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Morlais Project Environmental Statement

Chapter 25: Socio-Economics, Tourism and Recreation

Volume I

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TABLE OF CONTENTS

TABLE OF TABLES	II
TABLE OF PLATES	III
TABLE OF APPENDICES (VOLUME III).....	III
GLOSSARY OF ABBREVIATIONS.....	IV
GLOSSARY OF TERMINOLOGY	IV
25. SOCIO-ECONOMICS, TOURISM AND RECREATION.....	1
25.1. INTRODUCTION.....	1
25.2. POLICY, LEGISLATION AND GUIDANCE	2
25.3. METHODOLOGY	11
25.4. EXISTING ENVIRONMENT	18
25.5. IMPACT ASSESSMENT	38
25.6. SUMMARY	75
25.7. REFERENCES.....	78



TABLE OF TABLES

Table 25-1 National and Regional Policy Requirements Relevant to Socio-economics, Tourism and Recreation.....	4
Table 25-2 Summary of EIA scoping responses related to socio-economics	8
Table 25-3 Sensitivity definitions	14
Table 25-4 Magnitude definitions.....	15
Table 25-5 Table of impact significance for adverse impacts	16
Table 25-6 Table of impact significance for beneficial impacts.....	16
Table 25-7 Population statistics across study area (2011-2017) (ONS, 2018b).....	18
Table 25-8 Demographic make-up (expressed as %) of different communities by age (Welsh Government, 2019c)	19
Table 25-9 Employment by Sector in Wales (source Welsh Government, 2018a).....	20
Table 25-10 Key Sectors of Employment in North Wales (2012)	21
Table 25-11 Employment by sector in Anglesey (October 2017 -September 2018) (NOMIS Report). 23	
Table 25-12 Tenure of new accommodation required in the Isle of Anglesey over the next 11 years - (dated from 2015)	24
Table 25-13 Volume of Overnight Domestic GB Trips (000s) (Great Britain Tourism Survey, cited in Welsh Government, 2018b)	28
Table 25-14 Volume of International Visits (000).....	28
Table 25-15 Activity Types (in order of popularity/per type) (NRW, July 2015)	30
Table 25-16 Total Project spend (International Energy Agency (IEA) 2015)).....	41
Table 25-17 Local Anglesey-based spend projections	42
Table 25-18 Summary of Residual Impacts.....	44
Table 25-19 Summary of Residual Impacts.....	46
Table 25-20 Summary of Residual Impacts.....	48
Table 25-21 Summary of Residual Impacts.....	50
Table 25-22 Summary of Residual Impacts.....	52
Table 25-23 Job distribution during construction across study area.....	55
Table 25-24 Construction phase job estimates.....	57
Table 25-25 Direct, indirect and induced job estimates	59
Table 25-26 O&M jobs breakdown by geographical area.....	60
Table 25-27 O&M jobs allocation across study area per year based on 30 % local content	60
Table 25-28 O&M jobs allocation across study area per year based on 50% local content	60
Table 25-29 O&M jobs allocation across study area per year over project lifetime	61
Table 25-30 Summary of Residual Impacts.....	62
Table 25-31 Summary of Residual Impacts.....	63
Table 25-32 Summary of Residual Impacts.....	65
Table 25-33 Summary of Residual Impacts.....	66
Table 25-34 Summary of Residual Impacts.....	68
Table 25-35 Summary of Residual Impacts.....	69
Table 25-36 Assessment of cumulative significance of issues across different phases of activity	72

Table 25-37 Cumulative effects linked to assessed projects	74
Table 25-38 Summary of Potential Impacts for Socio-Economics, Tourism and Recreation	75

TABLE OF PLATES

Plate 25-1 Places People Visit (NRW Report, July 2015) (National Survey of Wales 2016-17).....	31
Plate 25-2 National Cycle Routes North Wales (Source: Sustrans, 2019)	32
Plate 25-3 Coastal Footpaths -Anglesey	33
Plate 25-4 Dive Sites (Holy Island South).....	35
Plate 25-5 Abandoned Slate Quarry, Snowdonia	36
Plate 25-6 Distribution of Scheduled Ancient Monuments.....	38

TABLE OF APPENDICES (VOLUME III)

Appendix 25.1 Assessment Matrices	
Appendix 25.2 Public Health Imp act Assessment	

GLOSSARY OF ABBREVIATIONS

AONB	Area of Outstanding Natural Beauty
Bn	Billion (£)
CfD	Contract for Difference
DECC	Department of Energy and Climate Change
EIA	Environmental Impact Assessment
EMEC	European Marine Energy Centre
ES	Environmental Statement
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GVA	Gross Value Added
HIE	Highlands and Islands Enterprise
IoACC	Isle of Anglesey County Council
KPI	Key Performance Indicator
M	Million (£)
MCAA	Marine and Coastal Access Act
MDZ	Morlais Demonstration Zone
MEW	Marine Energy Wales
MPS	Marine Policy Statement
MW	Mega Watts
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
NVQ	National Vocational Qualification
ONS	Office of National Statistics
PRoW	Public Right of Way
PPA	Power Purchase Agreement
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WEFO	Welsh European Funding Office
WNMP	Wales National Marine Plan

GLOSSARY OF TERMINOLOGY

Average gross weekly earning	The average wage rate before any tax or other deductions are taken applied.
Average job density	The average number of people employed within an area based on population.
Brexit	The political term for Britain's plan to leave the European Union.
Employment multiplier	National employment statistic multipliers used to compare employment across different sectors.
Energy Island Programme	Funding programme developed by the European Union specially for energy projects within islands.
European Marine Energy Centre (EMEC)	Marine energy test centre, based in Orkney.

FTE - Full Time Equivalents	A measure used to estimate the amount of full time jobs a project may create.
GVA - Gross Value Added	The measure of the value of goods and services produced in an area, industry or sector of an economy.
HIE - Highlands and Islands Enterprise	Government economic agency that covers the north of Scotland and the northern and western isles.
Indirect jobs	Jobs that are created by a project that are not directly related to the individual developer such as boat crews.
Induced Jobs	Jobs that are created by the presence of a project but not directly or indirectly related to the project. Such as increased hotel staff in a hotel close to project used by people visiting.
Minesto	Tidal developer with an operational site in North Wales.
North Wales Growth Deal	The government funding package for North Wales.
NVQ qualifications	National vocational qualifications which are a work based qualification which recognises the skills and knowledge a person needs to do a job. It is a recognised standard qualification across the UK.
Occupancy rates	The amount of time a tourist accommodation is full.
Person-years	Person-years is a type of measurement which takes into account both the number of people in the project and the amount of time each person spends working on the project.
RSPB	Royal Society for the Protection of Birds.
Socio-economic	The social and economic issues that relate to the project.
UNESCO World Heritage Site	United Nations recognised site of outstanding heritage importance.

25. SOCIO-ECONOMICS, TOURISM AND RECREATION

25.1. INTRODUCTION

1. Menter Môn Morlais Limited (Menter Môn) proposes the development of 240 MW of tidal generating capacity within the Morlais Demonstration Zone (MDZ). The development of the Morlais Project (the Project) will support the development of renewable energy technology objectives of the Anglesey and Gwynedd Joint Local Development Plan (JLDP), providing a consented tidal technology demonstration zone which supports installation, testing and commercial demonstrations of tidal energy devices. The Project will also provide opportunities for the local communities via direct employment and support of the local supply chain.
2. The Project will include permanent communal infrastructure for tidal technology developers which provides a shared route to a local grid connection via nine export cable tails, an onshore landfall substation, and an onshore electrical cable route to a grid connection via a grid connection substation (see **Chapter 4, Project Description**).
3. Menter Môn is a social enterprise which works across North Wales to deliver a range of regeneration, environmental and cultural projects for the benefit of local communities. By working in partnership with government, the third sector, business and individuals, Menter Môn attracts funding from different sources to add value and to contribute to creating a sustainable future. This Project aims to establish Anglesey as a marine energy hub, whilst maximising opportunities for local communities directly through employment and indirectly through the establishment of a local supply chain where possible.
4. This chapter focuses specifically on assessing the impacts of the Project (both beneficial and adverse) on local, regional and national socio-economic conditions, including employment, tourism, recreation, interaction with other sectors e.g. the fishing and shipping industries, as well as energy related issues. Where possible and appropriate, quantitative estimation and analysis has been undertaken to describe and analyse potential outcomes in key topic areas. In other areas it is only possible to offer qualitative description and analysis based on the experience of the chapter authors, which is itself based on over 15 years' experience of the tidal energy sector.
5. Within the overall assessment a number of references are made to experience of tidal energy development to date in the Orkney Islands. Orkney is an island community that has been host to a test and demonstration facility since 2003, the European Marine Energy Centre (EMEC). It therefore offers considerable opportunity for comparison with the proposed Project. The Orkney experience is particularly relevant to Anglesey due the island nature of the two communities. The assessment is further informed by data from other similar projects located in the Anglesey/North Wales regions.
6. This chapter should, where applicable, be considered in conjunction with the following chapters contained within this ES:
 - **Chapter 2, Policy and Legislation**; overview of relevant policy and legislation for the Project;
 - **Chapter 4, Project Description**: describes the key aspects of the Project including location, infrastructure and the methods likely to be adopted for the construction, operation, maintenance and final decommissioning phases of the Project;

- **Chapter 13, Offshore Archaeology and Cultural Heritage:** assesses the impacts of the Project on marine archaeology;
 - **Chapter 14, Commercial Fisheries:** assesses the impacts of the Project on commercial fisheries;
 - **Chapter 15, Shipping and Navigation:** assesses the effects of the Project on shipping and navigation.
 - **Chapter 23, Traffic and Transport:** assesses the effects of the Project on traffic and transport; and
 - **Chapter 24, Seascape, Landscape and Visual Impact Assessment:** assesses the effects of the Project on landscapes and seascapes.
7. This chapter should also be read with reference to the Morlais Welsh Language Impact Assessment which is a standalone (non ES) document.
8. All baseline characterisation and impact assessment work carried out as part of this chapter is based on best practice and best available data. The approach is not intended to be wholly prescriptive, with professional judgement and experience being applied where appropriate. It is acknowledged that some data gaps and uncertainties still exist. Where possible necessary measures have been taken to minimise these data gaps and uncertainties, to ensure that they do not compromise the robustness of the impact assessment.
9. This Chapter has been prepared for the Project by Aquatera Ltd on behalf of Menter Môn.

