MARINE ENERGY WALES

MARINE ENERGY TEST AREA (META)

Environmental Impact Assessment

Chapter 15:
Socio-economic and Tourism

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Table of Contents

Table of Tables

Table of Figures

Glossary

Term	Definition
Gross Value Added	Gross Value Added (GVA) is the measure of the value of goods and services produced in an area, industry or sector of an economy.
Location Quotient	Location quotient (LQ) is a way of quantifying how concentrated a particular sector is in a specific area as compared to the national average. An LQ above 1 indicates an above average concentration, whilst an LQ below 1 indicates a below average concentration.
Standard Occupational Classification	The standard occupational classification is a common classification of occupational information for the UK

Acronyms

Acronym	Description
BRES	Business Register and Employment Survey
CIA	Cumulative Impact Assessment
EMEC	European Marine Energy Centre
ERS	Economic Regeneration Strategy
FBC	Full Business Case
FTE	Full-Time Equivalent
GB	Great Britain
GVA	Gross Value Added
LDP	Local Development Plan
LQ	Location Quotient
MEECE	Marine Energy Engineering Centre of Excellence
MEW	Marine Energy Wales
MHPA	Milford Haven Port Authority
NRA	Navigational Risk Assessment
ONS	Office for National Statistics
PCC	Pembrokeshire County Council
PDE	Project Design Envelope
PDI	Pembroke Dock Infrastructure
PDM	Pembroke Dock Marine
PDZ	Pembrokeshire Demonstration Zone
PPF	People, Places, Futures
PPW	Planning Policy Wales
R&D	Research and Development
SFTR	STEAM Final Trend Report for 2004-2015
SME	Small and Medium size Enterprise
TCE	The Crown Estate

Units

Unit	Description
km^2	Square kilometre (area)
Kw/m	Kilowatt per metre
m	metres
m^3	Metres cubed (volume)
MW	Megawatt

15. SOCIO-ECONOMIC AND TOURISM

15.1 Introduction

15.1.1.1 This chapter of the Environmental Statement presents the results of the Environmental Impact Assessment (EIA) for the potential impacts of the META project on socio-economics and tourism.

15.2 Purpose of this chapter

15.2.1.1 The primary purpose of the Environmental Statement is to support the marine licence (and planning) applications for the META project, which are outlined in chapter 1: Introduction.

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

15.2.1.3 In particular, this Environmental Statement chapter:

- Presents the existing environmental baseline established from desk studies, and consultation;
- Presents the potential environmental effects on socio-economics and tourism arising from the META project, based on the information gathered and the analysis and assessments undertaken;
- Identifies any assumptions and limitations encountered in compiling the environmental information; and
- Highlights any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

15.3 Study area

15.3.1.1 The socio-economic and tourism study area for this chapter is Pembrokeshire County (hereafter referred to as Pembrokeshire). The offshore elements of the META project will have impacts on offshore activities that will have onshore impacts where socio-economic and tourism receptors are concerned. For example, if a developer deploys a device offshore at one of the META project testing sites, the jobs that are supported by this activity will be located onshore.

15.3.1.2 On the basis of commuting data (presented in paragraphs 15.7.3.12 and 15.7.3.13) Pembrokeshire is a relatively self-contained economic area, making it a suitable choice for the socio-economic and tourism study area.

15.3.1.3 Figure 15.1 shows the extent of the socio-economic and tourism study area.

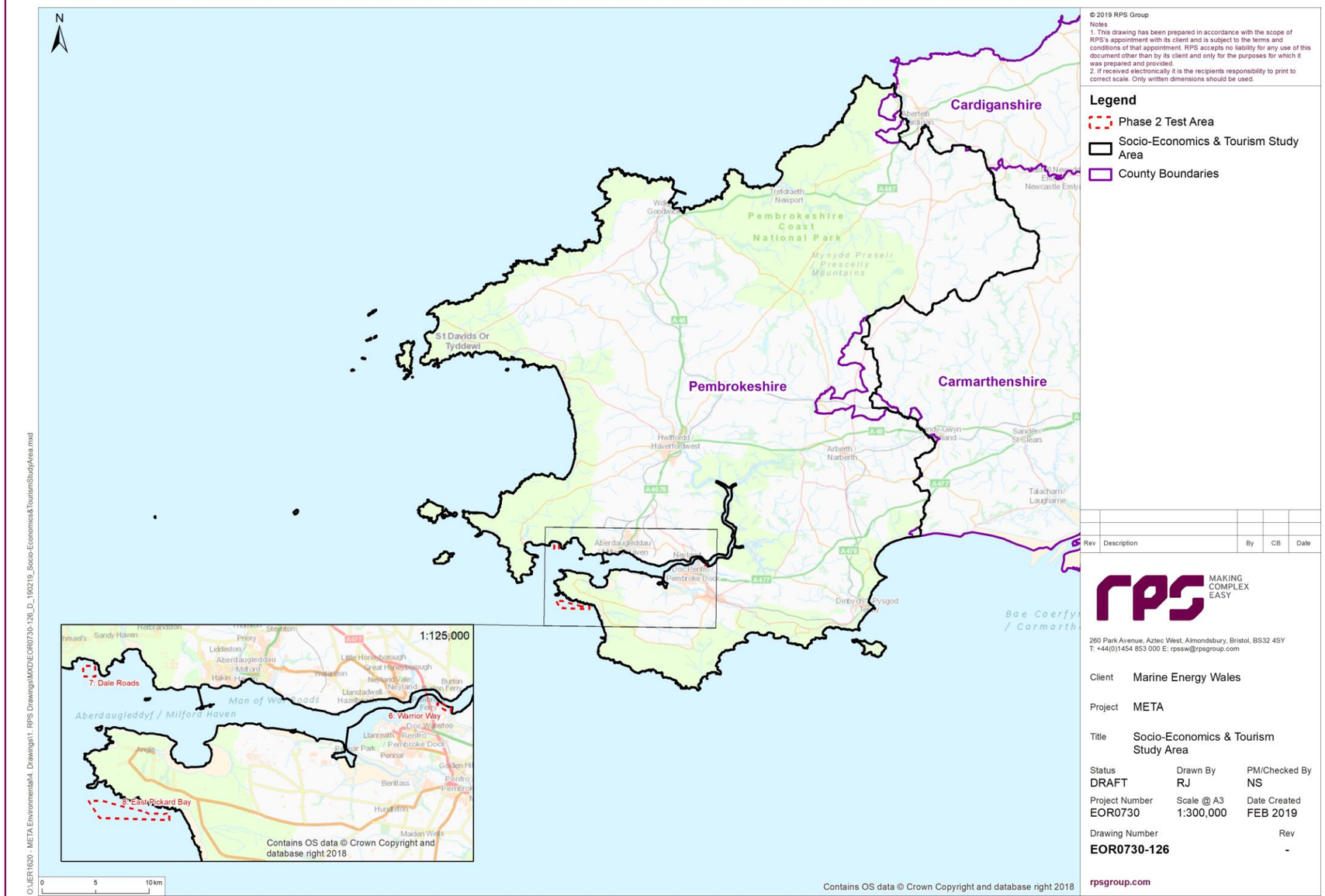

Figure 15.1: Socio-economic and tourism study area.

15.4 Policy context

15.4.1.1 This section covers the national, regional, and local legislative and policy provisions that relate to socio-economic and tourism impacts. These are summarised in Table 15.1 at the end of the section.

15.4.2 Legislation

Well-being of Future Generations Act (Wales)

15.4.2.1 In the Well-being of Future Generations (Wales) Act 2015, the Welsh Government commit to the aim of delivering 'sustainable development', which the Act defines as *"the process of improving the economic, social, environmental and cultural well-being of Wales by taking action, in accordance with the sustainable development principle, aimed at achieving the well-being goals."*

15.4.2.2 As part of its well-being goals, the Act sets out the goal of promoting a 'prosperous' Wales. This means working towards *"an innovative, productive and low carbon society which…develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work."*

15.4.2.3 Another of the well-being goals relates to achieving a 'resilient' Wales. This means striving for a *"nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change)."*

15.4.2.4 The well-being goals also promote the importance of a 'globally responsible' Wales. This requires action that aims to improve *"the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being."*

15.4.3 Policy

UK Industrial Strategy

15.4.3.1 The UK Industrial Strategy sets out the long-term policy by which the Government plans to boost the productivity performance of the UK economy. It sets an overarching context within which economic development takes place, and therefore is relevant to a Welsh context. One of the five 'foundations of productivity' identified is Infrastructure, and one of the four Grand Challenges to put the UK at the forefront of industry relates to Clean Growth – maximising 'the advantages for UK industry from the global shift to clean growth'. Key policies to boost innovation include:

- Increased levels of Research and Development (R&D) investment;
- An increase in the rate of R&D tax credit to 12%;
- A £725 million investment in new Industrial Strategy Challenge Fund programmes;
- Sector Deals in life sciences, construction, Artificial Intelligence, and the auto industry; and
- Driving over £20 billion of investment in innovative and high potential businesses.

Prosperity for All

15.4.3.2 This strategy takes the key commitments from the Welsh Government's Programme for Government, and places them in a long-term context, setting out how they fit within the work of the Welsh public service.

15.4.3.3 There are a number of important commitments that fall under the strategy's first aim to provide 'prosperous and secure' economic growth, including:

- Use business support to build capacity and innovation within home grown businesses along local supply chains;
- Harness the opportunities of major infrastructure projects, such as Wylfa Newydd and Swansea Bay Tidal Lagoon;
- Provide more effective support for the development of local supply chains and clusters, so that economic value is retained locally, and more employment opportunities are created closer to home; and
- Establish a bespoke infrastructure consenting process that is responsive to business and community needs, to support sustainable economic growth, and to decarbonise Wales' energy supply.

15.4.3.4 One of the main objectives set within this first aim is to 'drive sustainable growth and combat climate change'. One aspect of this objective is to capitalise on the economic opportunities of Wales' natural resources by supporting low carbon energy generation and greater use of renewable energy sources.

Prosperity for All: Economic Action Plan

15.4.3.5 The plan highlights a number of ways in which the Welsh Government can respond to the challenges facing the Welsh economy.

15.4.3.6 One area of focus is on the need for innovation and skills in response to the demand for knowledge-based activities to underpin economic growth.

15.4.3.7 Another response advocated by the plan is tackling climate change, as 'the shift towards a low-carbon future offers huge opportunities for [the] economy to diversify and grow'. Welsh Government wants Wales to capitalise on the opportunities arising from the shift away from fossil fuels to a low carbon economy. As part of this response, the Welsh Government is committed to supporting businesses that provide growth opportunities in this transitional process, specifically developers, regulators and energy infrastructure providers that can accelerate the deployment of low carbon energy generation.

15.4.3.8 This approach will help to meet the target of 70% of electricity consumed in Wales being from Welsh renewable sources by 2030.

