Reference	Distance from Warrior Way (km)	Distance from Dale Roads (km)	Distance from East Pickard Bay (km)	Spatial/temporal overlap with the META project	Details	Dates of Installation/Operation	Further Consideration in technical chapters required?	Justification
Installation/ Operation and Maintenance	EGNEDOL Wales Ltd	N/A	N/A	N/A	Potential temporal overlap	EGNEDOL propose to create an environmentally sustainable centre of excellence in Milford Haven, at the Waterston and Blackbridge sites. The proposal includes providing business units and refurbishing a jetty to serve as a primary supply link to the EGNEDOL electricity generation plan, and for export of products. The land-based green energy scheme may generate up to 350 MW.	Not available	No	Planning permission for the EGNEDOL project was refused planning permission on 19/10/2018, therefore it is considered highly unlikely that this project will overlap temporally with the META project. NRW, Welsh Government and PCC have confirmed that at the time of publication of the META Environmental Statement, there are no live consent/licence applications in relation to the Egnedol project and therefore they are content that the META CIA does not need to consider this project further.
Installation/ Operation and Maintenance/Decommissioning	Bombora Wave Energy	11.6	5.0	0	Spatial overlap with East Pickard Bay (site 8) within META test area. Potential for temporal overlap	Bombora on- and off-shore infrastructure and deployment of Bombora mWave device at East Pickard Bay. This is to include device deployment (mWave device), installation of temporary communications cable between mWave device and temporary onshore control station to be located above East Pickard Bay, and installation and operation of temporary control station onshore. Laying of marine cable to shore and through intertidal area at East Pickard Bay to involve up to 3 days cable laying below MHWS using cable lay vessel and up to four vessels, including guard boat. Cable to be laid on seabed and kept in place in sandy sediment by using six, three tonne rock bags covering an area of 4.5 m ² per rock bag. Where the marine cable traverses potential reefy habitat, it will follow natural rock channel. In the intertidal area, the cable will be laid through a natural gully, or up the vertical gully side and attached to the semi-vertical rock face with rock bolts using hand held tools. JCB will pull the cable through the intertidal area from a location above MHWS.	Q1 2020	Yes	There is the potential for spatial overlap in the META East Pickard Bay test area (site 8) and temporal overlap with all META project sites installation and operation and maintenance phases, therefore this project cannot be excluded from further consideration in the CIA.
Ministry of Defence sites									
	Ministry of Defence	8.1	5.5	0.0	Temporal overlap	The Castlemartin Range is located immediately south of the entrance to the Waterway and extends for up to 12 NM from the coast between Little Furznip (at the southern extent of Freshwater West) and St Govan's Head. The southern boundary of the East Pickard Bay (Site 8) site is located adjacent to the northern boundary of the Castlemartin Military Practice Area D113A. The range at Castlemartin	N/A	Yes	There is a high level of uncertainty as to timing of MOD activities at the MOD site, however on-going activity is likely therefore there is the potential for cumulative impacts with the META project.