25.2. POLICY, LEGISLATION AND GUIDANCE

10. This section outlines the policy, legislation and guidance materials of particular relevance to the Project. A detailed overview of the all key policy and legislation related to the Project, can be found in **Chapter 2, Policy and Legislation**.

25.2.1. Policy Statements

25.2.1.1. Marine Policy Statement

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

25.2.1.2. Wales National Marine Plan

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

14. Objective 10 of the draft WNMP, “to maintain and enhance the resilience of marine ecosystems and the benefits they provide in order to meet the needs of present and future generations”, is of relevance to this chapter. It covers policies and commitments on the wider ecosystem, as set out in the MPS including those relating to the Marine Strategy Framework Directive and the Water Framework Directive, and other environmental, social and economic considerations.

25.2.1.3. National Policy Statements

15. Although this Project is not seeking a Development Consent Order (DCO), its size (up to 240 MW) means it is of equivalent scale and magnitude as a Nationally Significant Infrastructure Project (NSIP). Guidance that is relevant to assessing potential socio-economic impacts for NSIPs are set out within National Policy Statements (NPS) which are the principal decision-making documents for NSIPs.
16. The assessment of potential impacts within this chapter has, therefore, been undertaken with specific reference to the relevant National Policy Statements (NPS). Those NPS relevant to the Project are:
- Overarching NPS for Energy (EN-1) (Department of Energy and Climate Change (DECC) 2011a); and
 - NPS for Renewable Energy Infrastructure (EN-3), (DECC) 2011b).
17. Specific relevant sections of these NPS that detail the focus of impact assessment work on socio-economic impacts and which have been used to inform this assessment are summarised below:
- NPS EN-1 (Para 5.12.3): The assessment should consider the creation of jobs and training opportunities;
 - NPS EN-1 (Para 5.12.3): The assessment should consider the provision of additional local services and improvements to local infrastructure, including the provision of educational and visitor facilities;
 - NPS EN-1 (Para 5.12.3): The assessment should consider effects on tourism;
 - NPS EN-1 (Para 5.12.3): The assessment should consider the impact of a changing influx of workers during the various construction, operations and maintenance (O&M) and decommissioning phases, of the energy infrastructure;
 - NPS EN-1 (Para 5.12.3): The assessment should consider cumulative effects;
 - NPS EN-1 (Para 5.12.6 to 5.12.7): PINS (Licensing Body) conclude that little weight is to be given to assertions of socio-economic effects that are not supported by appropriate evidence (particularly in view of the need for energy infrastructure as set out in this NPS); and
 - NPS EN-1 (Para 5.12.8): The assessment should consider any relevant beneficial provisions the applicant has made or is proposing to make to mitigate impacts (for example through planning obligations) and any legacy benefits that may arise as well as any options for phasing development, in relation to socio-economic impacts.

25.2.1.4. Other Relevant Policy

18. From a policy perspective, the primary documents used to inform this Chapter are as follows:
- North Wales Growth Deal 2017;
 - Sustainable Tourism – A Framework for Wales 2007;
 - Destination Anglesey Management Plan 2016 – 2020;
 - Isle of Anglesey - Single Integrated Plan 2013 – 2025;
 - Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026;
 - Anglesey Food Tourism Strategy and Action Plan 2011;
 - Rights of Way Improvement Plan 2008 – 2018;
 - Energy Wales: A Low Carbon Transition Delivery Plan 2014;
 - The Welsh Government Strategy for Tourism 2013 – 2020;
 - Partnership for Growth 2013;
 - The Welsh Government Rural Communities - Rural Development Programme 2015;
 - Welsh Language (Wales) Measure 2011; and
 - Cymraeg 2050: Welsh Language Strategy.
19. This Project forms a vital part of the Destination Anglesey Management Plan 2016-2020 – Strategic Objective 6 (Isle of Anglesey Council, 2016b). It also dovetails with the Energy Wales’s ambition to transition steadily to decarbonise its energy supply, whilst reaping the potentially significant social and economic benefits from doing so.
20. **Table 25-1** sets out a summary of the relevant national and regional policies for Socio-economics, Tourism and Recreation.

Table 25-1 National and Regional Policy Requirements Relevant to Socio-economics, Tourism and Recreation

Policy Description	Reference	ES Reference
MPS		
Properly planned developments in the marine area can provide environmental and social benefits as well as drive economic development, provide opportunities for investment and generate export and tax revenues. The marine planning system will help to promote these benefits in contributing to the achievement of sustainable development. There will therefore be a presumption in favour of sustainable development in the marine planning system.	2.5.2	The impact assessment concludes that the majority of effects arising from the Project will have a beneficial impact on socio-economics, tourism and recreation Appendix 25.1 (Volume III)
Marine based activities can provide opportunities for employment in long established industries such as fishing, marine transport, port related storage and processing, oil and gas production and new and developing industries such as the renewable energy sector and associated offshore electricity transmission. This employment provides wide and long term benefits for both national and local economies.	2.5.3	Opportunities for local services arising from the Project are discussed in Section 25.5.14

Policy Description	Reference	ES Reference
<p>The marine environment provides national economic and social benefits including for heritage assets, seascape and cultural services of coastal and marine activities, as well as directly contributing to the quality of life and well-being of coastal communities. Marine planning will also therefore make an important contribution towards ensuring vibrant and sustainable coastal communities - helping to build strong local economies - improving quality of life, access to, and enjoyment of, their marine areas.</p>	2.5.4	<p>The impact assessment concludes that the majority of effects arising from the Project will have either insignificant effects such as for tourism and recreation (See Section 25.5.5.1) or beneficial impact such as on socio-economics, (See Section 25.5.5; Section 25.5.6 and Section 25.5.17 and Table 25-35)</p>
<p>Renewable energy offers the potential for significant broad-scale environmental benefits through mitigating greenhouse gas emissions from energy production. In addition there are a number of potentially significant socio-economic benefits from the sector including employment opportunities, export business and energy security. As yet, the potential for benefits such as introduction of artificial reef structures, which can yield biodiversity benefits and fishing opportunities around wind farm sites, have not been fully explored. These should be considered further in the context of marine planning, and for individual developments.</p>	3.3.23	<p>As above and in addition see Section 25.5.10 regards job creation benefits and Section 25.5.16 regards the benefits for decarbonisation</p>
Draft WNMP		
<p>Designated landscapes: Proposals that demonstrate that they are compatible with the purposes and special qualities for which National Parks or Areas of Outstanding Natural Beauty have been designated are encouraged.</p>	SOC_06:	<p>Potential impacts to Anglesey AONB are assessed in Chapter 24, SLVIA</p>
<p>Seascapes Proposals should demonstrate how potential impacts on seascapes have been taken into consideration at an early stage and should, in order of preference: a) avoid adverse impacts on seascapes; and/or b) minimise impacts where they cannot be avoided; and/or c) mitigate impacts where they cannot be minimised. If significant adverse impacts cannot be adequately addressed, proposals should present a clear and convincing justification for proceeding. Opportunities to enhance seascapes are encouraged.</p>	SOC_07	<p>Potential impacts on seascapes are assessed in Chapter 24, SLVIA</p>
<p>Cumulative effects Proposals should demonstrate that they have assessed potential cumulative effects and, in order of preference: a) avoid adverse effects; and/or b) minimise effects where they cannot be avoided; and/or c) mitigate effects where they cannot be minimised. If significant adverse effects cannot be adequately addressed, proposals should present a clear and convincing justification for proceeding. Proposals that contribute to positive cumulative effects are encouraged.</p>	GOV_01	<p>Cumulative effects are assessed in Section 25.5.17 and in Chapter 26: Cumulative and In-combination.</p>

Policy Description	Reference	ES Reference
Planning Policy Wales		
The planning system should identify proactive and preventative measures to reduce health inequalities. This will include enabling opportunities for outdoor activity and recreation, reducing exposure of populations to air and noise pollution, promoting active travel options and seeking environmental and physical improvements, particularly in the built environment.	3.20	Impacts to noise and vibration are assessed in Chapter 21 , impacts to air quality are assessed in Chapter 22
If required, language impact assessments may be carried out in respect of large developments not allocated in a development plan which are proposed in areas of particular sensitivity or importance for the language. Any such areas should be defined clearly in the development plan.	3.29	Potential impacts to the Welsh Language are assessed in the Morlais Welsh Language Impact Assessment
Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur. In circumstances where impacts are unacceptable, for example where adequate mitigation is unlikely to be sufficient to safeguard local amenity in terms of air quality and the acoustic environment it will be appropriate to refuse permission.	6.7.14	The impact assessment concludes that the effects arising from the Project regards amenity, health and the environment will be insignificant (Section 25.5 and Appendix 25-1, Volume III)
Anglesey and Gwynedd Joint Local Development Plan (JLDP)		
1. All impacts on landscape character, heritage assets and natural resources have been adequately mitigated, ensuring that the special qualities of all locally, nationally and internationally important landscape, biodiversity and heritage designations, including, where appropriate, their settings are conserved or enhanced; 3. That the proposal is mitigated to ensure that there aren't any significant unacceptable effects on sensitive uses located nearby;	Policy ADN 3: Other Renewable Energy and Low Carbon Technologies	The impact assessment concludes that the Project will have insignificant effects on these factors (Section 25.5 and Appendix 25-1, Volume III)
Whilst seeking to protect and enhance the natural and built environment, the Councils will facilitate economic growth in accordance with the spatial strategy of the Plan	Strategic Policy PS 13: Providing Opportunity for a Flourishing Economy	The impact assessment concludes that there will be positive economic benefit (See Section 25.5.6 and Section 25.5.17)
The Councils will promote and support the use of the Welsh language in the Plan area.	Strategic Policy PS1: Welsh Language and Culture	Potential impacts to the Welsh Language are assessed in the Morlais Welsh Language Impact Assessment
Whilst ensuring compatibility with the local economy and communities and ensuring the protection of the natural, built and historic environment the Councils will support the development of a year-round local tourism industry	Strategic Policy PS 14: The Visitor Economy	The Project will not have an adverse effect on tourism (Section 25.5 and Appendix 25-1, Volume III)

Policy Description	Reference	ES Reference
The Councils will manage development so as to conserve and where appropriate enhance the Plan area's distinctive natural environment, countryside and coastline, and proposals that have a significant adverse effect on them will be refused unless the need for and benefits of the development in that location clearly outweighs the value of the site or area and national policy protection for that site and area in question.	Strategic Policy PS 19: Conserving and Where Appropriate Enhancing the Natural Environment	Impacts to the natural environment are assessed in Chapters 9, 10, 11, 12, 18, 19 and 24 of this ES.
Proposals within or affecting the setting and/ or significant views into and out of the AONB must, where appropriate, have regard to the relevant Area of Outstanding Natural Beauty Management Plan.	Policy AMG1: Area of Outstanding Natural Beauty (AONB) Management Plans	Potential impacts to Anglesey AONB are assessed in Chapter 24, SLVIA
Wellbeing of Future Generations (Wales) Act 2015		
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).	A resilient Wales	See Section 25.5 and Appendix 25.1, Volume III for the impact assessment results

25.2.2. Relevant Legislation

25.2.2.1. EIA Directive

21. The 2014/52/EU Environmental Impact Assessment (EIA) Directive requires consideration of socio-economic effects within the EIA process. The key regulations and guidance that apply to onshore electrical substations and associated infrastructure projects in Wales are listed below:

- Planning (Wales) Act (2015);
- The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations (2017);
- Marine and Coastal Access Act (2009); and
- The Isle of Anglesey Supplementary Planning Guidance (2018).