Planning Policy Wales

15.4.3.9 As part of planning for sustainability, Planning Policy Wales (PPW) states the *"planning system provides for a presumption in favour of sustainable development to ensure that social, economic and environmental issues are balanced and integrated, at the same time, by the decision-taker when… taking decisions on individual planning applications." (paragraph 4.2.2).*

15.4.3.10 PPW sets an expectation for all those involved in the planning system to adhere to a set of principles, including:

- Taking a long-term perspective to safeguard the interests of future generations, whilst at the same time meeting needs of people today;
- Tackling climate change by reducing the greenhouse gas emissions that cause climate change and ensuring that places are resilient to the consequences of climate change;
- Support initiative and innovation and avoid placing unnecessary burdens on enterprises (especially small and medium sized firms) so as to enhance the economic success of both urban and rural areas, helping businesses to maximise their competitiveness;
- Promote a low carbon economy and social enterprises; and
- Support the need to tackle the causes of climate change by moving towards a low carbon economy. This includes facilitating development that reduces emissions of greenhouse gases in a sustainable manner, provides for renewable and low carbon energy sources at all scales and facilitates low and zero carbon developments.

15.4.3.11 Tackling climate change is a fundamental part of delivering sustainable development:

"Climate change is one of the most important challenges facing the world and the Welsh Government has made a commitment to tackling climate change, resolving that the Government and people of Wales will play the fullest possible part in reducing its carbon footprint… Our commitment to action on climate change is based on a scientific imperative to act and to act urgently to reduce greenhouse gas emissions and deal with the consequences of climate change." (paragraph 4.5.1)

15.4.3.12 Among the key areas highlighted as important parts of taking action on this topic are:

- Research and good practice;
- Innovation and skills; and
- Energy generation.

15.4.3.13 PPW mandates that wherever possible, local planning authorities should seek to guide and control economic development to facilitate regeneration and promote social and environmental sustainability. In so doing, they should aim to support national, regional, and local economic policies and strategies, and to deliver physical regeneration and employment opportunities to disadvantaged communities.

15.4.3.14 Small-scale enterprises have a vital role in promoting healthy economic activity in rural areas, which can contribute to both local and national competitiveness. New businesses in rural areas are essential to sustain and improve rural communities.

People, Places, Futures – The Wales Spatial Plan

Note: the Welsh Planning Directorate are currently producing a National Development Framework for Wales, which will set out a 20-year land use framework for Wales and will replace the current Wales Spatial Plan when published.

15.4.3.15 People, Places, Futures (PPF) guidance states that a sustainable future *"depends on the vitality of our communities as attractive places to live and work. We need to reduce inequalities between communities whilst retaining their character and distinctiveness" (paragraph 10).*

15.4.3.16 The Plan aims to facilitate the development of initiatives which *"tackle child poverty, employability, skills deficits and economic inactivity, as well as improving the environment, health and wellbeing, and community safety" (paragraph 10.1).*

15.4.3.17 Pembrokeshire is included in PPF as one of six Spatial Plan Areas. There are a number of key strategic priorities set out in PPF to achieve the vision of 'a network of strong communities supported by a robust, sustainable, diverse high value-adding economy underpinned by the Area's unique environment, maritime access and internationally important energy and tourism opportunities.' One of these strategic priorities is focused on developing a more diverse, entrepreneurial knowledge-based economy, working closely with higher and further education institutions, indigenous businesses and multinational companies, to increase wage levels and create enough well-paid jobs to establish a critical mass that will both attract people with higher skills and reduce the out-migration of young skilled people. Energy and the environment will be critical to achieving success.

15.4.3.18 Pembroke and Pembroke Dock (which will provide land/port-based support to the META project) is included as one of three strategic hubs that perform an important regional role, making it an important focus for future investment. The area is anticipated to see employment growth linked to further development of the port and marina.

Swansea Bay City Region Economic Regeneration Strategy 2013–2030

15.4.3.19 There are a number of economic challenges highlighted in the Economic Regeneration Strategy (ERS) in the areas of business starts, skills, employment, and infrastructure. One of the major opportunities noted in the ERS is the strength of key sectors that possess *"…significant potential for growth…"* Two of these key sectors are the energy industry and advanced engineering.

15.4.3.20 Strategic Aim 1 is focused on business growth, retention, and specialisation. The aim is to develop a large, vibrant and increasingly specialised business base by attracting, developing, and retaining a larger stock of sustainable, high-value and productive businesses.

15.4.3.21 Strategic Aim 4 is focused on the knowledge economy and innovation. The ERS acknowledges the need to specialise and focus on the sectors that display the greatest potential for growth and building a critical mass of successful businesses.

15.4.3.22 Strategic Aim 5 is focused on 'distinctive places and competitive infrastructures.' Part of this aim is to co-ordinate spatial planning to ensure targeted development of land, property, and infrastructure. This involves delivering substantial employment and investment opportunities that will come about from the successful development of strategic employment sites, with a focus on knowledge-based and innovation-driven business activity.

Pembrokeshire County Council Local Development Plan: Planning Pembrokeshire's Future (2013)

15.4.3.23 The Local Development Plan (LDP) establishes a vision and policy context for directing development in Pembrokeshire between 2013–2021. Although it deals primarily with land use, it is a useful guide as to the direction of travel of planning policy in the County.

15.4.3.24 The LDP highlights a number of issues facing the Pembrokeshire economy, including:

- Lack of employment opportunities in rural areas;
- Loss of skilled young people from the County; and
- Need to expand industrial/port activities.

15.4.3.25 The Plan supports the potential for Pembrokeshire to develop its economy in areas such as renewable energy.

15.4.3.26 Under Objective E – Building on the County's strategic location for energy and port related development – the Plan includes a sub objective to 'ensure sufficient land is available for port and energy/renewable energy technologies both for research and for delivery'.

15.4.3.27 General Policy GN.4 commits to supporting developments that 'enable the supply of renewable energy through environmentally acceptable solutions', stating that Pembrokeshire has 'significant' potential to provide energy from all renewable sources and to build on its role as an 'energy centre'.

The Welsh Government Strategy for Tourism 2013 – 2020: Partnership for Growth

15.4.3.28 The goal of the Welsh Government is to see tourism 'grow in a sustainable way and to make an increasing contribution to the economic, social and environmental well-being of Wales'. Part of the strategic approach is to improve the attractiveness of Wales through innovative product development. This will be achieved by stimulating investment in 'high quality, reputation-changing products.'

15.4.3.29 An emphasis will be placed on projects that can change people's perception of Wales, and deliver additional economic growth, jobs and wealth. This will be evident both directly in the businesses concerned and indirectly through supply chain and multiplier benefits that deliver jobs in the community.

Table 15.1: Summary of policy framework provisions relevant to socio-economics and tourism.

Summary of relevant policy framework	How and where considered in the Environmental Statement
Sustainable economic growth	Employment and Gross Value Added (GVA) impacts associated with the deployment of energy devices at the META project sites are included in the impact assessment.
Innovation, and Research and Development (R&D)	Employment and GVA impacts associated specifically with the design and R&D stage of wave energy device deployment at the META project sites are included in the impact assessment.
Low carbon economy and renewable energy	The role of the META project within the renewable energy sector is included in the impact assessment.
Growth of the tourism sector	The impact of the META project on tourism and leisure activities, particularly outdoor pursuits, is considered in the impact assessment.

15.5 Consultation

15.5.1.1 Consultation activities have been undertaken for the META project. Of the key issues raised during the consultation phase, none are specific to socio-economics and tourism. Therefore, there are no key issues to be considered in the production of this Environmental Statement chapter on the basis of the consultation responses.

15.6 Methodology to inform the baseline

15.6.1 Desktop study

15.6.1.1 There are no formal measures of impact significance for socio-economic receptors. The assessment has therefore been informed by the professional judgment of the chapter authors.

15.6.1.2 Information on socio-economics within Pembrokeshire was collected through a detailed desktop review of existing studies and datasets. These are summarised at Table 15.2 below.

Table 15.2: Summary of key desktop sources.

Title	Source	Year	Author
Accelerating Marine Energy	Carbon Trust	2011	N/A
An analysis of economic activity dependent on the Milford Haven Waterway	MHPA	2012	Cardiff University
Annual Population Survey	ONS	2018	N/A
Annual Survey of Hours and Earnings	ONS	2018	N/A
Business Demography	ONS	2017	N/A
Business Register and Employment Survey	ONS	2018	N/A
Census of Population	ONS	2011	N/A

Title	Source	Year	Author
Jobs Density	ONS	2018	N/A
Jobseekers Allowance	ONS	2018	N/A
Local authority population projections	Statistics Wales	2014-based	N/A
Mid-year population estimates	ONS	2018	N/A
Regional Gross Value Added	ONS	2018	N/A
Regional Gross Value Added by Local Authority	ONS	2015	N/A
STEAM Final Trend Report for 2004-2015	PCC	2015	Global Tourism Solutions UK
UK Business Counts	ONS	2018	N/A

15.7 Baseline environment

15.7.1 Population

15.7.1.1 The Office for National Statistics (ONS) Mid-Year Estimates report a resident population of 124,700 persons in Pembrokeshire.

15.7.1.2 The population of Pembrokeshire has increased by 4.3% over the ten-year period 2007-17 (Mid-Year Estimates, ONS).

15.7.2 Industry

15.7.2.1 The Pembrokeshire economy is dominated by micro businesses. The number of micro and small-medium size enterprises (SME) in Pembrokeshire increased between 2014 and 2018 (UK Business Counts, ONS) (Table 15.3). It is difficult to make an accurate assessment of the change in the number of large businesses in Pembrokeshire as ONS figures are rounded to the nearest five. However, the data shows there are very few.

Table 15.3: Change in size band distribution of businesses 2014–2018, Pembrokeshire.

Business size	2014	2018
Micro (0–9 employees)	4,715	5,005
SME (10–249 employees)	505	575
Large (250+ employees)	5	5

Source: UK Business Counts, ONS

15.7.2.2 The share of Pembrokeshire's business base attributable to new enterprises ('births') decreased slightly between 2013 and 2017, and the share of business 'deaths' as a proportion of Pembrokeshire's business base increased slightly over the same period (Business Demography, ONS) (Table 15.4).

Table 15.4: Change in business 'births' and 'deaths' 2013–2017, Pembrokeshire.

	2014	2018
Business births (total)	465	410
Business births (% share of business base)	10%	9%
Business deaths (total)	375	430
Business deaths (% share of business base)	8%	9%

Source: Business Demography, ONS

15.7.2.3 The survival rate of new enterprises in Pembrokeshire is higher than the Wales average (Business Demography, ONS) (Table 15.5).

Table 15.5: Business survival rates based on 2012 business births.

	1-year	2-year	3-year	4-year	5-year
Pembrokeshire	93%	81%	67%	58%	47%
Wales	92%	75%	60%	51%	44%

Source: Business Demography, ONS

15.7.2.4 Location Quotients (LQ) show the concentration of sectors in an area, relative to the UK economy. An LQ of 1 indicates the sector has an equal concentration to the UK, an LQ>1 shows a relative concentration of activity in that sector. An LQ<1 shows an under-representation of that sector.