Phase	Developer - Reference	Distance from Warrior Way (km)	Distance from Dale Roads (km)	Distance from East Pickard Bay (km)	Spatial/temporal overlap with the META project	Details	Dates of Installation/Operation	Further Consideration in technical chapters required?	Justification
						supports the training of military personnel (Army) in the firing of a range of munitions at land-based targets. The seaward danger area provides a safety zone for overfire and shrapnel which may result from the striking of targets. The Castlemartin Range is used every day of the week and on some weekends.			
Aquaculture projects									
Installation/ Operation and Maintenance	Tethys Oysters	8.9	5.1	2.6	Temporal overlap	The oyster farm is located on the eastern side of Angle Bay, whereby oysters are grown in baskets on metal supports. The farm will be serviced from the shore by foot.	Oct 2017 – Oct 2020 (possible renewal of licence)	Yes	There is potential for temporal overlap with the META project and as such will be included for assessment.
Installation/ Operation and Maintenance	Pembrokeshire Scallops	15.3	1.8	3.9	Temporal overlap	The scallop farm is located within Castlebeach Bay, whereby a system of weighted ropes will be deployed for growing scallops and mix species of native algae. The farm will be serviced by vessels and divers.	Jan 2019 – Q4 2020 (possible renewal of licence)	Yes	There is potential for temporal overlap with Dale Roads (site 7) and as such will be taken forward for assessment.
Pembroke Dock Marine Projects									
Installation/ Operation and Maintenance	Milford Haven Port Authority - SC1810: Pembroke Dock Infrastructure	2	11.3	8.8	No spatial overlap with consented sites. Potential for temporal overlap.	Pembroke Dock redevelopment Scoping Report submitted. The intention of the Project is to create a flexible and efficient port-related office, industrial, warehousing and distribution, and ancillary operations infrastructure. This will involve the redevelopment of its existing space to incorporate increased deep-water access, internal and external heavy fabrication areas, construction of MEECE and Education/Skills Facility and the construction of a heavy lift facility.	Q3 2019 – Q3 2023	Yes	Port activity as a result of Pembroke Dock Port operations could cause an increase in underwater noise emissions, increased potential for suspended sediments, and impacts on shipping and navigation. There is therefore the potential for cumulative effects with activities associated the META Project.
Installation/ Operation and Maintenance/Decommissioning	Marine Energy Wales - DEM1875	1.7	11.7	9.4	No spatial overlap with any of the consented areas. Potential for temporal overlap	Marine Energy Test Area - Phase 1 Band 2 application submitted. The Project aims to create pre-consented test areas within the Pembroke Dock area. The test areas will have licensable activities to suit testing of initial stage marine renewable devices. These include testing of non-operating components and subassemblies. No full-scale testing is to be support within the test areas	21/04/2019-21/04/2029	Yes	Vessel use, and some testing activities have the potential for temporal overlap with the META project, therefore this project cannot be excluded from further consideration in the CIA.

Phase	Developer - Reference	Distance from Warrior Way (km)	Distance from Dale Roads (km)	Distance from East Pickard Bay (km)	Spatial/temporal overlap with the META project	Details	Dates of Installation/Operation	Further Consideration in technical chapters required?	Justification
						Pembrokeshire Demonstration zone			
Installation/ Operation and Maintenance/Decommissioning	Wave Hub Ltd. - SC1082	31.4	31.1	25.8	No spatial overlap with any consented areas. Potential for temporal overlap as the projects are linked.	Scoping Report submitted The Project entails the development of 90 km ² of seabed with water depths of approximately 50 metres and a wave resource of approximately 19 kW/m; to support the demonstration of wave arrays with a generating capacity of up to 30MW for each project. Consent for this Project could be achieved in 2022, infrastructure could be built by 2024 and the first technology could be installed in 2025.	2024	Yes	There is the potential for temporal overlap with this project therefore this project cannot be excluded from further consideration in the CIA.