25.2.2.2. Well-being of Future Generations (Wales) Act

22. The Well-being of Future Generations (Wales) Act 2015 is intended to improve the social, economic, environmental and cultural well-being of Wales. The Wellbeing of Future Generations (Wales) Act 2015 places a statutory duty on public bodies in relation to sustainable development, based on seven well-being goals. Amongst these goals is “a prosperous Wales”, which aims to develop an “innovative, productive and low carbon society which recognises the limits of the global environment and, therefore, uses resources efficiently and proportionately (including acting on climate change); and 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”.

23. An impact assessment for public health is provided in **Appendix 25.2 (Volume III)**.

25.2.3. Consultation

24. A request for scoping opinion for the Project was issued to the Welsh Government Planning Inspectorate (PINS) under different consenting regimes in 2015 and 2017, with a final scoping opinion requested in April 2018 from Natural Resources Wales (NRW) and the Welsh Government PINS.
25. Via these consultation exercises, queries were raised around the potential risk to navigation, the impact to commercial fisheries, the visual impact on the sea and landscape, as well as the potential impact to sites of archaeological importance and/or cultural heritage value. These potential impacts are assessed in stand-alone topic-specific chapters (**Chapter 14, Commercial Fisheries; Chapter 15, Shipping and Navigation; Chapter 20, Onshore Archaeology and Cultural Heritage; and Chapter 24, Seascape, Landscape and Visual Assessment**). However, the socio-economic, tourism and recreation aspects of these concerns have been assessed within this chapter and are displayed in **Table 25-2**.
26. All scoping comments pertaining to this chapter have been presented in **Table 25-2**. These comments have been addressed fully in this chapter, with the location of the relevant information highlighted in the response column, for ease of location.

Table 25-2 Summary of EIA scoping responses related to socio-economics

Consultee	Comment/Discussion	Response/ where addressed in ES
Planning Inspectorate, 2018	Public rights of way The ES should identify any public rights of way which would be temporarily or permanently affected by the Proposed Works. Any necessary diversions or closures should be identified, and the resultant effects assessed.	Results of initial assessment provided in Appendix 25.1 (Volume III) , impact screening concluded detailed assessment not required. Also see Section 24.4.8.3 .
Planning Inspectorate, 2018	Employment The Scoping Report states that increased personnel and temporary construction workers may put pressure on tourist accommodation and result in a 'more buoyant' rental market. This potential impact has also been identified within the Socio-economics Section of the Scoping Report. The ES should clearly state how construction and operational workers are anticipated to be accommodated and how this may impact tourism. The ES should state how any mitigation and/ or enhancement measures are to be secured.	Assessed in Appendix 25.1 (Volume III) summarised in Section 25.4.4 & 25.5.10 . Assessment considers temporal and spatial distribution of likely job opportunities.
Planning Inspectorate, 2018	New draw for tourists The Scoping Report states that the Proposed Works may create a new draw for tourists. The ES should clarify if this is due to the existence of the Proposed Works and if other features are proposed as part of the Project, such as tourist education. The ES should explain any assumptions and limitations made in undertaking this assessment.	Assessed in Appendix 25.1 (Volume III) , summarised in Section 25.4.4 & 25.5.5 . Green branding opportunities for the locality are considered.
Planning Inspectorate, 2018	Visual effect for tourists The Scoping Report states that the Proposed Works may impact tourist visual amenity onshore and offshore when tourists are arriving from sea. The Applicant is	Briefly assessed within Appendix 25.1 (Volume III) but covered in

Consultee	Comment/Discussion	Response/ where addressed in ES
	advised to include this assessment within the Seascape and Landscape Chapter of the ES, identifying tourists as a receptor of seascape and landscape visual effects, providing clear cross-reference to the Tourism and Recreation aspect of the ES.	greater detail in Chapter 24, SLVIA .
Planning Inspectorate, 2018	Recreational Angling The ES should assess any likely significant effects associated with the potential impacts to recreational angling and changes to target species.	Assessed in Appendix 25.1 (Volume III) . Impact screening concluded detailed assessment not required.
Planning Inspectorate, 2018	Cross-referencing The Applicant should consider how to avoid duplication and potential conflict within the ES, specifically between the Socio-economic and Tourism and Recreation aspect Chapters of the ES. Clear cross-referencing should be utilised.	Tourism and recreation, and socioeconomics are both referenced within this chapter. The two topics have been combined to avoid duplication.
Planning Inspectorate, 2018	Landfall works The ES should identify whether any beach closures are necessary for the landfall works and if so, the areas and duration for which access would be restricted.	See Chapter 4, Project Description . Covered in Section 24.4.7.3 .
Planning Inspectorate, 2018	Tourism, housing, worker migration The impacts from increased worker numbers during construction and operation to other industries, such as tourism has also been identified within Section 9.9 Tourism and Recreation of the Scoping Report.	Further baseline information provided in Section 25.4.4 and impacts assessed in Appendix 25.1 (Volume III) .
Planning Inspectorate, 2018	Improvements to infrastructure and facilities and local transport services The Scoping Report identifies a potential beneficial impact from external investment to local infrastructure, including the transport network, Holyhead Harbour and public services. If such investment is not guaranteed and does not form part of the Proposed Works, this should not be taken into account within the ES.	Assessed in Appendix 25.1 (Volume III) . Summarised in Section 25.5.11 . Assessment considers local supply chain and services benefits.
Planning Inspectorate, 2018	Well-being of Future Generations (Wales) Act 2015 The Applicant's intention to support the Wellbeing of Future Generations (Wales) Act 2015 in its objectives to improve the social, economic, environmental and cultural well-being of Wales is welcomed.	Assessed in Appendix 25.1 (Volume III) , summarised in Section 25.5.6 . Assessment considers project against well-being goals. An impact assessment on public health is provided in Appendix 25.2 (Volume III) . The project wide approach in support of the Wellbeing of Future Generations (Wales) Act 2015 is presented in Chapter 2, Policy and Legislation .
Planning Inspectorate, 2018	Qualitative assessment The Scoping Report states that the Socio-economic aspect Chapter will present a qualitative assessment of potential impacts. The ES should provide clarification regarding the methodology of the assessment, given	Methodology is detailed in Section 25.3 . Job estimates assessed in Section 25.5.10 .

Consultee	Comment/Discussion	Response/ where addressed in ES
	that the Scoping Report later states economic impacts e.g. number of jobs will be calculated within an economic impact assessment. Where appropriate, a qualitative assessment is expected, of potential socio-economic impacts.	
Planning Inspectorate, 2018	Guidance The Applicant should take care to ensure that the methodology applied is sufficient to identify and assess the likely significant effects from the Proposed Works.	Methodology is detailed in Section 25.3 .
Planning Inspectorate, 2018	Local business survey The Scoping Report states that survey(s) and discussions will be undertaken with local businesses to gather data and ascertain the capabilities of the local supply chain. The ES should clearly set out the methodology for survey(s) and discussions, such as providing the questions posed in the survey(s) and ensure leading questions are avoided.	A local business survey has not been undertaken as existing information sufficient for EIA. Future targeted surveys may be undertaken as part of the wider Project development.
NRW (for PINS), 2018	Recreational angling - including charter boat trips - are addressed within this section. However, we recommend that consideration should be given to changes in target species, not just the potential to restrict or impair the access to the area.	Assessed in Appendix 25.1 (Volume III) . Impact screening concluded detailed assessment not required. Further detail on commercial (including recreational) fisheries is presented in Chapter 14, Commercial Fisheries .
IoACC, 2018	A detailed Economic Impact Assessment should be provided.	Detailed throughout this Chapter.
IoACC, 2018	Tourism should be a stand-alone item within the ES.	Tourism is addressed in Section 25.4.7 and Appendix 25.1 (Volume III) .
IoACC, 2018	Consideration should be given to Welsh language impacts.	Potential impacts to the Welsh Language are assessed in the Morlais Welsh Language Impact Assessment.
IoACC, 2017	A detailed Economic Impact Assessment should form part of the EIA. Further information is required regarding jobs (numbers, type, quality, breakdown of skills etc.).	Detailed throughout this Chapter. Assessment regarding jobs detailed in Section 25.5 .
IoACC, 2017	Full reference should be made to the geology of the Island, given UNESCO status. Soldier's Point is part of a site for a large multi-use development and the tourism and other impacts of a cable route here should be fully referenced. Pressures on temporary accommodation to house workers should be included.	Assessed in Appendix 25.1 (Volume III) . Note that project refinement has led to selection of cable landfall at Abraham's Bosom not Soldier's Point. This is covered in Chapter 3, Site Selection and Alternatives .
IoACC, 2017	Statistics quoted in the EIA should be the most up-to-date available; e.g. tourism figures presented date back to 2011 whereas more recent 2015 figures are available.	Sources of information detailed in Section 25.4.7 .