15.7.2.5 Table 15.6 reports the number of businesses and the equivalent LQ of each sector in Pembrokeshire. This shows that the Energy and Tourism (proxy based on Accommodation and food services, and Arts, entertainment and recreation) sectors are well represented in the Pembrokeshire economy (UK Business Counts, ONS).

Table 15.6: Total business LQ by sector, Pembrokeshire (2018).

Sector	Total businesses	LQ
A : Agriculture, forestry and fishing	1,385	1.85
B : Mining and quarrying	5	1.32
C : Manufacturing	300	0.96
D : Energy	15	1.43
E : Water supply	20	0.92
F : Construction	620	0.89
G : Wholesale and retail trade	725	0.84
H : Transportation and storage	140	0.67
I : Accommodation and food services	650	1.40
J : Information and communication	130	0.54

Sector	Total businesses	LQ
K : Financial and insurance activities	60	0.61
L : Real estate activities	90	0.60
M : Professional, scientific and technical activities	500	0.77
N : Administrative and support service activities	345	0.83
O : Public administration and defence	40	1.56
P : Education	55	0.78
Q : Human health and social work activities	185	0.77
R : Arts, entertainment and recreation	145	1.19
Total	**5,585**	

Source: UK Business Counts, ONS (Note – figures may not sum due to rounding)

15.7.3 Employment and economic activity

15.7.3.1 The economic activity rate in Pembrokeshire is 76.0%. This is lower than the Wales average (76.2%) and GB average (78.5%) (ONS Annual Population Survey, Oct 2017 – Sep 2018).

15.7.3.2 The employment rate is measured at 73.5% compared to Wales 72.6% and GB 75.1%. Self-employment is very high in Pembrokeshire, at 14.1% compared to 9.5% in Wales and 10.6% in GB; unemployment is low at 3.8% compared to 4.6% in Wales and 4.2% GB (ONS Annual Population Survey, 2018).

15.7.3.3 The most comprehensive measure of jobs in an area is the ONS Jobs Density measure. This indicates 55,000 jobs in Pembrokeshire in 2017.

15.7.3.4 Table 15.7 reports the employment sectoral profile in Pembrokeshire. The tourism sector, based on a proxy comprising the 'Accommodation and food services' sector and 'Arts, entertainment and recreation' sector, is very well represented in Pembrokeshire in terms of employment (Business Register and Employment Survey (BRES), ONS, 2018). The 'Energy' sector's LQ falls below 1.

Table 15.7: Total employment and LQ by sector, Pembrokeshire (2017).

Sector	Total employment	LQ
A : Agriculture, forestry and fishing	6,000	2.95
B : Mining and quarrying	125	1.97
C : Manufacturing	2,000	0.40
D : Energy	225	0.89
E : Water supply	350	0.80
F : Construction	2,500	1.17
G : Wholesale and retail trade	8,000	1.22
H : Transportation and storage	1,750	1.15
I : Accommodation and food services	7,000	1.93
J : Information and communication	1,250	0.66
K : Financial and insurance activities	300	0.28
L : Real estate activities	500	0.81
M : Professional, scientific and technical activities	2,000	0.80
N : Administrative and support service activities	1,500	0.47
O : Public administration and defence	2,000	0.63
P : Education	4,000	0.90
Q : Human health and social work activities	7,000	0.96
R : Arts, entertainment and recreation	900	1.46
Total	**48,000**	

Source: BRES, ONS (Note – figures may not sum due to rounding)

15.7.3.6 Table 15.8 shows the share of Pembrokeshire residents employed in occupation categories 1-3 (higher order occupations) is much lower than the Wales average (Annual Population Survey, ONS, 2019). The number employed in occupation categories 4-6 (middle order occupations) is much higher than the Wales average. The number employed in occupation categories 7-9 (lower order occupations) is very similar to the Wales average.

Table 15.8: Employment by Standard Occupational Classification, Pembrokeshire (2017).

Occupation	Total employment	Share of employment (Pembs)	Share of employment (Wales)
1: Managers, directors and senior officials	5,800	10.4%	9.8%
2: Professional occupations	8,700	15.6%	18.4%
3: Associate prof & tech occupations	6,000	10.7%	13.4%
4: Administrative and secretarial occupations	5,200	9.3%	9.9%
5: Skilled trades occupations	7,900	14.2%	11.5%
6: Caring, leisure and other service occupations	6,800	12.3%	9.4%
7: Sales and customer service occupations	4,100	7.3%	8.1%
8: Process, plant and machine operatives	3,800	6.9%	7.7%
9: Elementary occupations	7,300	13.2%	11.2%

Source: Annual Population Survey, ONS

15.7.3.7 The proportion of the 16-64 population with the highest level of qualifications (NVQ4+) is reported at 30.7% compared to 35.1% in Wales and 38.6% Great Britain (GB) (ONS Annual Population Survey).

15.7.3.8 42.5% of jobs in Pembrokeshire are part time (ONS, BRES). This compares to 34.7% in Wales and 32.5% GB.

15.7.3.9 Whilst the employment and economic activity rates in Pembrokeshire indicate labour market participation levels in Pembrokeshire are at or above the Welsh average, this is based on high levels of self-employment and part time working. The occupational and skills data shows a low concentration of high skilled, higher order activity.

Income and wealth

15.7.3.10 The Annual Survey of Hours and Earnings reports that earnings in Pembrokeshire are much lower than in Wales as a whole. The median annual earnings of a Pembrokeshire resident in full-time employment is £24,824, compared to £27,039 for Wales. Workplace based measures show a similar picture with median earnings approximately 90% of the Wales average.

15.7.3.11 The ONS reports that, in 2015, GVA per head in Pembrokeshire was £15,905 compared to an average of £18,674 in Wales (Regional Gross Value Added, Regional and by Local Authority).

Transport and commuting

15.7.3.12 Travel to work patterns indicate a functional economic area that is contained almost entirely within Pembrokeshire local authority. Census 2011 data on Origin Destination indicates that 91% of Pembrokeshire residents that are in employment work within the Pembrokeshire local authority, and 92% of workers who work in Pembrokeshire are residents of Pembrokeshire local authority.

15.7.3.13 Of the 54,697 Pembrokeshire residents in employment, 18% work mainly at or from home and 9% have no fixed place of work (Census 2011, ONS). In Pembrokeshire, 87% of jobs with a fixed workplace outside the home are filled by residents of Pembrokeshire, and 13% are taken by in-commuters (Census 2011, ONS).

Marine energy sector

15.7.3.14 In 2017, investment in the marine energy sector in Wales was £68.3 million (Marine Energy Wales (MEW)). The sector directly supported 137 full-time equivalent (FTE) jobs and 350 person years of employment in Wales, and the contribution increases when effects are included from elsewhere in the supply chain (MEW). It is anticipated that developers within the marine energy sector will invest £1.4 billion between 2017 and 2022 (MEW). Tidal energy represents the largest share of these figures, with wave energy representing a smaller share of the marine energy sector.

15.7.3.15 The energy sector in Pembrokeshire is heavily biased towards oil and gas. The energy sector in Pembrokeshire accounts for around £92 million in wages per annum (Milford Haven Port Authority (MHPA), 2012). Of the £323.7 million of GVA associated with economic activity in the Milford Haven Waterway, over 60% is estimated to be generated in the energy sector – roughly 12% of the Pembrokeshire economy (MHPA, 2012).

Tourism and leisure sector

15.7.3.16 The total number of visitors to Pembrokeshire per annum amounts to 4.3 million, of which 2 million are day visitors (Pembrokeshire County Council (PCC), 2015).

15.7.3.17 The recreation sector contributed £37.7 million of direct revenue to Pembrokeshire's tourism economy in 2015 (PCC, 2015). This accounted for 10.4% of the Pembrokeshire economy's total direct revenue from tourism in 2015 (£362.2 million). In employment terms, the recreation sector provided 672 FTE jobs in 2015 (PCC, 2015). This accounted for 6.6% of the Pembrokeshire economy's total direct employment relating to tourism in 2015 (10,176 FTEs).

15.7.3.18 The best available local data on the accommodation sector in Pembrokeshire is provided in terms of visitorship. In 2015, there were 512,000 visitors to Pembrokeshire who stayed in paid serviced accommodation (i.e. hotels or similar), equating to 1.03 million visitor days. In the same year, there were 1.6 million visitors to Pembrokeshire who stayed in paid non-serviced accommodation (i.e. self-catering or similar), equating to 10.58 million visitor days.

15.7.3.19 The tourist activities most likely to be impacted by the offshore testing sites are discussed in chapter 16: Other Users.

15.7.4 Future baseline scenario

15.7.4.1 The (Marine Works (EIA) Regulations 2007 (as amended)) requires that *"a description of the relevant aspects of the current state of the environment (baseline scenario), and an outline of the likely evolution thereof without implementation of the project, as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge*" is included within the Environmental Statement.

15.7.4.2 In the event that the META project does not come forward, an assessment of the future baseline conditions has been carried out and is described within this section.

15.7.4.3 Based on Statistics Wales' local authority population projections, Pembrokeshire's population is expected to decrease by around 1.6% between 2019 and 2039.

15.7.4.4 Workforce job projections indicate there will be demand for an additional 2,200 new jobs in Pembrokeshire between 2017 and 2033. Many of these are expected to be part-time and low-paid jobs.

15.7.4.5 Employment in extraction and mining (capturing oil and gas activities) and utilities (capturing other energy activities) are estimated to remain at roughly the same level between 2017 and 2033. GVA in these sectors is also expected to remain largely static (Local Employment Trends Background Paper, PCC, 2018). The value of fuel refining is expected to fall over the same period, from £189.1 million in 2017 to £146.5 million in 2033.

15.7.4.6 The Carbon Trust has estimated the global market for marine energy could be worth £340 billion by 2050, and the UK's share of this could be worth £76 billion (Carbon Trust, 2011). The same report also estimates there could be as many as 68,000 UK-based jobs in the marine energy sector by 2050. The absence of the META project could limit the expansion of the sector in Wales.

15.7.4.7 The baseline assessment demonstrates the importance of the energy sector to the Pembrokeshire economy. Despite an important economic contribution, non-renewable elements of the energy sector in Pembrokeshire are under an increasing regulatory burden, with concerns that firms are finding it more difficult to invest profitably (MHPA, 2012). There are opportunities for investment in renewable energy activities to diversify the energy sector in Pembrokeshire and create better conditions for growth in the future. The absence of the META project might slow down this diversification process. However, diversification will require investment in a number of different renewable sources, not just wave and tidal energy.

15.7.4.8 The Port of Milford Haven is in the process of expansion through the Pembroke Dock Infrastructure project (which is one of the Pembroke Dock Marine (PDM) projects, as is the META project), which is likely to result in increased socio-economic activity within the port. This project is further considered in the Cumulative Impact Assessment (CIA) presented in section 15.12.

15.7.4.9 Given the energy sector in Pembrokeshire is heavily reliant on non-renewable energy sources, the future baseline scenario for energy-related activities in Pembrokeshire is unlikely to experience significant change from that presented in section 15.7. The absence of the META project could exacerbate this lack of growth, as it would inhibit the energy sector's capacity for exploiting one possible avenue of diversification.