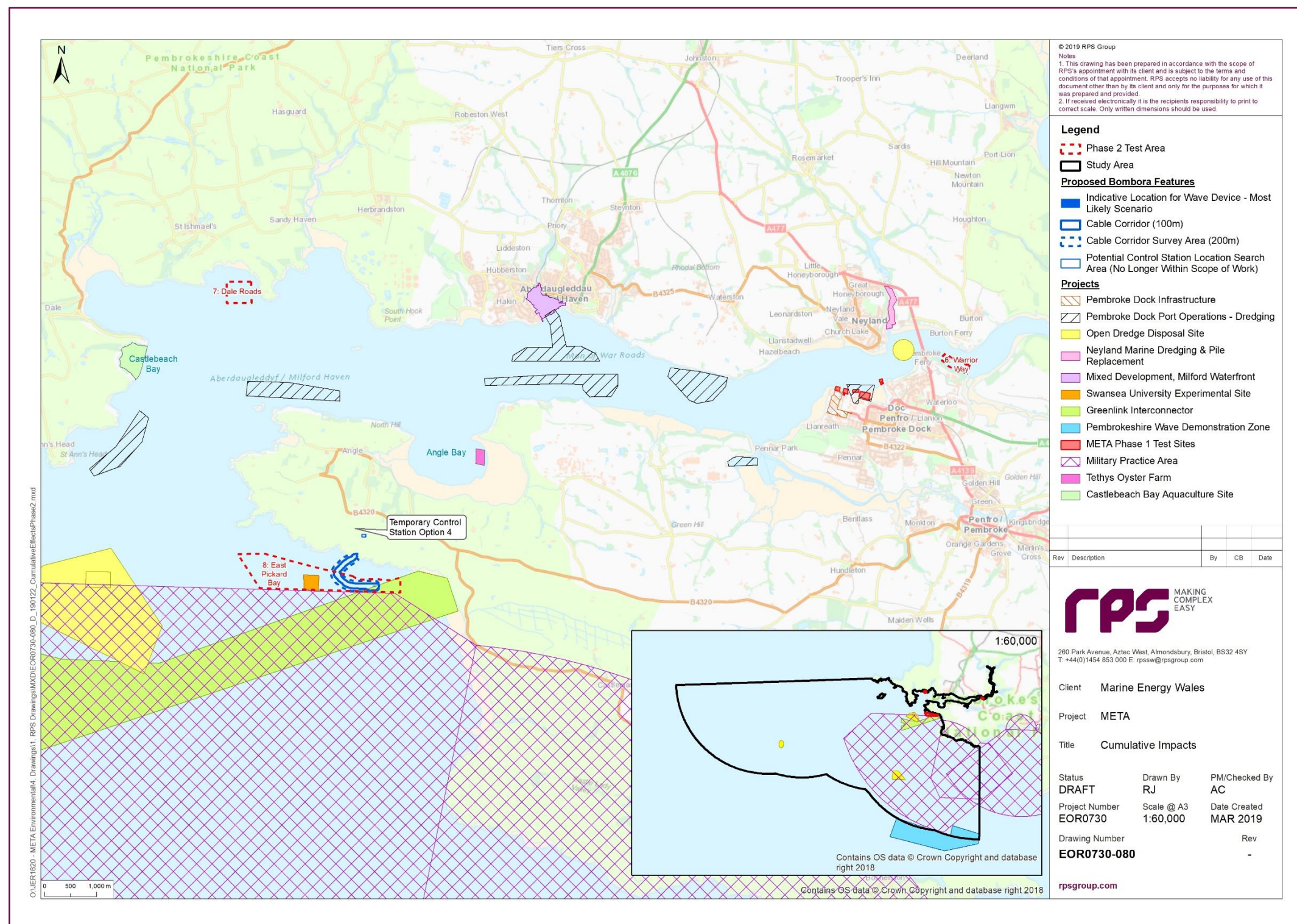


Figure 4.1: Projects/plans considered in the Cumulative Impact Assessment (CIA) for each technical chapter.

Transboundary impacts

- 4.4.2.43 Each technical chapter considers whether there is the potential for any transboundary impacts on other European Union (EU) states.

Inter-relationships

- 4.4.2.44 Each topic chapter considers whether or not there are any inter-related effects with other topics included within the EIA that have not already been considered in order to identify any secondary, cumulative or synergistic effects.
- 4.4.2.45 Inter-relationships are considered to be the impacts and associated effects of different aspects of the META project on the same receptor. These are considered to be:

- Project lifetime effects: assessment of the scope for effects that occur throughout more than one phase of the project (installation, operational and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three key project stages (e.g. subsea noise effects, operational turbines, vessels and decommissioning); and
- Receptor-led effects: assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on marine mammals, such as direct habitat loss or disturbance, may interact to produce a different, or greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

Summary tables

- 4.4.2.46 Summary tables have been used to summarise the effects of the META project for each environmental topic within each of the technical chapters.

4.6 References

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