Consultee	Comment/Discussion	Response/ where addressed in ES
IoACC, 2017	Consideration should be given to Welsh language Impacts e.g. during the construction phase, utilising nationally-based workers.	Potential impacts to the Welsh Language are assessed in the Morlais Welsh Language Impact Assessment.
IoACC, 2017	As previously stated in our earlier screening opinion, a detailed Economic Impact Assessment should form part of the EIA. Further information is required regarding jobs (numbers, type, quality, breakdown of skills etc.). Tourism should be a stand-alone item within the ES. Pressures of temporary accommodation to house workers should be included. Statistics quoted in the EIA should be the most up to date available.	Addressed in Appendix 25.1 (Volume III) , detailed throughout this Chapter. Full Assessment regarding jobs detailed in Section 25.5 .
NRW, 2017	Recreational angling including charter boat trips are addressed within this section, however, consideration should be given to changes in target species not just the potential to restrict or impair the access to the area.	Assessed in Appendix 25.1 (Volume III) . Impact screening concluded detailed assessment not required. Further detail on commercial (including recreational) fisheries is presented in Chapter 14, Commercial Fisheries .
NRW, 2017	A detailed Economic Impact Assessment should form part of the EIA. Further information is required regarding jobs (numbers, type, quality, breakdown of skills etc.). Pressures of temporary accommodation to house workers should be included. Statistics quoted in the EIA should be the most up to date available.	Detailed throughout this Chapter. Full Assessment regarding jobs detailed in Section 25.5 .
NRW, 2017	Consideration should be given to Welsh language Impacts e.g. during the construction phase utilising nationally-based workers.	Potential impacts to the Welsh Language are assessed in the Morlais Welsh Language Impact Assessment.

25.3. METHODOLOGY

25.3.1. Introduction

27. This section outlines the methodology used to assess the potential socio-economic impacts of the Project. The study area is defined and data sources identified, along with residual data gaps and uncertainties. The approach to describe and assess the sensitivity of the various socio-economic receptors is presented, as well as approaches to assigning levels of magnitude to the various beneficial and adverse impacts.

25.3.2. Study Area

28. This Chapter has considered the potential social and economic impacts of the Project on a local (Anglesey), regional (North Wales – Gwynedd, Anglesey, Conwy, Denbighshire and Wrexham) and national level (Wales). The use of a local, regional and national study area aligns with the definitions in the Isle of Anglesey Topic Papers (2015). These categorisations also reflect the strong locational funding packages that support the Project.

29. In some instances, it has not been necessary to evaluate the impact on a receptor at all these spatial scales since the impact pathway is clearly linked to only one of these study area extents or is clearly so negligible that it cannot reasonably or meaningfully be assessed at larger spatial extents, i.e. National.

25.3.3. Data Sources – Desk Study

30. Given that tidal energy development at the scale proposed by the Project is relatively new and that the underpinning economic basis for the sector is continually under review, there are no references that can be used to provide a definitive prediction of possible socio-economic outcomes for the Project. This differs significantly from, for example, a similar socio-economic assessment of a commercial-scale offshore wind farm where there is now a 20-year track record of costs and benefits.
31. To address this evidence gap, direct anecdotal information from other existing areas of tidal energy development activity have been used, i.e. Orkney.
32. Publicly available data and supporting studies that has been used to inform the assessment include:
- Project-specific consultation responses from local stakeholders;
 - Economic overview of the Isle of Anglesey – A data analysis of the Island 2013;
 - The Economic Impact of the Development of Marine Energy in Wales. Report for Welsh Government. July 2013. Regeneris Consulting Ltd and Cardiff University (2013);
 - Heritage Impact Assessment Wales (Cadw, 2017);
 - Wales Tourism Business Barometer Wave 4, Autumn 2018;
 - Wylfa Newydd Supplementary Planning Guidance (Wylfa Newydd SPG – 2014);
 - Anglesey and Gwynedd Joint Local Development Plan (JLDP) – July 2017 – Including topic papers:
 - Topic Paper 1: Natural Environment – Anglesey County Council;
 - Topic Paper 2: Historic Environment;
 - Topic Paper 3 Population and Housing;
 - Topic Paper 4: Describing Housing and Spatial Growth;
 - Topic Paper 5: Transport;
 - Topic Paper 6 Urban Capacity Study;
 - Topic Paper 7: Retail;
 - Topic Paper 8: Infrastructure;
 - Topic Paper 9: Tourism;
 - Topic Paper 10: Welsh Language and Culture;
 - Topic Paper 14: Open Space Assessment;
 - Topic Paper 17: Local Market Housing;

- North Wales Growth Deal, 2018; and
- Older People and Place in Wales; Demography, Policy and Community, 2013.

25.3.4. Data Gaps and Uncertainties

33. There are three main areas of uncertainty regarding the potential socio-economic impacts of this Project.
- The exact programme/phasing of development that may take place;
 - The economic/revenue framework within which tidal energy and wider energy developments may take place; and
 - The wider socio-economic context within which the Project could develop. Specifically, the uncertain or un-specified linkages between some socio-economic cause and effect pathways.
34. The first two bullets above relate to the exact nature of development of the MDZ and the economic/revenue framework that would be needed to support it, which are closely related. The tidal and wider marine energy sectors are currently lobbying the UK government to establish a suitable fiscal framework. The outcome of this lobbying process and subsequent fiscal support mechanism will have a major influence upon the type, scale and pace of development that will ultimately be taken forward within the MDZ.
35. To enable this assessment of potential socio-economic impacts to be undertaken, a phased development scenario has been developed for the purposes of this chapter. Four sequential, indicative, interim phases up to the full 240 MW capacity have been mentioned throughout the chapter, however note that if alternative development scenarios emerge post this assessment, particularly if they were slower or at a lesser scale, then significant changes to the socio-economic outcomes predicted in the following sections could arise with a reduction in the predicted beneficial as well as the adverse outcomes outlined. The first of these phases has been determined by the outcomes of assessments outlined in **Chapter 12, Marine Mammals**.
36. This dynamic relationship between the scale and pace of marine energy development and economic and employment effects were illustrated in a study commissioned by Welsh Government to examine the potential economic benefits of wave and tidal energy development in Wales (Regeneris Consulting, 2013). This study considered three illustrative development scenarios of 60MW, 300MW and 1GW. The GVA and person-years of employment for these three scenarios were estimated to be £72m and 2,020 persons years; £303m and 8,510 person-years; and £840m and 23,760 person-years, respectively.
37. The third bullet point in paragraph 33 relates to the uncertain political, economic and energy strategy context for the Project. Issues such as Brexit, decarbonisation imperatives and nuclear energy development strategies could also have a major influence upon the Project that are very difficult to predict.
38. Finally, there is inherent uncertainty associated with predicting socio-economic outcomes and about attributing observed changes to specific stimuli. It is clear that the socio-economic metrics of Anglesey, North Wales and Wales as a whole are dynamic and influenced by many different and interacting factors. Demonstrating a straightforward cause and effect, even where it is clear that such a relationship exists may, therefore, be difficult because of the many other interacting factors in play. Any of the predicted outcomes set out within this chapter may, therefore, be

significantly altered by external factors unrelated to the eventual development scenario that the Project follows.

25.3.5. Impact Assessment Methodology

39. The overarching methodologies used for the EIA are outlined in **Chapter 5, EIA Methodology**. This section sets out the assigned definitions that are used in the assessment process, for both beneficial and adverse socio-economic impacts.
40. The approach to making balanced assessments for the Project has been guided by technical specialists, using available data, experience and expert judgement.
41. The socio-economic assessment initially involved a review of baseline conditions within the study area. This was then compared against the potential impacts (beneficial or adverse) from the Project.
42. This impact assessment considers the potential for impacts during the construction, operations and maintenance (including re-powering) and decommissioning phases of the Project.
43. Impacts have been classified as follows:
 - Direct impacts: these may arise from impacts associated with the construction, operations and maintenance, or decommissioning of the Project;
 - Indirect impacts: these may be experienced by a receptor that is removed (e.g. in space or time) from the direct impact (e.g. noise impacts upon fish which are a prey resource for fish or mammals); and
 - Cumulative impacts: these may occur as a result of the Project, in conjunction with other existing, or planned projects within the study area, for each receptor.
44. The methodology that has been followed is based upon a clear and concise set of definitions for sensitivity of receptor and magnitude of effect, which have then been combined to give an assessment of potential significance.

25.3.5.1. Receptor Sensitivity

45. Sensitivity in the context of socio-economic issues has been taken to comprise the capacity of the receptor in question to deal with change, with specific reference to issues such as adaptability, experience/exposure to change and levels of other existing changes. The qualities addressed in terms of adverse effects include robustness, acceptability, tolerability and threat levels, as well as adaptability, capability and vulnerability.
46. The sensitivity qualities addressed in terms of beneficial effects include: robustness, strength of benefit afforded, any imperative needs, as well as current status regards resilience, favourable positions and any latent threats (see **Table 25-3** below).

Table 25-3 Sensitivity definitions

Sensitivity	Definition
Adverse	
High	Receptor under some threat, vulnerable to change
Medium	Receptor in tolerable, but not favourable state, capable of coping with change

Low	Receptor in an acceptable and less favourable state, but with some resilience and adaptability
Negligible	Receptor in a robust, sub-favourable state which will be little changed, inherent resilience
Beneficial	
High	Receptor with an imperative need for benefit, ready to embrace beneficial change
Medium	Receptor in a tolerable, favourable state, capacity to embrace beneficial influence, limited inertia
Low	Receptor in an acceptably favourable state, some adaptability, some inertia to improvement
Negligible	Receptor in a robust favourable state which, where change may be difficult to measure, inherent inertia

47. The full evaluation of sensitivity for each receptor/issue is presented in **Appendix 25.1 (Volume III)**.

25.3.5.2. Magnitude of Effect

48. The magnitude of effect factors considered, related to the scale of change (effect) that might take place. This was defined in terms of the geographical scale and the intensity of change (effect) as outlined in **Table 25-4**. Definitions are provided for both adverse and beneficial effects.

Table 25-4 Magnitude definitions

Magnitude	Definition
Adverse	
High	Change across wider area, affecting multiple sectors of the economy, multiple communities influenced, possible long-term barriers or problems being created
Medium	Change across a region or sub-region, affecting one/few key sectors or one/few key communities, medium term disruption and disturbance
Low	Change across a locality, affecting sub sectors and sub communities, shorter-term effects associated with nuisance and inconvenience
Negligible	Change at a specific place, affecting individual business or individuals, effects which are known and noticed, but not manifestly detrimental
Beneficial	
High	Change across a wider area, affecting multiple sectors of the economy, multiple communities influenced, possible long-term material opportunities and solutions available
Medium	Change across a region or sub-region, affecting one/few key sectors or one/few key communities, medium term direct and indirect benefits
Low	Change across a locality, affecting sub sectors and sub communities, shorter-term effects associated with enablement and support
Negligible	Change at a specific place, affecting individual business or individuals, effects which are known and noticed, but not manifestly beneficial

25.3.5.3. Significance

49. In terms of assigning levels of significance, a standard EIA matrix, comprising (receptor sensitivity x magnitude of effect) was used, with compatible classifications of adverse and beneficial impacts, as shown in **Table 25-5** and **Table 25-6**.
50. Levels of significance classified as moderate or above were considered to be significant and merit further detailed analysis. Classifications of minor and below were considered to be non-significant and were not considered further within the formal EIA process, but have been included in **Appendix 25-1 (Volume III)** for reference.