15.7.4.10 Employment in accommodation and food services in Pembrokeshire is estimated to increase from 6,800 to 7,300 from 2017 to 2033, reflecting expected growth in the tourism sector. GVA in this sector is also expected to increase from £172.2 million to £218.8 million (Local Employment Trends Background Paper, PCC, 2018). This sector captures some tourism activities.

15.7.4.11 The future baseline scenario for tourism activities is considered unlikely to change substantially in the absence of the META project, although there is an aim to increase visitor numbers outside the peak summer months (Pembrokeshire County Council, 2018).

15.7.5 Data limitations

15.7.5.1 The data sources used in this chapter are detailed in Table 15.2 above. The data used are the most up to date publicly available information which can be obtained from the applicable data sources as cited. The data are therefore limited by what is available and by what has been made available, at the time of writing the Environmental Statement.

15.7.5.2 It is considered that the data employed in the assessment are of a robust nature and are sufficient for the purposes of the impact assessment presented.

15.7.5.3 There is insufficient data available to quantitatively assess the scale of the wave energy sector and its present contribution in employment and GVA to the Pembrokeshire and Welsh economy. This presents challenges during impact assessment. The data that is available is therefore used to inform a qualitative assessment.

15.7.5.4 The way sectors are defined presents some limitations with regards to assessing the existing energy sector in Pembrokeshire. It is likely that activities within the renewable energy sector are coded within other sector groupings such as R&D and manufacturing.

15.7.5.5 There is a lack of detail on the scale of key user group activities within the tourism and recreation sector and their associated baseline economic impact.

15.8 Key parameters for assessment

15.8.1.1 For the purposes of this chapter, the installation and deployment, operation and maintenance, and decommissioning phases have been considered together. Since devices can be deployed throughout the lifetime of the project, the socio-economic and tourism impacts cannot be readily sub-divided into discrete sequential phases. Therefore, impacts on the receptors for this chapter are described for the project as a whole.

15.8.2 Maximum and most likely design scenario

15.8.2.1 The maximum design scenarios identified in Table 15.9 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in the project description (chapter 2: Project Description). Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Design Envelope (PDE) e.g. different infrastructure layout, to that assessed here be taken forward in the final design scheme.

15.8.2.2 The most likely design scenarios identified in Table 15.9 have been selected as those having the potential to result in the most likely effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in the project description (chapter 2: Project Description). Effects of greater adverse significance are outlined under the maximum design scenario.

15.8.2.3 For the majority of socio-economic and tourism receptors the key determinants will be the total number of device deployments as a measure of scale of activity.

Table 15.9: Maximum and most likely design scenarios considered for the assessment of potential impacts on socio-economics and tourism.

Potential impact	Maximum design scenario	Most likely design scenario	Justification
All phases			
Impact on design and R&D employment and GVA in the renewable energy sector.	**Warrior Way (site 6)** • The level of testing activity is used to estimate the level of design and R&D activity. • Up to four test deployments in a 12-month period (i.e. up to 60 deployments over the project lifetime). • When it is assumed that each deployment is of a separate device i.e. four devices tested once in a 12-month period (as opposed to one device tested four times), the maximum design scenario equates to up to four devices undergoing design and R&D stage activities in a 12-month period. **Dale Roads (site 7)** • The level of testing activity is used to estimate the level of design and R&D activity. • Up to two test deployments in a 12-month period (i.e. up to 30 deployments over the project lifetime). • When it is assumed that each deployment is of a separate device i.e. two devices tested once in a 12-month period (as opposed to one device tested two times), the maximum design scenario equates to up to two devices undergoing design and R&D stage activities in a 12-month period. **East Pickard Bay (site 8)** • The level of testing activity is used to estimate the level of design and R&D activity. • Maximum testing activity occurs as follows: – up to two tow tests in a 12-month period, – up to four moored/gravity base tests in a 12-month period. • When it is assumed that each deployment is of a separate device i.e. six devices tested once in a 12-month period, the maximum design scenario equates to up to six devices undergoing design and R&D stage activities in a 12-month period. **All sites** • The maximum design scenario equates to a maximum range of 12 devices undergoing design and R&D stage activities in a 12-month period across all sites.	**Warrior Way (site 6)** • The level of testing activity is used to estimate the level of design and R&D activity. • Up to two test deployments in a 12-month period (i.e. up to 30 deployments over the project lifetime). • When it is assumed that each deployment is of a separate device i.e. two devices tested once in a 12-month period (as opposed to one device tested two times), the most likely design scenario equates to up to two devices undergoing design and R&D stage activities in a 12- month period. **Dale Roads (site 7)** • The level of testing activity is used to estimate the level of design and R&D activity. • Up to one test deployments in a 12-month period (i.e. up to 15 deployments over the project lifetime) • When it is assumed that each deployment is of a separate device i.e. one device tested once in a 12-month period, the most likely design scenario equates to up to one device undergoing design and R&D stage activities in a 12-month period. **East Pickard Bay (site 8)** • The level of testing activity is used to estimate the level of design and R&D activity. • Most likely testing activity occurs as follows: – up to one tow tests in a 12-month period, – up to one moored/gravity base tests in a 12-month period. • When it is assumed that each deployment is of a separate device i.e. two devices tested once in a 12-month period, the most likely design scenario equates to up to two devices undergoing design and R&D stage activities in a 12-month period. **All sites** • The most likely design scenario equates to a maximum range of 5 devices undergoing design and R&D stage activities in a 12-month period across all sites.	As per Project Design Envelope.
Impact on installation and deployment, operation and maintenance, and decommissioning related employment and GVA.	**Warrior Way (site 6)** • The level of deployment and retrieval activity is used as an indicator of the scale of related economic activity. • Up to 20 deployment and 20 retrieval vessel movements in a 12-month period (moored/gravity base only) with up to five vessels utilised at any one time. • Up to four test deployments in a 12-month period (i.e. up to 60 deployments over the project lifetime. • Up to 104 vessel visits are associated with the operation and maintenance of these device tests in a 12-month period with up to five vessels utilised at any one time. • Therefore, the maximum design scenario equates to up to 144 vessel movements over a 12-month period. This will require the services of up to ten vessels at any one time. **Dale Roads (site 7)** • The level of deployment and retrieval activity is used as an indicator of the scale of related economic activity.	**Warrior Way (site 6)** • The level of deployment and retrieval activity is used as an indicator of the scale of related economic activity. • Up to 20 deployment and 20 retrieval vessel movements in a 12-month period (moored/gravity base only) with up to three vessels utilised at any one time. • Up to two test deployments in a 12-month period (i.e. up to 30 deployments over the project lifetime. • Up to 52 vessel visits are associated with the operation and maintenance of these device tests in a 12-month period with up to three vessels utilised at any one time. • Therefore, the most likely number of vessel movements is up to 92 over a 12-month period. This will require the services of up to six vessels at any one time. **Dale Roads (site 7)** • The level of deployment and retrieval activity is used as an indicator of the scale of related economic activity.	As per Project Design Envelope.

Potential impact	Maximum design scenario	Most likely design scenario	Justification
	• Up to 20 deployment and 20 retrieval vessel movements in a 12-month period (moored/gravity base only). • Up to two test deployments in a 12-month period (i.e. up to 30 deployments over the project lifetime. • Up to 104 vessel visits are associated with the operation and maintenance of these device tests in a 12-month period with up to five vessels utilised at any one time. • Therefore, the maximum design scenario equates to up to 144 vessel movements over a 12-month period. This will require the services of up to ten vessels. **East Pickard Bay (site 8)** • The level of deployment and retrieval activity is used as an indicator of the scale of related economic activity. • Up to 40 deployment and 40 retrieval vessel movements in a 12-month period (moored/gravity base only). • Up to four test deployments in a 12-month period (i.e. up to 60 deployments over the project lifetime. • Up to 150 vessel visits are associated with these device tests in a 12-month period with up to five vessels utilised at any one time. • Therefore, the maximum design scenario equates to up to 230 vessel movements over a 12-month period. This will require the services of up to ten vessels. **All sites** • The maximum design scenario equates to up to 518 vessel movements associated with installation and deployment, operation and maintenance, and decommissioning in a 12-month period (moored/gravity base only). This will require the services of up to 30 vessels.	• Up to 20 deployment and 20 retrieval vessel movements in a 12-month period (moored/gravity base only). • Up to one test deployments in a 12-month period (i.e. up to 15 deployments over the project lifetime. • Up to 52 vessel visits are associated with the operation and maintenance of these device tests in a 12-month period with up to three vessels utilised at any one time. • Therefore, the most likely number of vessel movements is up to 92 over a 12-month period. This will require the services of up to six vessels. **East Pickard Bay (site 8)** • The level of deployment and retrieval activity is used as an indicator of the scale of related economic activity. • Up to 20 deployment and 20 retrieval vessel movements in a 12-month period (moored/gravity base only). • Up to two test deployments in a 12-month period (i.e. up to 30 deployments over the project lifetime. • Up to 104 vessel visits are associated with these device tests in a 12-month period with up to three vessels utilised at any one time. • Therefore, the maximum design scenario equates to up to 144 vessel movements over a 12-month period. This will require the services of up to six vessels. **All sites** • The most likely design scenario equates to up to 328 vessel movements associated with installation and deployment, operation and maintenance, and decommissioning in a 12-month period (moored/gravity base only). This will require the services of up to 18 vessels.	
Impact on access to installation and deployment, operation and maintenance, and decommissioning related employment opportunities amongst residents.	See impact above. 518 vessel movement across all sites in a 12-month period.	See impact above. 328 vessel movement across all sites in a 12-month period.	As per Project Design Envelope.
Impact on demand for housing, accommodation and local services.	**Warrior Way (site 6)** • Maximum of four test activities in a 12-month period. Total maximum number of vessel movements over a 12-month period equals 144. **Dale Roads (site 7)** • Maximum of two test activities in a 12-month period. Total maximum number of vessel movements over a 12-month period equals 144. **East Pickard Bay (site 8)** • Maximum of six test activities in a 12-month period. Total maximum number of vessel movements over a 12-month period equals 230. **All sites** • The maximum design scenario equates to up to 12 device deployments and up to 518 vessel movements in a 12-month period across all sites.	**Warrior Way (site 6)** • Likelihood of up to two test activities in a 12-month period. Total maximum number of vessel movements over a 12-month period equals 92. **Dale Roads (site 7)** • Likelihood of up to one test activities in a 12-month period. Total maximum number of vessel movements over a 12-month period equals 92. **East Pickard Bay (site 8)** • Likelihood of up to two test activities in a 12-month period. Total maximum number of vessel movements over a 12-month period equals 144. **All sites** • The maximum design scenario equates to up to five device deployments and up to 328 vessel movements in a 12-month period across all sites.	As per Project Design Envelope.
Impact on the performance of the renewable energy sector.	As for “impact on demand for housing accommodation and local services”.	As for “impact on demand for housing accommodation and local services”.	As per Project Design Envelope.

Potential impact	Maximum design scenario	Most likely design scenario	Justification
Impact on offshore and coastal tourism and recreation activity and associated economic value.	As for “impact on demand for housing accommodation and local services”.	As for “impact on demand for housing accommodation and local services”.	As per Project Design Envelope.
Impact on local tourism and recreational resources.	As for “impact on demand for housing accommodation and local services”.	As for “impact on demand for housing accommodation and local services”.	As per Project Design Envelope.

15.8.3 Impacts scoped out of the assessment

15.8.3.1 On the basis of the baseline environment and the project description outlined in chapter 2: Project Description, no impacts are proposed to be scoped out of the assessment for socio-economics and tourism.

15.9 Impact assessment methodology

15.9.1 Overview

15.9.1.1 The socio-economic and tourism EIA has followed the methodology set out in chapter 4: Environmental Impact Assessment Methodology.

15.9.2 Impact assessment criteria

15.9.2.1 There are no formal measures of impact significance for socio-economic receptors and tourism. The assessment has therefore been informed by the professional judgment of the chapter authors.

15.9.2.2 The assessment will consider the likely significant effects associated with offshore infrastructure. For offshore infrastructure, the assessment will consider the onshore and offshore receptors.

15.9.2.3 This assessment is based on the best available information at the time of preparation.

15.9.2.4 The criteria for defining magnitude in this chapter are outlined in Table 15.10 below.

Table 15.10: 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)
	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

15.9.2.5 The criteria for determining the significance of effects is a two-stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts. This section describes the criteria applied in this chapter to assign values to the sensitivity of receptors and the magnitude of potential impacts. The terms used to define sensitivity and magnitude are based on those which are described in further detail in chapter 4: Environmental Assessment Methodology.

15.9.2.6 The criteria for defining sensitivity in this chapter are outlined in Table 15.11 below.

Table 15.11: Definition of terms relating to the sensitivity of the receptor.

Sensitivity	Definition
Very High	The receptor is identified as the highest-ranking policy priority (as a result of economic potential and/or need). There is evidence of severe socio-economic challenges, underperformance and vulnerability for the receptor in the study area.
High	The receptor is identified as a policy priority (as a result of economic potential and/or need). There is evidence of major socio-economic challenges or underperformance and vulnerability for the receptor in the study area.
Medium	The receptor is not identified as a policy priority (as a result of economic potential and/or need). There is evidence of considerable socio-economic challenges or underperformance and vulnerability for the receptor in the study area.
Low (or lower)	The receptor is not identified as a policy priority (as a result of economic potential and/or need). There is evidence that the receptor is resilient and no particular weaknesses or challenges for the receptor in the study area.
Negligible	The receptor is not identified as a policy priority (as a result of economic potential and/or need). There is evidence of good overall performance and no particular weaknesses or challenges for the receptor in the study area.

15.9.2.7 The significance of the effect upon socio-economics and tourism is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The particular method employed for this assessment is presented in Table 15.12.

15.9.2.8 Where a range of significance of effect is presented in Table 15.12, the final assessment for each effect is based upon expert judgement.

15.9.2.9 For the purposes of this assessment, any effects with a significance level of minor or less have been concluded to be not significant in terms of the EIA Regulations.

Table 15.12: Matrix used for the assessment of the significance of the effect.

Sensitivity of receptor	Magnitude of impact: No change	Negligible	Minor	Moderate	Major
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

15.10 Measures adopted as part of the META Project

15.10.1.1 There are no adopted measures associated with the META project of relevance to socio-economic and tourism receptors.

15.11 Assessment of significance

15.11.1 Installation and deployment, operation and maintenance, and decommissioning phases

15.11.1.1 As detailed in paragraph 15.8.1.1, the socio-economic and tourism impacts of all phases of the META project have been assessed as a single assessment for receptors for this topic. The environmental impacts arising from all phases of the META project are listed in Table 15.9, along with the maximum design scenario against which each impact has been assessed. A conclusion of significance of effect will be made for the META project as a whole, unless there are exceptions where effects differ depending on the specificities of individual META sites.

15.11.1.2 A description of the potential effect on socio-economics and tourism receptors caused by each identified impact is given below.

Impact on design and Research and Development employment and GVA in the renewable energy sector

Magnitude of the impact

15.11.1.3 Based on the PDE described in chapter 2: Project Description, it is assumed there is the potential for up to 12 devices to be deployed at the META project sites over the course of a 12-month period. With multiple deployments of one or more individual devices the total number of individual devices could be lower. It is anticipated there will be phased growth of activity up to a potential peak of 12 device deployments per annum.

15.11.1.4 Each device could have a separate developer i.e. up to 12 developers could look to have some level of testing presence at the META sites. This level of activity is assumed to be a maximum scenario. It is feasible that testing could include multiple deployments of a lower number of devices.

15.11.1.5 The European Marine Energy Centre (EMEC) lists 227 known wave and tidal energy concepts worldwide, linked to 212 separate developers, suggesting one device per developer is a fair assumption. The maximum scenario would therefore demand the involvement of around 6% of known wave and tidal energy developers worldwide, annually. The Marine Energy Wales members directory provides an indication of current developers that could be interested in being involved in device testing at the META project. There are around 13 developers registered on the members directory, based throughout Wales, the UK, and the rest of the world.

15.11.1.6 Established in 2003, EMEC lists nine developers as current or previous clients, with three of these developers listed as currently testing on site. This suggests that the maximum scenario is ambitious in the short term. On this basis, developer involvement in the META project is assumed to be reflected in the most likely scenario estimate of 5 devices/developers within a 2-month period.

15.11.1.7 The availability of the META project will provide a stimulus and locational attractor for the level of Design and R&D activity within the marine renewable energy sector in Pembrokeshire, the Swansea Bay City Region and Wales. The META project creates the opportunity to attract new and existing developers to locate part or all their operations within Pembrokeshire and Wales as well as supporting the growth of developers already located in the area. META will therefore support the safeguarding and creation of new employment opportunities and an increase in GVA. These effects could be substantial in comparison to the current size of the marine energy sector in Pembrokeshire and Wales. However, they will appear more muted in contrast to total levels of employment in Pembrokeshire.

15.11.1.8 There will also be further induced effects through the expenditure of earned wages from new jobs created.

15.11.1.9 Research by Amion Consulting to inform the Full Business Case for the overarching Pembroke Dock Marine project identified a wage premium of £6,000 per job. This highlights the high value nature of activity which will be supported by META. This will be of substantial benefit given the low average wages within Pembrokeshire.

15.11.1.10 The anticipated effects have clear potential to be long-term or permanent.

15.11.1.11 The effects of the META project on employment and GVA will, in part, be achieved in tandem with other elements of the Pembroke Dock Marine proposals. This is recognised in the cumulative impact assessment set out at section 15.12. Other projects include the creation of workspace and other support facilities which are likely to accommodate these jobs. It is challenging to attribute employment and GVA effects across the component elements. Typically, assessments attribute employment to workspace, and therefore to avoid double counting, no quantification of employment and GVA attributable to META is set out here.

15.11.1.12 The magnitude is considered as moderate beneficial and long term.

Sensitivity of the receptor

15.11.1.13 The design and R&D associated with devices for deployment at the META project testing sites will support additional employment and GVA along the supply chain related to design and R&D as well as feasibility studies and associated surveys.

15.11.1.14 It is plausible that elements of this activity would continue to take place without the META project. The activities of international developers are unlikely to be adversely impacted in the absence of the META project. However, the activities of local, regional, or national developers are likely to be more vulnerable to the absence of the META project. It is reasonable to expect that the majority of employment and GVA gains would not occur for developers at the Wales level and below without the META project, given the lack of consented sites available for testing and deployment.

15.11.1.15 With the primary effects within Pembrokeshire and Wales the sensitivity of the receptor is assessed to be medium.

Significance of the effect

15.11.1.16 Overall, the sensitivity of the receptor is considered to be medium and the magnitude of the impact is deemed to be moderate beneficial. The overall effect is therefore assessed to be of **moderate (beneficial) significance**. At a level of moderate significance this would be deemed significant in EIA terms.

15.11.1.17 For the reasons discussed at section 15.7.5 above there is moderate uncertainty attached to this level of significance.

Impact on installation and deployment, operation and maintenance, and decommissioning related employment and GVA

Magnitude of impact

15.11.1.18 Based on the PDE described in chapter 2: Project Description, it is assumed there will be up to 48 devices deployed across all sites over the course of a 12-month period. The 'maximum design scenario' equates to 518 vessel visits in any given 12-month period across all three testing sites. For context, the 'likely design scenario' equates to 328 vessel movements in ant given 12-month period across all three testing sites.

15.11.1.19 The META project will impact on the economic activity of certain industries. The industries most closely associated with the META project activity will be those related to engineering activities. Aside from the design element detailed above, device testing will require specialists in manufacturing, installation, maintenance, and decommissioning. Device deployment, inspection and maintenance, and retrieval will also create additional demand within the seaborne haulage sector. It is likely that developers will locate jobs relating to deployment activity in Pembrokeshire, whether office-based analysts or field engineers.

15.11.1.20 These impacts are assessed as long term and ongoing i.e. these impacts will be repeated every time a device is deployed for testing, even if the same device has been deployed previously.

15.11.1.21 The META Navigational Risk Assessment (NRA) indicates the average number of vessel movements in a year is approximately 5,004[1]. Therefore, the maximum design scenario would represent an additional 9.6% of vessel activity across all vessel types. The most likely design scenario would represent an additional 6.6% of vessel activity. Chapter 12: Shipping and Navigation assesses the impact of increased vessel movement during the installation and decommissioning phases as of minor significance.

15.11.1.22 The impact is predicted to be of local (Pembrokeshire) and regional (Wales) spatial extent, long term duration, continuous, and unknown reversibility.

15.11.1.23 The magnitude is assessed to be moderate beneficial and long-term.

Sensitivity of the receptor

15.11.1.24 The installation and deployment, operation and maintenance, and decommissioning of devices at the META project will support additional employment and GVA along the supply chain related to specialist engineering activities and seaborne haulage.

[1] Based on recorded incoming and outgoing vessel movements of 392 for one winter month and 442 for one summer month, assuming that both summer and winter months represent 6 months of the year.

15.11.1.25 It is unlikely this activity would occur in Pembrokeshire without the META project. It is reasonable to assume the META project will have an agglomerative effect on activity in the marine energy industry, given how specialised the sector is, and how limited testing sites are for the sector's technology. The extent and timing of any agglomerative effects is challenging to predict, making it difficult to quantify the extent to which supply chain activity in Pembrokeshire will be dependent on the existence of the META project. Overall, the benefits are expected to be positive and beneficial.

15.11.1.26 The value of the project to the supply chain can be measured by the strong presence of industry related firms on the MEW members directory, which are supporting the aim of making Wales 'a global leader in marine energy generation'.

15.11.1.27 The sensitivity of the receptor is considered to be low or medium with effects primarily felt at the Pembrokeshire and Wales level.