Table 25-5 Table of impact significance for adverse impacts

	Magnitude			
Sensitivity	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

Table 25-6 Table of impact significance for beneficial impacts

	Magnitude			
Sensitivity	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

25.3.5.4. Mitigation and/or Optimisation

25.3.5.4.1. Embedded Mitigation

51. The current preferred Project Design Envelope (PDE) has been designed to avoid impacts as far as reasonably possible on selected receptors, including seascape and landscape and marine navigation/shipping, via the development of embedded mitigation measures. These have been developed via consultation with selected stakeholders.
52. The Project will avoid the deployment of surface emergent tidal devices in the north of the MDZ which is closer to the coastline and within 1 km of the coastline to reduce seascape impacts. Furthermore, the Landfall Substation has been designed within a recessive location in the landscape, in a relatively low-lying position which using the landform to help integrate the buildings. The Project has also committed to the use of underground cabling to provide the connections between all Project elements, avoiding the need for overhead cables.
53. A full list of the embedded mitigation measures is outlined in **Chapter 4, Project Description**.

25.3.5.4.2. Additional Mitigation/Optimisation Measures

54. Where significant adverse impacts have been identified as a result of the Project, additional mitigation measures are proposed to seek to reduce residual impacts to acceptable (non-significant) levels. Where beneficial impacts have been identified, measures defined as “optimisation measures” are also provided. These are aimed at further enhancing any potential beneficial impacts.
55. These additional measures relevant to socio-economics, recreation and tourism are outlined within each impact assessment, as required.

25.3.5.4.3. Implementation and Monitoring of Proposed Mitigation/Optimisation Measures

56. Menter Môn are committed to the optimisation measures set out in this Chapter. The proposed optimisation measures have been developed in order to localise expenditure and to encourage the local supply chain to invest in opportunities that maximise their ability to take up contracting opportunities.
57. With respect to how Menter Môn actually intend to secure these measures, in particular the optimisation measures, a series of actions are proposed which are intended to form the basis of future discussions with relevant stakeholders, post consent application.
58. These will include, but may not be limited to the following:

- Inclusion of proposed measures within a formal Section 106 agreement(s) between Menter Môn and relevant consenting bodies;
- Development of local/regional/national supply chain action plans that set out the proposed measures and actions that Menter Môn would aim to deliver to ensure full engagement with the supply chain;
- Development of a mitigation/optimisation measure monitoring framework specific to socio-economic elements. This will enable the progress and implementation of all proposed measures to be formally monitored, potentially against an agreed set of Key Performance Indicators (KPIs); and
- Regular meetings with Isle of Anglesey County Council (IoACC) in the period between consent application and potential consent award to further develop the potential mechanisms outlined above, and, where relevant, develop additional ones.

25.3.5.5. Worst Case Scenario

59. In line with the underlying approach within this EIA of ensuring that worst-case impacts are assessed, there is also a more optimistic case presented to highlight the potential if some of the manufacturing activity can be attracted to Wales. This has been justified by the level of turbine manufacturing that has already been undertaken within Wales and the strength of the supply chain around this type of activity within Wales.
60. This socio-economic assessment chapter presents a range of potential values. The “worst case” scenario is used as the basis of any impact significance conclusions.

25.3.5.6. Cumulative effects

61. Details of the approach for assessing the cumulative effects of the Project with other onshore and offshore projects are provided in **Section 25.5.17**.

25.4. Existing Environment

62. The existing socio-economic environment was assessed wherever appropriate at local, regional and national level. Baseline statements have been created for the following:

- Population and Demographics;
- Employment and GVA;
- Skills, Training and Education;
- Housing and Accommodation;
- Commercial Fisheries;
- Shipping and Navigation;
- Tourism;
- Recreation; and
- Cultural Heritage.

25.4.1. Population and Demographics

63. The population numbers and the structure (demographics) of that population provide important insights into (a) the status of communities overall; (b) the possible availability of labour and; (c) present trends associated with age group migration for education and jobs in or out of the regions under consideration. Recent population trends in Anglesey, North Wales and Wales taken from the Office of National Statistics (ONS) are presented in **Table 25-7**.

Table 25-7 Population statistics across study area (2011-2017) (ONS, 2018b)

Year	2011	2012	2013	2014	2015	2016	2017	% increase/decrease
Anglesey	69,913	70,037	70,073	70,141	69,936	69,665	69,794	-0.1%
North Wales	688,417	689,924	691,180	693,067	693,360	694,826	696,284	1%
Wales	3,074,067	3,082,412	3,092,036	3,099,086	3,113,150	3,125,165	3,125,200	1%

25.4.1.1. Population

64. The population across all three study area scales (Anglesey, North Wales, Wales) has remained relatively constant over the period 2011-2017. Anglesey has experienced a very minor decrease in overall population over the period, in contrast to the regional and national figures which exhibit a 1 % rise over the same period.

25.4.1.2. Demographics

65. Further consideration is provided here with respect to the structure (demographics) of the populations in these three areas, with particular consideration of the numbers of young people staying on the local area of Anglesey and the percentage of working age residents (**Table 25-**

8). These are considered useful metrics with regards to the availability of a suitable workforce and the likely age profile of that workforce.

Table 25-8 Demographic make-up (expressed as %) of different communities by age (Welsh Government, 2019c)

Age group	Wales	Gwynedd	Conwy	Denbigh	Flint	Wrexham	Anglesey
0—14	16.9	15.8	15.2	17	17.3	18.3	16.2
15-29	18.9	21.2	14.7	16.2	16.8	16.9	15.1
30-44	17.2	14.9	14.6	15.1	17.5	18.5	15.4
45-64	26.5	25.5	28.3	27.8	27.6	26.8	27.8
64-75	11.4	12.3	14.1	13.5	12	11	14.3
>75	9.2	10.3	13	10.3	8.8	8.5	11.2

25.4.1.3. National

66. On average, the age of the UK's population is increasing, and Wales mirrors this trend. This trend is more pronounced in rural areas than towns and cities and particularly in geographically peripheral areas. It is predicted that by 2036, only four local authorities in Wales will have populations with an age demographic containing less than 25 % of over 65s (Welsh Government, 2019c). Wales typically has a lower proportion of work age residents in comparison to the rest of the UK, usually being between 1.1 and 1.5 % lower depending on the comparator UK region.

25.4.1.4. Regional

67. Similar figures are seen across North Wales where comparable age group demographics are recorded. Wrexham, however, is an outlier, with approximately 63.14 % of residents being of working age (16-64). This is above both the Welsh national average of 61.5 % and the UK average of 62.9 %. All other local authorities in North Wales had lower working age populations than both the Welsh national average and the UK average in 2017.

25.4.1.5. Local

68. In 2017, the Isle of Anglesey had approximately 40,000 inhabitants of a working age (16-64), which accounted for 57.3 % of the Islands population. This figure is below the Welsh national average of 61.5 % and the UK average of 62.9 %. The percentage of working age residents in Anglesey has declined steadily since 2007.

25.4.2. Employment and GVA

25.4.2.1. National

69. The economy of Wales is estimated to have a gross value of £62 billion (ONS, 2018a). In 2016, all nations and regions of the UK had a lower GVA per head than the UK average except London and the South East of England. Welsh GVA per head as a percentage of the UK average has

been the lowest of all of the UK nations and regions since 2001¹ (72.7 % of UK National average in 2016).

70. Across Wales, the unemployment rate amongst working age residents is estimated at 27.4 %, 2.5 % higher than the UK average (Welsh Government, 2019c). Between 2001 and 2016 the growth of Welsh employment grew slightly less than that of the UK as a whole and Wales was hit harder during the 2008-2010 recession, when Wales saw greater falls relative to the UK; falling 4 % over that two-year period, compared with 1 % for the UK. A Welsh Government study of employment across different sectors in Wales found that since 2010, Wales has seen seven of its key sectors grow over the 15 years from 2001 – 2015 (Welsh Government, 2018a) (see **Table 25-9**).
71. Between 2001 and 2016 the biggest percentage sectoral growth was in the real estate sector, where employment in Wales increased by 92%, representing an additional 4,000 jobs. The greatest growth in job numbers over the same period was within the human health and social services sector, where jobs grew by 38,000 (23 %). Also of note, is the growth of the agriculture, forestry and fishing sector, which grew as an employer by 24 % between 2001 and 2016, despite a fall of 5 % for the UK as a whole (Welsh Government, 2018a).

Table 25-9 Employment by Sector in Wales (source Welsh Government, 2018a)

Area and industry	Jobs (000s)			Change in job numbers		Percentage change in job numbers	
	2001	2015	2016	2001 to 2016	2015 to 2016	2001 to 2016	2015 to 2016
Agriculture, Forestry & Fishing	33	41	41	8	-	+24%	-
Mining & Quarrying	3	2	2	-1	1	-33%	+50%
Manufacturing	193	147	142	-51	-5	-26%	-3%
Electricity, Gas, Steam & Air Conditioning	5	10	8	3	-2	+60%	-20
Water supply; Sewage, Waste Management & Remediation activities	8	13	10	2	-2	+25%	-23%
Construction	85	93	103	18	11	+21%	+11%
Wholesale & retail trade; Repair of Motor Vehicles & Motorcycles	210	207	199	-11	-8	-5%	-4%
Transportation & Storage	49	51	41	-7	-9	-16%	-19%
Accommodation & Food Service activities	84	100	117	33	17	+40%	+17%
Information and Communication	25	24	35	10	11	+40%	+45%
Financial and Insurance activities	26	31	31	5	-	+19%	0%
Real Estate activities	12	19	23	11	4	+92%	+21%
Professional, Scientific & Technical activities	43	78	70	27	-8	+62%	-10%
Administration & Support service activities	64	88	90	27	2	+40%	+2%
Public Administration & Defence Compulsory Social Security	74	86	83	9	-2	+12%	-3%

¹ <https://seneddresearch.blog/2018/01/04/gross-value-added-in-wales-the-headlines-and-beyond/>

Area and industry	Jobs (000s)			Change in job numbers		Percentage change in job numbers		
	Year	2001	2015	2016	2001 to 2016	2015 to 2016	2001 to 2016	2015 to 2016
Education		114	132	131	16	16	+15%	-1%
Human Health & Social work activities		167	205	205	38	-	+23%	0%
Arts, Entertainment & Recreation		30	44	41	12	-3	+37%	-7%
Other Industries		29	33	31	3	-1	+7%	-6%
All Industries		1,253	1,403	1,404	152	1	+12%	0%

72. Despite growth in some sectors, average job density (defined by the number of jobs in an area, divided by the area's population) within Wales is 0.76, which is lower than the British average of 0.86 (Welsh Government, 2018c). This indicates lower wage levels within Wales than the rest of the UK.