Significance of the effect

15.11.1.28 Overall, the sensitivity of the receptor is considered to be low to medium and the magnitude of the impact is deemed to be moderate beneficial. The effect will, therefore, be of **minor or moderate beneficial significance**. At a level of moderate significance this would be deemed significant in EIA terms.

15.11.1.29 For the reasons discussed at section 15.7.5 above there is a level of uncertainty attached to this level of significance. This uncertainty has been addressed through expressing the assessment of effects as a range.

Impact on access to installation and deployment, operation and maintenance, and decommissioning related employment opportunities amongst residents

Magnitude of impact

15.11.1.30 The 2011 Census indicates that 89% of all jobs in Pembrokeshire with a fixed workplace outside the home are filled by Pembrokeshire residents. The creation of new employment roles in Pembrokeshire will therefore create opportunities for Pembrokeshire residents. As set out at paragraph 15.11.1.9, these roles are anticipated to attract a wage premium.

15.11.1.31 ONS data for the sought occupations of individuals registered for Jobseekers Allowance indicates that, when searching by Standard Occupational Classification, there are a number of potential applicants for jobs lower down the occupation hierarchy (around 30 potential applicants). This would include jobs in construction and plant operations, and seafarers. Clearly the ability for any job to be filled by such applicants would be reliant on the decision-making of both the employer and potential employee but suggests there is potential for a proportion of lower skilled roles to be filled by Pembrokeshire residents. There will also be opportunities to engage with some of those currently recorded as economically inactive.

15.11.1.32 For higher order occupations, there is no data to suggest there are potential applicants from within Pembrokeshire for jobs in more technical engineering disciplines (on the basis of ONS Job Seekers Allowance data alone). This indicates the labour for such jobs would need to be supplied through:

- Attracting workers from outside Pembrokeshire, likely through relocation if for permanent roles;
- Attracting Pembrokeshire residents with sufficient skills and experience that are already employed; and/or
- Upskilling existing residents and workers to meet the needs of employers.

15.11.1.33 This could have a displacing effect on economic activity in Pembrokeshire with the potential effect of supporting structural change in the economy or creating further back filling opportunities. The nature of these effects would be dependent on the specific skill requirements for new jobs, the transferability of skills and the roles currently filled by any workers that move into the marine energy sector.

15.11.1.34 Anecdotal evidence within the industry suggests that a lack of sector-specific opportunities within Pembrokeshire has displaced potential workers in these higher order occupations to other locations outside of Pembrokeshire, and even outside Wales. One potential impact of the META project on this receptor would be to create the necessary conditions for the retention of skilled workers over coming generations. This impact is difficult to quantify.

15.11.1.35 Analysis by MEW on the marine renewables sector in Wales at present suggests it is a small sector in employment terms. Growth in the scale of activities would therefore require new entrants to the sector. The Regional Learning Partnership including Swansea University and Pembrokeshire College is working as a core partner of the Pembroke Dock Marine project to ensure a skilled workforce is established to support sector growth. This will further enhance the access to employment opportunities created by the META project.

15.11.1.36 The primary impact is predicted to be of local (Pembrokeshire) and regional (Wales) spatial extent. The duration will be long term as a result of the ongoing creation of job opportunities as the sector expands and to back fill roles as workers move on.

15.11.1.37 The magnitude is assessed to be minor or moderate beneficial and long term in terms of creating employment opportunity for existing residents.

Sensitivity of the receptor

15.11.1.38 The META project testing sites will support additional employment opportunities among Pembrokeshire residents.

15.11.1.39 These employment opportunities would not exist in Pembrokeshire without the META project.

15.11.1.40 The sensitivity of the receptor is therefore, considered to be low to medium, with the primary zone of influence being local (Pembrokeshire).

Significance of the effect

15.11.1.41 Overall, the sensitivity of the receptor is considered to be low to medium and the magnitude of the impact is deemed to be minor or moderate beneficial. The effect will, therefore, be of **minor to moderate (beneficial) significance**. At a level of moderate significance this would be deemed significant in EIA terms.

15.11.1.42 For the reasons discussed at section 15.7.5 above there is a level of uncertainty attached to this level of significance. This uncertainty has been addressed through expressing the assessment of effects as a range.

Impact on demand for housing, accommodation and local services

Magnitude of impact

15.11.1.43 The expected increase in employment opportunities is likely to stimulate in-migration of high-skill workers to fill jobs in technical engineering disciplines. The degree of in-migration will be partially dependent on the ability to attract and train local workers to fill new roles. There could also be additional workers in Pembrokeshire on a temporary basis to support the deployment, operation, maintenance and retrieval of devices from developers located outside the County. An increase in population, either temporary or permanent, in and of itself is neither positive nor negative. Its effects on each of several important topic areas are considered below.

15.11.1.44 Housing: the baseline assessment identified 12.4% unoccupied dwellings in Pembrokeshire, which is notably higher than the Wales average (5.9%). This indicates that, even when allowing for an element of these unoccupied dwellings being second homes, there is potentially a surplus of houses in Pembrokeshire. Further, population projections indicate a fall in the population of Pembrokeshire.

15.11.1.45 Temporary Accommodation: the baseline assessment identified 512,000 visitors to Pembrokeshire who stayed in paid serviced accommodation (1.03 million visitor days), and 1.6 million visitors who stayed in paid non-serviced accommodation (10.58 million visitor days). The estimated impact of the META project on the labour market, and potential for temporary workers, would account for an extremely small proportion of the overnight stays in Pembrokeshire in any given year. This could have the effect of driving demand during the off-season and a minor displacement of tourist activity in peak seasons.

15.11.1.46 Education, health and other services: additional population will increase demand for educational, health and local service provision in Pembrokeshire. There will also be additional expenditure within Pembrokeshire based businesses creating positive economic effects. When considering the magnitude of expected in-migration distributed across Pembrokeshire as a whole, the effects are assessed as negligible to minor adverse and positive impacts.

15.11.1.47 Given the projected population decrease in Pembrokeshire highlighted in the future baseline scenario, an increase in working age migration could be deemed a positive impact.

15.11.1.48 Overall, the magnitude of this impact is assessed to be minor or negligible – it is uncertain whether this will be adverse, neutral, or beneficial.

Sensitivity of the receptor

15.11.1.49 The META project testing sites will support additional employment opportunities, which is likely to support a small amount of in-migration to Pembrokeshire.

15.11.1.50 The impact is predicted to be of local (Pembrokeshire) spatial extent. The sensitivity of the receptor is therefore, considered to be low.

Significance of the effect

15.11.1.51 Overall, the sensitivity of the receptor is considered to be low and the magnitude of the impact is deemed to be minor or negligible adverse. The effect will, therefore, be of **negligible or minor significance** (possibly adverse, neutral, or beneficial), which is not significant in EIA terms.

15.11.1.52 For the reasons discussed at section 15.7.5 above there is a level of uncertainty attached to this level of significance. This uncertainty has been addressed through expressing the assessment of effects as a range.

Impact on the performance of the renewable energy sector

Magnitude of impact

15.11.1.53 As set out in the policy context section of this chapter, developing the renewable energy sector in Wales, for both energy supply and economic benefit is a key priority. The marine energy sub-sector is currently small in Wales but has substantial opportunity if the correct infrastructure is put in place to support its growth.

15.11.1.54 The META project will establish Pembrokeshire as one of a limited number of locations in the UK with consented test sites. The META project therefore presents a clear opportunity, in tandem with other elements of the Pembroke Dock Marine initiative, for Pembrokeshire to be firmly established as one of the UK's primary locations for marine energy R&D and production as the sector grows. This is further explored as part of the cumulative assessment in section 15.12.

15.11.1.55 The magnitude, considering the META project in isolation is assessed to be moderate beneficial.

Sensitivity of the receptor

15.11.1.56 The impacts on the renewable energy sector, and particularly the marine renewables sub-sector will reach across Pembrokeshire, Wales and have potential to impact at the UK and international level.

15.11.1.57 On this basis the sensitivity of the receptor is assessed to range from low to very high, with the core effects in the low to high range.

Significance of the effect

15.11.1.58 Overall, the sensitivity of the receptor is considered to be low to high and the magnitude of the impact is deemed to be moderate beneficial. The effect is therefore assessed to be of **moderate (beneficial) significance**, which is significant in EIA terms.

15.11.1.59 For the reasons discussed at section 15.7.5 above there is a level of uncertainty attached to this level of significance. This uncertainty has been addressed through expressing the assessment of effects as a range.

Impact on offshore and coastal tourism and recreation activity and associated economic value

15.11.1.60 This impact is a secondary effect resulting from the primary effects discussed in Chapter 16: Other Users. Therefore, the assessment of this impact on socio-economic and tourism receptors draws heavily on the analysis in that chapter.

Magnitude of impact

15.11.1.61 There is potential for the primary effect of changes to the wave regime on surfing conditions in East Pickard Bay (site 8). The impact of this primary effect on tourism is scoped out of the further assessment in chapter 16: Other Users based on primary effect being of minor significance, and not significant in terms of the EIA (chapter 5: Coastal Processes). Therefore, there is no need to consider any secondary socio-economic and tourism impacts resulting from this primary effect in this chapter.

15.11.1.62 The installation and deployment, operation and maintenance, and decommissioning of devices at any of the META project sites may displace recreational activities from the footprint of the development and from any areas subject to temporary advisory clearance distances, resulting in a loss of recreational resource. This may displace some activity to other locations in the Waterway, or elsewhere in Pembrokeshire. The amount of activity displaced is likely to be minimal, particularly given that, for the most part, interference with recreation activities will be limited to diverting around devices.

15.11.1.63 It is predicted that the impact will affect the receptor indirectly. The magnitude is therefore assessed to be negligible.

Sensitivity of the receptor

15.11.1.64 As per the impact assessment in chapter 16: Other Users, it is anticipated that recreational vessels will be able to transit past any of the META project sites, or else find alternative suitable locations to carry out their activity. There are a variety of locations available for recreational vessels to occupy within the Waterway such that alternatives are available if required during device installation and deployment, operation and maintenance, and decommissioning works.

15.11.1.65 The presence of the devices and associated installation and deployment, operation and maintenance, and decommissioning activities would be communicated in advance to an email list of registered interested parties as well as via official formal channels (such as notice to mariners via the PoMH) to help ensure that as many interested parties as possible are aware of META project activities and the need to avoid the area.

15.11.1.66 The sensitivity of the receptor is therefore considered to be low (or lower).

Significance of the effect

15.11.1.67 The significance of these primary effects is categorised in chapter 16: Other Users as negligible to minor adverse, which is not significant in EIA terms. Similarly, the significance of any secondary effects on socio-economic and tourism receptors can be categorised as negligible to minor adverse.

Impact on local tourism and recreational resources

15.11.1.68 This impact is a secondary effect resulting from the primary effects discussed in chapter 14: Seascape. Therefore, the assessment of this impact on socio-economic and tourism receptors draws heavily on the analysis in that chapter. This assessment considers ‘resources’ to refer to natural resources.