25.4.2.2. Regional

73. The economy of North Wales is worth approximately £12.8 bn per annum (North Wales Economic Ambition Board, 2016) and represents 22 % of the economy of Wales. North Wales represents over 30 % of the manufacturing output of Wales (Mersey Dee Alliance, 2012).

74. The Welsh Government Sector Report, (Welsh Government, 2018a) also presents the economic value of the economy running along the M56/A55 corridor from Manchester Airport to Anglesey, which generates an output of £31 bn; £6 bn more than the M4 corridor from the Vale of Glamorgan to Bristol which represents £25 bn.

75. 75.3 % of the working aged population in North Wales was in Full or Part Time employment in September 2018 (Welsh Government, 2019a). This figure is higher than that of the national average of Wales (72.6 %) and aligns with the British average of 75.1 %.

76. The GVA per head in key sectors of employment, as assessed by Welsh Government in 2012 is outlined in **Table 25-10**.

Table 25-10 Key Sectors of Employment in North Wales (2012)

Employment	Anglesey	Gwynedd	Conwy	Denbighshire	Wrexham	Flintshire	Total	LQ
Major Manufacturing sectors								
Manufacture of Air, Spacecraft and related machinery							6,200	7.4
Manufacture of Chemicals and Chemical products						1,700	2,700	2.65
Manufacture of Food Products	800	700	100	300	1,900	2,800	6,700	2.10
Manufacture of Computer, Electronic, and Optical Products (ICT)		100		600	600	300	1,700	1.41
Manufacture of Electrical Equipment	100			500	400	200	1,100	1.39
Other significant Manufacturing Sectors								
Manufacture of Paper and Paper Products		100			400	1,400	1,900	3.99

Employment	Anglesey	Gwynedd	Conwy	Denbighshire	Wrexham	Flintshire	Total	LQ
Manufacture of Motor Vehicles, Trailers and Semi-trailers	100	200		300	500	700	1,800	1.42
Manufacture of Wood and of products of Wood and Cork					900	300	1,400	1.84
Manufacture of basic Pharmaceutical products and Pharmaceutical preparations					500		600	1.43
Other disciplines								
Civil Engineering	300	400	400	500	200	300	2,100	1.10
Specialised Construction activities	600	900	1,000	900	1,400	2,400	7,100	1.18
Electricity, Gas, Steam, and Air Conditioning supply	400	200	200		600	300	1,800	1.76

77. The total GVA in North Wales in 2017 was £24.5 bn. This was an increase of 4.4 % from previously recorded values and was 1.3 % higher than that of Wales as a whole, in terms of total GVA. The GVA per head in North Wales in 2017 was £20,800, 1.7 % higher than that of Wales as a whole, equating to an additional £947 per head. Despite this, the average gross weekly earning of a worker in North Wales was £10.20 less than the Welsh average (based on data from Stats Wales).

25.4.2.3. Local

78. While all of the Welsh areas have GVA per head below the UK average, there is variation in economic performance across Wales. The Isle of Anglesey (and Gwent Valleys) have the lowest levels of GVA per head of any regions across the UK, with GVA per head at 51.8 % of the UK average in 2016 for Anglesey². However, it should be noted that commuting affects GVA figures for smaller areas, with areas such as Anglesey having more people commuting out than commuting in this means that their populations will contribute to the GVA of other areas.

79. Despite more growth in some sectors such as forestry and fisheries in Wales compared to the rest of the UK, job density in Anglesey in 2017 was 0.64 which is below the Wales and UK averages, indicating that Anglesey has lower average wage levels across the area. This point is further highlighted by Gross weekly pay for Anglesey, which is also lower than the Welsh average by approximately £250 per month.

80. The top seven employers by sector in Anglesey and the numbers they employ, taken from official labour market statistics provided by the Office of National Statistics³ are shown in **Table 25-11**.

² <https://seneddresearch.blog/2018/01/04/gross-value-added-in-wales-the-headlines-and-beyond/>

³ <https://www.nomisweb.co.uk/>

Table 25-11 Employment by sector in Anglesey (October 2017 -September 2018) (NOMIS Report)

Sector	Estimated number of jobs
Accommodation and Food Services Activities	3,000
Wholesale and Retail Trade	3,000
Human Health and Social Work Activities	2,500
Education	1,500
Public Administration and Defence	1,000
Construction	1,000
Administration and Support Service Activities	1,000

81. Despite the lower than national average job density (based on population), Anglesey has lower rates of unemployment than both Wales and Great Britain, with 74.9 % of working age adults in employment in October 2017 (0.5% lower than the Wales figure). The size and nature of business activities on Anglesey is broadly representative of the National average, with 89.8 % of enterprises being classed as ‘micro’, compared with the national average of 89.1 %.

82. With respect to educational qualifications, individuals with formal academic (Higher Education) qualifications are 1.2 % lower than the Wales average of 8.7 %. In 2018, earnings (by place of residence) figures for Anglesey, showed that on average, an employee in Anglesey will earn approximately £78 per week less than the average British citizen (NOMIS). In addition to the lack of growth in the population of Anglesey, the percentage of the population that is of working age is some 4.2 % lower than the UK national average.

25.4.3. Skills Training and Education

25.4.3.1. National

83. Nationally, Wales has lower levels of formal educational attainment than the UK in relation to skills, training and education, with only 35.1 % of people holding an NVQ Level 4 qualification or above, as opposed to the UK average of 38.6 %. When compared to the UK as a whole, Wales also has a higher percentage of individuals with no qualifications at all.

25.4.3.2. Regional

84. North Wales performs consistently well regarding the percentage of the population with formal educational qualifications. With the exception of Flintshire, which displays higher rates of residents with no formal qualifications than the rest of North Wales, only 11.8% of the North Wales population have no educational qualifications. North Wales also has a higher percentage of population with NVQ qualifications, compared with the rest of Wales.

25.4.3.3. Local

85. Anglesey has a higher percentage of individuals with an NVQ 4 or higher qualification than is recorded both nationally and in the UK. This percentage has been rising steadily since records began in 2004. In 2011, a wellbeing study conducted in Anglesey (Gwynedd and Môn Public Services Board, 2017) found that 57 % of pupils in Anglesey achieved five A* to C rates in their GCSEs; 1 % lower than the national average. The study also showed that 26 % of the Island’s population have a degree or equivalent qualification, which is 1.5 % higher than the UK national average (NOMIS). Of note, Anglesey also has a high percentage of residents who hold an NVQ

Level 4 qualification or above. This makes it an outlier in North Wales and makes it one of the most highly educated local authorities in Wales.

25.4.4. Housing and Accommodation

86. The housing and accommodation baseline has been established at a local level only. It is not predicted that there will be potential for any direct impacts on regional or national-scale housing and accommodation, as a result of the construction or operation of the Project – see Appendix 25.2. This is due to the current and predicted good levels of availability of housing in Anglesey. The size of the local housing market, as highlighted in Table 25-12 as well as the details that tourism occupancy in Wales is on average 67% (Paragraph 120) back up the assertion that there will be a minimal impact on accommodation. This is further backed up by the phasing described in **Chapter 4, Project Description** suggesting a relatively long build-out process which spreads demand over a longer timescale allowing any capacity adaptations that are needed to take place.

25.4.4.1. Local

87. The Anglesey County Council 2016 Construction Worker Accommodation Base and Assumptions study (IOACC, 2016a) provides useful insights into the type, availability and occupancy rates on Anglesey. These have been used to assess the potential impact of the Project’s migratory workforce on privately owned, rented and temporary holiday accommodation on Anglesey. The two main drivers of the housing market are the resident population and the local labour market. The purchase of second homes on Anglesey is also increasingly exerting an influence on the housing market.

88. Analysis conducted by Edge Analytics (Edge, 2014) predicts that between 2015 and 2026, the household population in Anglesey will increase by 2,420, which equates to 220 separate, new households. These predictions, however, suggest that the number of households is set to grow faster than the population. Within the Isle of Anglesey County Council, Construction Worker Accommodation Base 2016 the tenure status of property on Anglesey is shown in **Table 25-12**.

Table 25-12 Tenure of new accommodation required in the Isle of Anglesey over the next 11 years - (dated from 2015)

Tenure	Current Tenure Profile 2015	Tenure Profile 2026	Change required	% of change required
Market	26,636	28,342	1,706	70.5
Shared ownership/help to buy	60	128	68	2.8
Intermediate rent	18	427	409	16.9
Social rented	4,451	4,688	237	9.8
Total	31,165	33,585	2,420	100

89. The Local Housing Assessment model was based on predictions that included the continued development of the Wylfa Newydd Nuclear Power Station (currently on hold), which estimated a peak workforce of 9,200 employees. It was assessed that 25 % of the workforce would already be living in the area, 670 workers were likely to purchase accommodation in the area and that 6,230 employees would require temporary accommodation.

90. The workforce estimate for the development and operation of the Project is a fraction of that estimated for the Wylfa Newydd Nuclear Power Station. From a strategic perspective, it should be considered alongside any other smaller developments on Anglesey, as a contributing factor to a more significant, cumulative impact.
91. Continuing trends of increasing house prices (21.7 % between 2011-2015), above that of the national average (10 % between 2011-2015) and greater demand for temporary lets and tourist accommodation, are likely to continue if construction restarts at the Wylfa Newydd Nuclear Power Station.

25.4.5. Commercial Fisheries

92. Commercial fisheries are addressed in detail in **Chapter 14, Commercial Fisheries**. The description below highlights the economic importance of fisheries across the study area, including commercial charter angling vessels, from SeaFish (2019).