Magnitude of impact

15.11.1.69 There is potential for impact on the designation of Milford Haven Waterway as a Registered Landscape of Outstanding Historic Interest in Wales. Chapter 14: Seascape assesses the magnitude of this impact at Warrior Way (site 6) as Negligible during the construction phase and Minor during the operation phase. At Dale Road (site 7) the magnitude is assessed as Negligible during the construction phase and Moderate during the operation and maintenance phase. Any displacement of tourism activity as a result of this impact is anticipated to be Negligible.

15.11.1.70 There is potential for visual impact during installation and operation and maintenance phases. During the construction phase, chapter 14: Seascape assesses the magnitude of this impact as Negligible across all three sites. During the operation and maintenance phase, chapter 14: Seascape assesses the magnitude of this impact as Moderate at Warrior Way (site 6) and Dale Road (site 7), and Substantial at East Pickard Bay (site 8). Any displacement of tourism activity as a result of this impact is anticipated to be negligible.

15.11.1.71 It is predicted that the impact will affect the receptor indirectly. The magnitude is therefore assessed to be negligible.

Sensitivity of the receptor

15.11.1.72 As per the impact assessment in chapter 14: Seascape, there is existing evidence of commercial shipping, recreational boating, slipways, and moorings in parts of the Waterway, with tall refinery and power station structures also visible along the shoreline. These factors detract from the level of sensitivity of this impact.

15.11.1.73 Chapter 14: Seascape assesses the visual impact sensitivity of the Warrior Way (site 6) and Dale Road (site 7) sites as medium to high value, and the East Pickard Bay site (site 8) as very high value.

15.11.1.74 Given the secondary nature of the impact on local tourism and recreational resources, and considering that all of the sites are to some extent impacted by human activity (though East Pickard Bay (site 8) is considered relatively unspoiled), the sensitivity of the receptor is considered to be medium.

Significance of the effect

15.11.1.75 During the construction phase, chapter 14: Seascape assesses the impact on the designation of Milford Haven Waterway as a Registered Landscape of Outstanding Historic Interest in Wales as an effect of Negligible or Minor significance at Warrior Way (site 6) and Dale Road (site 7). During the operation and maintenance phase, this impact is assessed as an effect of Minor significance at both of these sites.

15.11.1.76 During the construction phase, chapter 14: Seascape assesses the visual impact at Warrior Way (site 6) and Dale Road (site 7) as an effect of Negligible or Minor significance, and an effect of Minor significance at East Pickard Bay (site 8). During the operation and maintenance phase this impact is assessed as an effect of Minor significance at Warrior Way (site 6) and Dale Road (site 7), and Substantial significance at East Pickard Bay (site 8).

15.11.1.77 The significance of any secondary effects related to these impacts on socio-economic and tourism receptors can be categorised as Negligible or Minor.

15.12 Cumulative Impact Assessment

15.12.1 Methodology

15.12.1.1 The Cumulative Impact Assessment (CIA) takes into account the impact associated with the META project together with other projects and plans. The projects and plans selected as relevant to the CIA presented within this chapter are based upon the results of a screening exercise (Table 15.13). Each project has been considered on a case by case basis for scoping in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

15.12.2 Screening of other projects and plans into the Cumulative Impact Assessment

15.12.2.1 The Cumulative Impact Assessment (CIA) takes into account the impact associated with the META project together with other projects and plans. The projects and plans selected as relevant to the CIA presented within this chapter are based upon the results of a screening exercise. Each project has been considered on a case by case basis for scoping in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

15.12.2.2 In undertaking the CIA for the META project, it is important to bear in mind that other projects and plans under consideration will have differing potential for proceeding to an operational stage and hence a differing potential to ultimately contribute to a cumulative impact alongside the META project. For example, relevant projects and plans that are already under construction are likely to contribute to cumulative impact with the META project (providing effect or spatial pathways exist), whereas projects and plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not ultimately be built due to other factors.

Table 15.13: List of other projects and plans considered within 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	Date of installation/ operation	Further Consideration in Socio-economic and Tourism chapter?	Justification
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	No	This project has negligible impact on socio-economic and tourism receptors. No CIA is therefore required.
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	No	
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. Temporal overlap	Location: South of Neyland within the central channel of the Milford Haven, 0.22 nm diameter x 5 m depth. Status: Open	Not applicable	No	
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	
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	This project has negligible impact on socio-economic and tourism receptors. No CIA is therefore 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	
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	
Research									

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	Date of installation/ operation	Further Consideration in Socio-economic and Tourism chapter?	Justification
Installation	Greenlink Interconnector Ltd. - RML1827	10.4	6	0	Spatial overlap with East Pickard Bay (site 8). Temporal overlap with East Pickard Bay (site 8).	Ground investigations	07-2018 - no end date given	Yes	Research operations are likely to have vessels present, with equipment for undertaking ground truthing surveys. Activities are likely to have spatial and temporal overlap with META project activities.
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. Temporal overlap.	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	Vessels and equipment will be required for the installation and operation of devices. Activities are likely to have temporal overlap with META project activities.
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 (site 8).	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. Activities are likely to have spatial and temporal overlap with META project activities.
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	No	Pile replacement is ongoing, but will not overlap with the META project. Furthermore, this project has negligible impact on socio-economic and tourism receptors. No CIA is therefore required.
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	No	This project is likely to have some impact on socio-economic and tourism receptors. However, given the broad scope of this project in comparison to the very focused scope of the META project, it is difficult to establish a link between the cumulative socio-economic impacts of both projects. The sector-based impacts associated with the commercial floorspace element of this project are very open-ended. It is likely the employment and GVA impacts resulting from this project will fall outside the scope applied to the assessment of socio-economic impacts in this chapter. Therefore, this project is too tenuous to include as part of a cumulative assessment of socio-economic impacts. No CIA is therefore required.

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	Date of installation/ operation	Further Consideration in Socio-economic and Tourism chapter?	Justification
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	No	This project has negligible impact on socio-economic and tourism receptors. No CIA is therefore required.
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. No CIA is therefore required.
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 (site 8). 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 (site 8), and installation and operation of temporary control station onshore. Laying of marine cable to shore and through intertidal area at East Pickard Bay (site 8) 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 (Milford Haven Port Authority 2019). 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 supports the training of military	N/A	No	There is a high level of uncertainty as to the timing of MOD activities at the MOD site, however on-going activity is likely. Any activities that might impact on tourism receptors are very unlikely to have cumulative impacts with the META project given the significantly different nature of the activities. The negligible to minor significance assessed for 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	Date of installation/ operation	Further Consideration in Socio-economic and Tourism chapter?	Justification
						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 (RPS, 2010). The Castlemartin Range is used every day of the week and on some weekends (RPS, 2010).			on tourism receptors should also be considered as evidence for the unlikelihood of cumulative impacts occurring with MOD sites. No CIA is therefore required.
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)	No	This project has negligible impact on socio-economic and tourism receptors. No CIA is therefore required.
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)	No	This project has negligible impact on socio-economic and tourism receptors. No CIA is therefore required.

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	Date of Construction	Further Consideration in Socio-economic and Tourism chapter?	Justification
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.	Oct-18	Yes	
Installation/ operation and maintenance / decommissioning	Marine Energy Wales - DEML1875	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	Given that the META project is one of the elements of the PDM project, there is significant overlap in the impact pathways of the other project elements.
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.	Pembrokeshire Demonstration zone Scoping Report submitted The Project entails the development of 90 km2 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.	Jul-18	Yes	

15.12.2.3 The potential impacts identified for assessment as part of the socio-economic and tourism cumulative effects assessment (CIA) are:

- Impact on the performance of the renewable energy sector; and
- Impact on the performance of the engineering sector.

15.12.3 Cumulative Impact Assessment

15.12.3.1 A description of the significance of cumulative impacts upon socio-economic and tourism receptors arising from each identified impact is given below.

Cumulative impact of Pembroke Dock Infrastructure, META Phase 1, and Pembrokeshire Demonstration Zone on design and R&D employment and GVA in the renewable energy sector

Magnitude of impact

15.12.3.2 PDM comprises separate but interrelated elements, as described in Table 15.13. The PDM project has been screened into the cumulative assessment of this impact. The PDM project will build on an existing energy cluster that has grown around the Pembroke Dock area. PDM will help to nurture developing technologies, most immediately acknowledging the opportunity presented by the marine energy sector and minimise risks for investors in a sector projected to be worth £76bn by 2050.

15.12.3.3 The PDM project will provide a stimulus and locational attractor for the level of design and R&D activity within the marine renewable energy sector in Pembrokeshire, the Swansea Bay City Region and Wales. The PDM project creates the opportunity to attract new and existing developers to locate part or all their operations within Pembrokeshire and Wales as well as supporting the growth of developers already located in the area. The cumulative effect of the META project, PDI, MEECE, and PDZ will be to attract more developers to locate part or all of their design and R&D operations within Pembrokeshire and Wales and provide greater levels of support for developers already located in the area.

15.12.3.4 This will lead to the creation of more new employment opportunities and greater levels of GVA growth. These effects could be substantial in comparison to the current size of the marine energy sector in Pembrokeshire and Wales, although they might appear muted in contrast to total levels of employment in Pembrokeshire.

15.12.3.5 The magnitude is considered as moderate beneficial and long term.

Sensitivity of the receptor

15.12.3.6 The design and R&D of devices associated with activities related to the PDM project will support additional employment and GVA.

15.12.3.7 It is plausible that some elements of this activity would continue to take place without the cumulative effect of the PDM project elements. The activities of international developers are unlikely to be adversely impacted in the absence of the PDM project. However, the activities of local, regional, or national developers are likely to be more vulnerable to the absence of the PDM project. It is reasonable to expect that the majority of employment and GVA gains would not occur for developers at the Wales level and below without the PDM project, given the lack of sites available for marine energy related activity. The cumulative effect here is greater than that of the META project alone.

15.12.3.8 With the primary effects within Pembrokeshire and Wales the sensitivity of the receptor is assessed to be medium.

Significance of the effect

15.12.3.9 Overall, the sensitivity of the receptor is considered to be medium and the magnitude of the impact is deemed to be moderate beneficial. The overall effect is therefore assessed to be of **moderate beneficial significance**. This is deemed significant in EIA terms.

Cumulative impact of Pembroke Dock Infrastructure, META Phase 1, Pembrokeshire Demonstration Zone, Greenlink, proposed Bombora Wave Energy project, and University College of Swansea activities on installation and deployment, operation and maintenance, and decommissioning related employment and GVA

Magnitude of impact

15.12.3.10 PDM comprises separate but interrelated elements, as described in Table 15.13. The PDM project has been screened into the cumulative assessment of this impact, along with the Greenlink Interconnector, University College of Swansea's Pembrokeshire Power Bubble Barrier and marker buoy removal, and the proposed Bombora wave energy project.

15.12.3.11 These projects will impact on the economic activity of certain industries. The industries most closely associated with the seaborne activity of these projects will be those related to engineering activities.

15.12.3.12 The PDM project will require specialists in manufacturing, installation, maintenance, and decommissioning. Device deployment, inspection and maintenance, and retrieval will also place additional demands on the seaborne haulage sector. It is likely that developers will locate jobs relating to device deployment activity in Pembrokeshire, whether office-based analysts or field engineers. The cumulative effect of the META project, PDI, and PDZ will be to attract more developers and supply chain activities to locate part or all of their installation and deployment, operation and maintenance, and decommissioning related operations within Pembrokeshire and Wales, and provide greater levels of support for developers and elements of the supply chain already located in the area.

15.12.3.13 The Greenlink Interconnector, the proposed Bombora Wave Energy project, and Pembrokshire Power Bubble Barrier and buoy removal, will provide support for elements of the engineering supply chain that overlap with META project activities. The cumulative effect of these projects will be beneficial.

15.12.3.14 The magnitude is assessed to be moderate beneficial and long term.

Sensitivity of the receptor

15.12.3.15 The engineering activities associated with the PDM project, proposed Bombora Wave Energy project, Greenlink Interconnector, and Pembrokeshire Power Bubble Barrier and marker buoy removal will support additional employment and GVA along the supply chain related to specialist engineering activities and seaborne haulage.

15.12.3.16 It is reasonable to assume the PDM project will have an agglomerative effect on activity in the marine energy industry, given how specialised the sector is, and how limited testing sites are for the sector's technology. If and when such agglomerative effects are established along the supply chain is challenging to predict. It is therefore impossible to quantify the extent to which activity in Pembrokeshire will be dependent on the existence of the PDM project. The cumulative effect here is greater than that of the META project alone. The benefits are therefore of high value.

15.12.3.17 It is not expected that the Greenlink Interconnector, proposed Bombora Wave Energy project, Pembrokeshire Power Bubble Barrier and marker buoy removal activities will have a similarly agglomerative effect. Therefore, it is unlikely that engineering activity in Pembrokeshire would come to depend on the activity supported by these projects.

15.12.3.18 The sensitivity of the receptor is considered to be medium with effects primarily felt at the Pembrokeshire and Wales level.

Significance of the effect

15.12.3.19 Overall, the sensitivity of the receptor is considered to be medium and the magnitude of the impact is deemed to be moderate beneficial. The effect will, therefore, be of **moderate (beneficial) significance**. This is deemed significant in EIA terms.

Cumulative impact of Pembroke Dock Infrastructure, META Phase 1, Pembrokeshire Demonstration Zone, Greenlink, proposed Bombora Wave Energy project, and University College of Swansea activities on access to installation and deployment, operation and maintenance, and decommissioning related employment opportunities amongst residents

Magnitude of impact

15.12.3.20 PDM comprises separate but interrelated elements, as described in Table 15.13. The PDM project has been screened into the cumulative assessment of this impact, along with the Greenlink Interconnector, proposed Bombora Wave Energy project, and University College of Swansea's Pembrokeshire Power Bubble Barrier and marker buoy removal.

15.12.3.21 ONS data for the sought occupations of individuals registered for Jobseekers Allowance indicates that, when searching by Standard Occupational Classification, there are a number of potential applicants for jobs lower down the occupation hierarchy (around 30 potential applicants). This would include jobs in construction and plant operations, and seafarers. Clearly the ability for any job to be filled by such applicants would be reliant on the decision-making of both the employer and potential employee but suggests there is potential for a proportion of lower skilled roles to be filled by Pembrokeshire residents. There will also be opportunities to engage with some of those currently recorded as economically inactive.

15.12.3.22 For higher order occupations, there is no data to suggest there are potential applicants from within Pembrokeshire for jobs in more technical engineering disciplines (on the basis of ONS Job Seekers Allowance data alone). This indicates the labour for such jobs would need to be supplied through:

- Attracting workers from outside Pembrokeshire, likely through relocation if for permanent roles;
- Attracting Pembrokeshire residents with sufficient skills and experience that are already employed; and/or
- Upskilling existing residents and workers to meet the needs of employers.

15.12.3.23 The impact of the screened-in projects on the labour market could have a displacing effect on economic activity in Pembrokeshire, with the potential effect of supporting structural change in the economy or creating further back filling opportunities. The nature of these effects would be dependent on the specific skill requirements for new jobs, the transferability of skills and the roles currently filled by any workers that move into the marine energy sector.

15.12.3.24 The primary impact is predicted to be of local (Pembrokeshire) and regional (Wales) spatial extent. The duration will be long term as a result of the ongoing creation of job opportunities as the sector expands and to back fill roles as workers move on.

15.12.3.25 The magnitude is assessed to be moderate beneficial and long term in terms of creating employment opportunity for existing residents.

Sensitivity of the receptor

15.12.3.26 The PDM, Greenlink Interconnector, proposed Bombora Wave Energy project, Pembrokeshire Power Bubble Barrier and marker buoy removal projects will support additional employment opportunities among Pembrokeshire residents. These employment opportunities would not exist in Pembrokeshire without the PDM project. The cumulative effect here is greater than that of the META project alone.

15.12.3.27 The sensitivity of the receptor is therefore, considered to be medium, with the primary zone of influence being local (Pembrokeshire).

Significance of the effect

15.12.3.28 Overall, the sensitivity of the receptor is considered to be medium and the magnitude of the impact is deemed to be moderate beneficial. The effect will, therefore, be of **moderate (beneficial) significance**. This is deemed significant in EIA terms.

Cumulative impact of Pembroke Dock Infrastructure, META Phase 1, and Pembrokeshire Demonstration Zone on the performance of the renewable energy sector

Magnitude of impact

15.12.3.29 PDM comprises separate but interrelated elements, as described in Table 15.13. The PDM project has been screened into the cumulative assessment of this impact. Developing the renewable energy sector in Wales, for both energy supply and economic benefit is a key priority. The marine energy sub-sector is currently small in Wales but has substantial opportunity if the correct infrastructure is put in place to support its growth.

15.12.3.30 The preferred option set out in the PDM Full Business Case (FBC) estimates that the whole PDM project will generate 1,881 net additional jobs, and £343.3 million of cumulative GVA.

15.12.3.31 The PDM project will establish Pembrokeshire as one of a limited number of locations in the UK with a combination of test sites, co-located workspace, and business support. The cumulative effect of co-locating these marine energy related projects in Pembrokeshire will be to encourage the agglomeration of the renewable energy sector, and the marine energy sector in particular, in Pembrokeshire. This will provide a complementary set of infrastructures and enabling support to create the conditions for the sector to grow. The PDM project therefore presents a clear opportunity for Pembrokeshire to be firmly established as one of the UK's primary locations for marine energy R&D and production as the sector grows.

15.12.3.32 The magnitude is therefore, considered to be **major (beneficial)**.

Sensitivity of the receptor

15.12.3.33 The impacts on the renewable energy sector, and particularly the marine renewables sub-sector will reach across Pembrokeshire, Wales and have potential to impact at the UK and international level. The cumulative effect here is greater than that of the META project alone.

15.12.3.34 On this basis the sensitivity of the receptor is assessed to range from low to very high, with the core effects in the low to high range.

15.12.3.35 The sensitivity of the receptor is assessed to range from **low to very high,** with the core effects in the **low to high** range**.**

Significance of the effect

15.12.3.36 Overall, the sensitivity of the receptor is considered to be low to high and the magnitude of the impact is deemed to be major beneficial. The effect is therefore assessed to be of **major (beneficial) significance**, which is significant in EIA terms.

15.12.3.37 There is a level of uncertainty attached to this level of significance. This uncertainty has been addressed through expressing the assessment of effects as a range.

15.13 Transboundary effects

15.13.1.1 A screening of transboundary impacts has been carried out and has identified that there was no potential for significant transboundary effects with regard to socio-economics and tourism from the META project upon the interests of other EEA States.

15.14 Inter-related effects

15.14.1.1 Inter-related effects are considered to be the impacts and associated effects of different aspects of the proposal 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 and deployment, operation 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. labour market pressure over the installation and deployment, operation and maintenance, and decommissioning phases); 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 socio-economic and tourism receptors 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.

15.14.1.2 Across the project lifetime, the effects on socio-economic and tourism receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase. No receptor led effects have been identified.

15.15 Conclusion and summary

15.15.1.1 This chapter has presented the existing socio-economic and tourism baseline in Pembrokeshire. This establishes the strong presence of the energy sector in Pembrokeshire, which is currently heavily reliant on oil and gas resources. The future baseline scenario presented in this chapter points towards the need for the energy sector in Pembrokeshire to diversify towards renewable sources of energy, with the META project providing an opportunity to exploit one possible avenue of diversification.

15.15.1.2 Table 15.14 summarises the assessment of effects on socio-economics and tourism associated with the installation, operation and maintenance, and decommissioning of the META project. The assessment of significance of effects has determined that the META project is likely to have a largely beneficial effect on socio-economic receptors, ranging from Minor to Moderate significance. The effect on tourism receptors is likely to be of Negligible to Minor Adverse significance.

15.15.1.3 On the basis of the socio-economic and tourism impacts assessed in this chapter, there are no additional monitoring or mitigation measures required to minimise, reduce or offset the possible effects on the receiving environment. The integrated package of measures around PDM as a whole provides the range of supporting activity to maximise the beneficial effects on the receiving environment.

Table 15.14: Summary of potential environment effects, mitigation and monitoring at the META project.

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
All phases							
Impact on design and R&D employment and GVA in the renewable energy sector.		Moderate Beneficial	Medium	Moderate Beneficial	None	Moderate Beneficial	
Impact on installation and deployment, operation and maintenance, and decommissioning related employment and GVA.		Moderate Beneficial	Low to Medium	Minor or Moderate Beneficial	None	Minor or Moderate Beneficial	
Impact on access to installation and deployment, operation and maintenance, and decommissioning related employment opportunities amongst residents.		Minor or Moderate Beneficial	Low to Medium	Minor or Moderate Beneficial	None	Minor or Moderate Beneficial	
Impact on demand for housing, accommodation and local services.		Negligible or Minor Adverse	Low	Negligible or Minor Adverse	None	Negligible or Minor Adverse	
Impact on the performance of the renewable energy sector.		Moderate Beneficial	Low to High	Moderate Beneficial	None	Moderate Beneficial	
Impact on offshore and coastal tourism and recreation activity and associated economic value.		Negligible	Low (or lower)	Negligible to Minor Adverse	None	Negligible to Minor Adverse	
Impact on local tourism and recreational resources.		Negligible	Medium	Negligible to Minor Adverse	None	Negligible to Minor Adverse	

15.16 References

Carbon Trust (2011) Accelerating Marine Energy: The potential for cost reduction – insights from the Carbon Trust Marine Energy Accelerator, Carbon Trust, July 2011.

MHPA (2012) An analysis of economic activity dependent on the Milford Haven Waterway, Cardiff University o.b.o Milford Haven Port Authority, February 2011.

PCC (2015) STEAM Final Trend Report for 2004-2015, Pembrokeshire County Council.