25.4.5.1. National/Regional

93. At a national level, the Welsh commercial fishing sector comprises a range of traditional fisheries, plus a number of innovative shellfish aquaculture operations. Over 460 vessels are licensed within Wales, employing 850 Full-Time and Part-Time fishermen. Wales' seafood industry is significant to the local economy and vital for the long-term sustainability of many coastal communities.
94. Approximately 75 % of the Welsh fleet is made up of small fishing vessels <8m, some no larger than dinghies. At the other end of the scale, some of the largest vessels (>15m) operate from the Ports of Milford Haven, Holyhead, and Porth Penrhyn. The most common type of vessels in Welsh waters are vessels <10 m that typically fish in inshore waters, with the most frequent vessel length being between 5 and 6 m. Vessels >10 m fish both within and outside the 12 nm boundary of Welsh waters.
95. Static gear (pot) fishing is the dominant method of fishing in Wales. Crab, lobster, whelk and prawn are high value key target species. Netting is also a key gear type used in Welsh waters, with fish including skate, ray, bass, herring caught in gill, trammel, drift and tangle nets.
96. Scallop fisheries using mobile dredge gear is another key high value fishery off the Welsh coast, with particularly important areas to the south of the MDZ in Cardigan Bay and vessels also targeting this species off the North Wales coast.
97. There are a very small number of trawlers operating from Wales. These trawlers predominantly target mixed, demersal fisheries, landing a range of species such as monkfish (anglerfish), megrim, sole and plaice.
98. Commercial fishing is widely distributed throughout the entire Irish Sea region. The waters around Wales provide an important variety of fishing areas and species for commercial activity. Welsh waters are targeted by both large (>10 m) offshore vessels and smaller (<10 m) inshore vessels, as well as hand gatherers and commercial net fishermen for diadromous (migratory) species, including salmon and sea trout. Fishing ports in this region include Holyhead, Amlwch, and Beaumaris on Anglesey, Pwllheli, Caernarfon and Morfa Nefyn in Gwynedd, and Conwy in Conwy County. A variety of species are landed.

25.4.5.2. Local

99. The closest main fishing port to the MDZ is Holyhead Port, which is one of the most important traditional commercial fisheries hubs in Wales and is one of a network of ports around the North West Wales coastline.
100. A list of vessels likely to fish in or near the area was also compiled as part of the baseline assessment by the Fisheries Liaison Officer (FLO) for the Project – see **Chapter 14, Commercial Fisheries**. This identified a total of 44 vessels that may fish in or near the MDZ area. The most common port of origin was Holyhead, followed by Morfa Nefyn and Caernarfon. There was one vessel from each of Amlwch, Porth Colmon, Pwllheli and Trefor. The majority of vessels (42 of 44) were ≤ 10 m in length. Of the two vessels >10 m, one originated from Holyhead, and one originated from Pwllheli.
101. In addition to commercial fishing vessels, there are at least 12 registered charter angling vessels that operate in the local area, from ports including Holyhead (i.e. *My Way 2; Bad Boyz IV; Spindrift New Dawn*); Beaumaris (*Maverick; Lander 2; Starida II; Sarah Jane Too*); Amlwch (*Fairway Aqua Star; Kerrykim; Empress & Julieann*) and Cemaes (*Stingray*). All these vessels contribute to the local economy both via direct charter fees but also local accommodation and catering inputs from visiting anglers.
102. A report commissioned by Menter Môn and completed by Aquatera and MarineSpace (Aquatera and MarineSpace, 2015) investigated opportunities for fishermen to diversify into marine renewables. The conclusions of this study highlighted there could be significant opportunities for vessel operators to diversify and provide a range of services across development, construction and operation of marine renewable projects
103. The report suggested that these contracts could be as much as £4 M over 10 years with up to £400,000 in development, approximately £2.5 M in construction phase and up to £350,000 / year during the operational phase.
104. The types of operations that would suit the diversification opportunities for the Anglesey fleet are physical and environmental surveys, deployment of monitoring equipment including Remotely Operated Vehicles and buoys, guard vessel duties and crew transfer services.

25.4.6. Shipping and Navigation

105. Shipping and navigation is addressed in detail in **Chapter 15, Shipping and Navigation**. However, for ease of cross-reference, it has also been addressed in brief in this chapter, in recognition of the potential knock-on social and economic impacts that may be associated with the Project.

25.4.6.1. Regional (Irish Sea)

106. The most notable routes where vessel traffic density is highest were the Holyhead and Liverpool to Dublin routes, the Heysham and Liverpool to the Isle of Man and Belfast routes, and Loch Ryan routes to Belfast and Larne routes (MMO, 2014).

25.4.6.2. Local (Anglesey)

107. Holyhead is the largest commercial Port on Anglesey. Annually, the Port handles approximately 2.7 million passengers, 400,000 cars, 170,000 freight units and 270,000 tonnes of bulk freight. It has a maximum depth of 13.5 m and can accommodate vessels up to 190 m in length, with a

deadweight tonnage of no more than 5,680 (Marine Energy Wales, 2019b). Commercial ferry Ro-Ro services run between Holyhead and Dublin year-round, with the two main commercial operators being Irish Ferries and Stena Line (UK Ports), The Holyhead-Dublin shipping channel intersects a small part of the northern section of the MDZ array. Ferry services can run up to five times a day in peak season.

25.4.7. Tourism

25.4.7.1. National

108. A study conducted by Deloitte and Oxford Economics (2013) estimated the total contribution of tourism to the Welsh economy, as being in the region of £8.7 billion per annum. Tourism is one of Wales' largest employers and since 2005 the Tourism Sector has outperformed other priority sectors (such as: Advanced Materials and Manufacturing, Construction, Creative Industries, Energy and Environment, Finance and Professional Services, Food and Drink, Information Technology and Telecommunications and Life Sciences).
109. In Wales in 2015, over half of 16-24-year olds working in priority sectors, were employed in tourism.
110. The latest tourism statistical release from the Welsh Government (dated 7th March 2019), shows that between the period of January 2018 and September 2018, 784,000 foreign visitors came to Wales. This is on additional to the 8.1 million overnight trips taken by UK residents and the 75 million day trips to Wales during the same period (Welsh Government, 2019a).
111. A Statistics for Wales report (Welsh Government, 2018b) records room occupancy rates of 67 % for hotels in Wales with occupancy rates falling to 48 % in January, peaking at 79 % in July and August. Guesthouses and B & B's have January room occupancy rates of 19 %, peaking at 57 % in August. Statistics for Coastal Touring and Camping Parks are only available for the months May through to October; such sites have an average occupancy rate of 40 % through this period with coastal sites seeing higher occupancy year on year as opposed to inland sites. As is to be expected, occupancy rates peak in the summer months. In 2017, Bunkhouse and Hostel occupancy levels peaked at 73 % in August; however, during the winter months (November through March) occupancy levels were approximately 40 %.

25.4.7.2. Regional

112. A Welsh Government study (Tourism Profile – North Wales 2014-2016), (Welsh Government, 2018c) established that between 2014 and 2016, 37 % of all overnight domestic UK trips to Wales and 28 % of both international and tourist day trips to Wales were to North Wales.

Table 25-13 Volume of Overnight Domestic GB Trips (000s) (Great Britain Tourism Survey, cited in Welsh Government, 2018b)

	Trips (000s)		
	2013-2015	2014-2016	% change
GB	120,524	119,374	-1
Wales	10,127	9,919	-2
North Wales	3,713	3,626	-2
Mid Wales	1,763	1,750	-1
South East Wales	2,473	2,471	0
South West Wales	2,081	2,014	-3

Table 25-14 Volume of International Visits (000)

	Visits (000s)		
	2013-2015	2014-2016	% change
GB	34,397	36,037	+5
Wales	924	992	+7
North Wales	253	274	+8
Mid Wales	87	98	+14
South East Wales	467	497	+6
South West Wales	191	205	+7

113. In 2014-2016, the most popular destination for overnight domestic GB trips to North Wales was the seaside (51 %), this compared favourably to a low percentage of only 6 % wishing to visit a city or town. The highest proportion of visitors (22 %) were visiting friends and family, closely followed by those choosing the region for a day out (17 %), to go out for a meal (13 %), or outdoor activities (11 %) (Welsh Government, 2018c).

25.4.7.3. Local

114. Anglesey is highly dependent on the tourism and recreation sectors and attracts 1.71 million visitors per annum, contributing £304 M per annum to the local economy. The latest Isle of Anglesey County Council Tourism Topic Report (Isle of Anglesey County Council, November 2018) showed that the Tourism Sector employs approximately 20 % of the island's population. Tourism forms the bedrock of the island's economy and the industry has been and continues to be, supported by initiatives and funding programs to promote the island's cultural, recreational and environmental assets.

115. The growth in the Tourism Sector in Anglesey, far outstrips that of the rest of Wales with a 63.7 % increase in revenue between 2006 and 2017, representing growth of 7 % (4 % higher than the national average). Although Anglesey predominately attracts tourists from the North West of England, Holyhead has also become a destination of choice for cruise ship operators. 2018 saw 43 cruise ships visit with approximately 32,700 passengers potentially disembarking. With an average spend of between £80 and £100 per head, passengers contribute significantly to the Island's economy (Isle of Anglesey County Council, November 2018).

116. Tourists are attracted to Anglesey for many reasons. A 2003 Survey carried out by Anglesey and Gwynedd Councils as part of the Local Joint Development Plan stated that 41 % of visitors were attracted to the region by the scenery and landscape, 19 % by the beaches and coastlines and 18 % by access to outdoor activities. Other factors included tranquillity, walking, castles and abbeys. Unequivocally, the area's landscape and natural beauty play a significant role in the number of visitors Anglesey receives, as does its rich and diverse cultural heritage. Whilst the cable landfall will be onto one of Anglesey's beaches, at Abrahams Bosom, this is not a busy or popular amenity beach, so effects on tourism are likely to be negligible – see **Appendix 25.2 (Volume III)**.
117. The landscape and visual impacts of the Project are assessed separately within **Chapter 24, Seascape, Landscape and Visual Impact Assessment**. This has taken into account embedded mitigation introduced during the project design process to minimise visual impacts of the Project from the coastline. Eight indicative subzones within the MDZ are shown in **Figure 4-1 (Volume II)**, however, these indicative zones may be modified to meet the requirements of tenants and regulators. Within indicative subzones 1– 3 and northern parts of indicative subzones 4 and 8 (which overlay the yellow and purple shaded areas), no visually prominent devices would be deployed. This mitigation will further reduce any possible negative effects on tourism and recreation arising as a result of the visibility of the Project from the Wales Coastal Path and South Stack RSPB Reserve.
118. Typical holiday accommodation is, in the main, geographically separate from residential accommodation, as a result of broader local and national planning policies. Types of holiday accommodation in Anglesey can be placed into the following categories; Hotels, guest houses and Bed and Breakfasts (B&B), self-catering accommodation, camping and caravanning, glamping (glamorous, high end camping, commonly in purpose built camping pods, yurts or tepees), hostels and bunkhouses. In addition, the purchase of second homes for personal use is increasing on the island.
119. The north west of Holy Island has a range of visitor accommodation including self-catering, bed and breakfast and caravanning and camping accommodation. This includes South Stack Coastal Retreats (a range of self-catering cottages), Ty Mawr Farm Camping and Caravan Club site caravan site and Blackthorn Farm Caravan site. These could all be subject to temporary disruption during construction of onshore infrastructure, including road closures, diversions and highways works, particularly along the South Stack access road. However, Chapter 23 Traffic and Transport identifies that these closures will be very temporary in nature and so not likely to result in significant disruption to access.
120. Occupancy durations for holiday accommodation in Anglesey are capped at ten months per annum; if occupancy rates exceed this, the property would be considered as residential. A Statistics for Wales report (Welsh Government, 2018b) records room occupancy rates of 67 % for hotels in Wales, with occupancy rates falling to 48 % in January and peaking at 79 % in July and August. Guesthouses and B&B's have January room occupancy rates of 19 %, peaking at 57 % in August.

25.4.8. Recreation

25.4.8.1. National

121. In 2014/15 a NRW survey (July 2015) estimated 84 % of the Welsh population participated in recreational activities on a frequent, or infrequent basis. Of this 84 %, 88 % were in the 16-64 age bracket. The survey categorised activities as either being “low input”, “active pursuits” or “traditional activities” (**Table 25-15**).

Table 25-15 Activity Types (in order of popularity/per type) (NRW, July 2015)

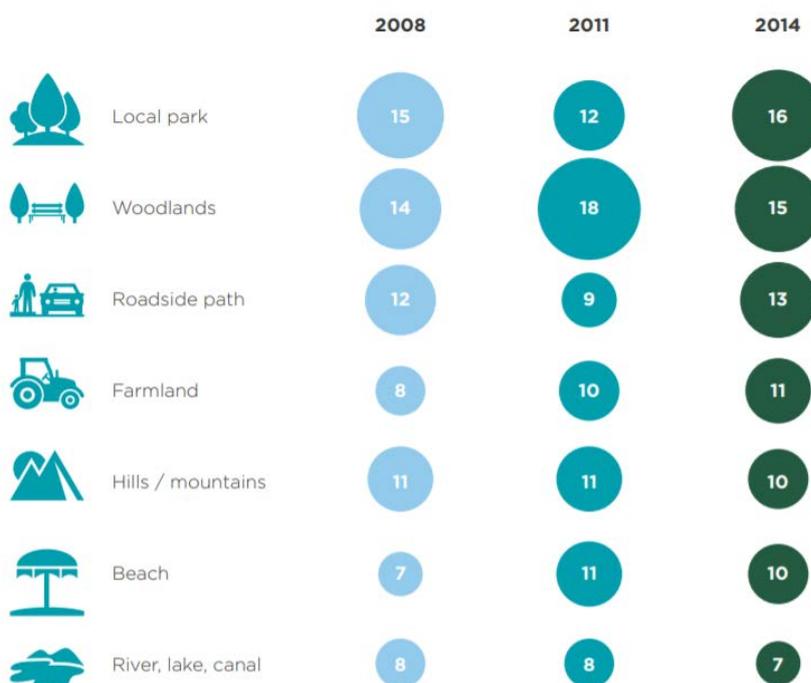
Low Input	Active Pursuits	Traditional Activities
1. Walking	1. Running	1. Fishing
2. Sightseeing	2. Swimming	2. Field Sports
3. Playgrounds	3. Road Cycling	3. Horse Riding
4. Picnics	4. Mountain Biking	
5. Informal games	5. Water sports	
6. Wildlife watching	6. Climbing	

122. Of all the low input activities, walking was the most popular, with 85 % of people surveyed having recreationally walked in the past 12 months. This was followed by sightseeing, which was the second most popular activity, with 71 % of people saying they had taken part in sightseeing activities in the preceding 12 months. Playgrounds, picnic, informal games and wildlife watching figures were lower, with approximately 40 % of those surveyed having taken part in these activities in the last 12 months.

123. Active pursuits were less popular, due to accessibility factors such as cost, proximity to resources, health factors etc. The most popular active pursuit was running (28 %) closely followed by swimming and road cycling (26 % and 24 % respectively). Water sports, mountain biking and climbing all had participatory rates of less than 20 %.

124. The NRW (July 2015) survey also asked which outdoor areas people most went to, in order to conduct recreational activities; the results are pictorially represented below in **Plate 25-1**.

125. A more recent Welsh Government Report (National Survey of Wales 2016-17) defined the recreational activities in Wales that adults are most likely to be accessing. In order of popularity the list included; walking, gym or fitness classes, swimming, cycling, jogging, football, rambling or hill walking, road running or cross country, golf and dance.



Note: numbers are a percentage of all visits to each type of place eg: in 2014, 16% of all visits were to local parks

Plate 25-1 Places People Visit (NRW Report, July 2015) (National Survey of Wales 2016-17)

25.4.8.2. Regional

126. The natural environment of North Wales lends itself to outdoor recreation. The region provides outstanding natural beauty and varied terrain, which makes it ideal for walking, cycling, climbing, water sports, wildlife watching etc.
127. North Wales is very popular for road, mountain biking and leisure cyclists. North Wales is home to seven Mountain Biking Centres, as well as seven National Cycle Routes (numbered 556, 8, 5, 41, 13, 12 and 81) (**Plate 25-2**). These routes alone provide hundreds of miles of marked cycle paths, many of which are on traffic free paths or roads with low density traffic.
128. Agreements with the Forestry Commission Wales to use tracks in the Gwydyr forest and Coed y Brenin have enabled dedicated mountain biking routes to be established, which has in turn led to increased investment in the mountain biking sector in North Wales. Government and EU investment led to the first dedicated trail centre at Coed y Brenin, being opened in 1997; this was followed closely by the development of other forestry sites. These established centres attract significant visitor numbers and have become important to their respective local economies.
129. Cycle tourism is growing rapidly in the UK. In 2015 it was estimated that the National Cycle Network in the UK contributed £650 million and supported 15,000 jobs. The National Cycle Route in North Wales is shown in **Plate 25-2**. The National Cycle Network is used by over 4.4 million people a year, and in 2017 an estimated 786 million trips were made on it, with 44 % of these journeys' leisure-based (Sustrans, 2019). Cycling continues to increase in popularity in the UK and Wales is becoming a destination of choice for the British and international cycling community.

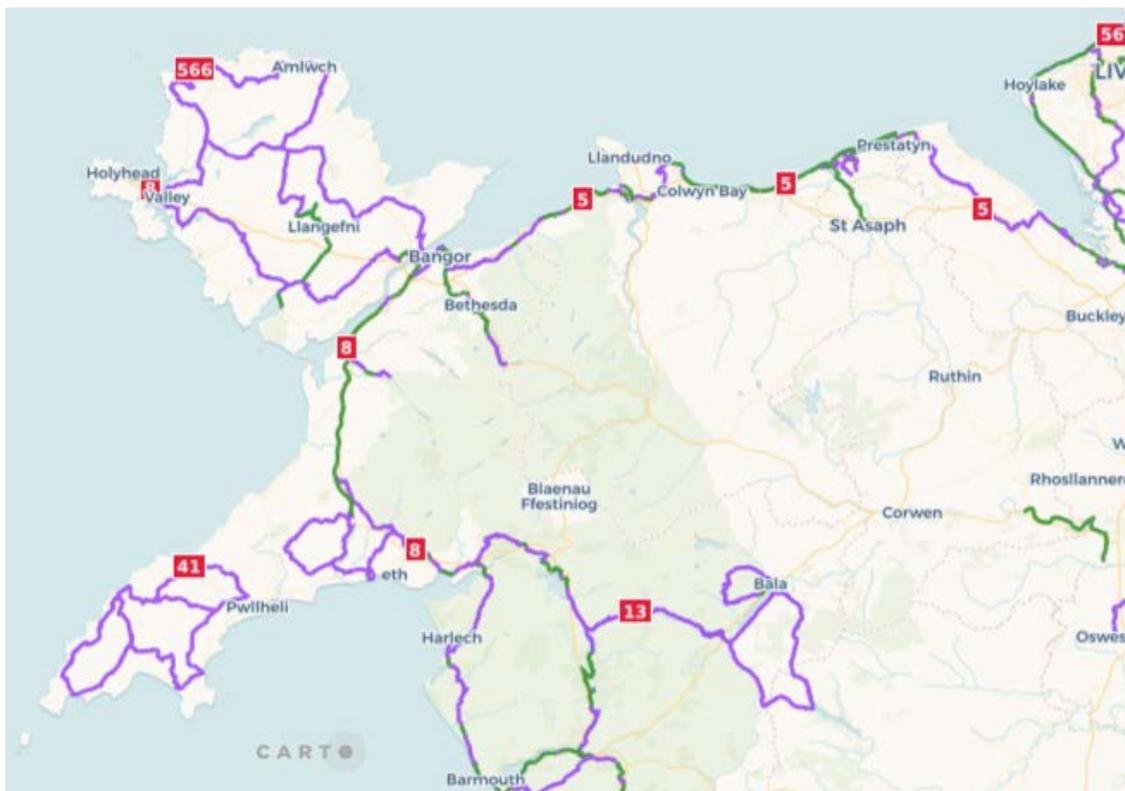


Plate 25-2 National Cycle Routes North Wales (Source: Sustrans, 2019)

130. North Wales is also popular with ramblers, hill walkers, road and trail runners alike. North Wales has a wealth of coastal footpaths stretching from the shores of the Irish Sea to the Peaks of the Snowdonia National Park. In 2015 it was estimated that 3.89 million people visited the Snowdonia National Park making it the ninth most visited park in the UK that year. In 2015 it was estimated that nearly 600,000 people visited Snowdon itself, making it the third most visited attraction in Wales (Scarborough Tourism Economic Activity Model (STEAM) Figures, 2015).
131. Other popular recreational activities in North Wales include water sports such as sailing, surfing, kayaking, coasteering, white water rafting and paddle boarding. General sightseeing, wildlife observation and visits to parks and forests for dog walking, picnics and enjoying the natural beauty of the land and seascape are also popular activities.

25.4.8.3. Local

132. Anglesey provides a microcosm of all the recreational activities available in North Wales. Anglesey is home to 125 miles of coastal paths that circumnavigate the island. Menter Môn invested £6 M to improve coastal access around Anglesey, as part of the wider Wales Coast Path project (figure from Menter Môn website). These footpaths travel through areas of both cultural significance and Areas of Outstanding Natural Beauty (AONB) (**Plate 25-3**).

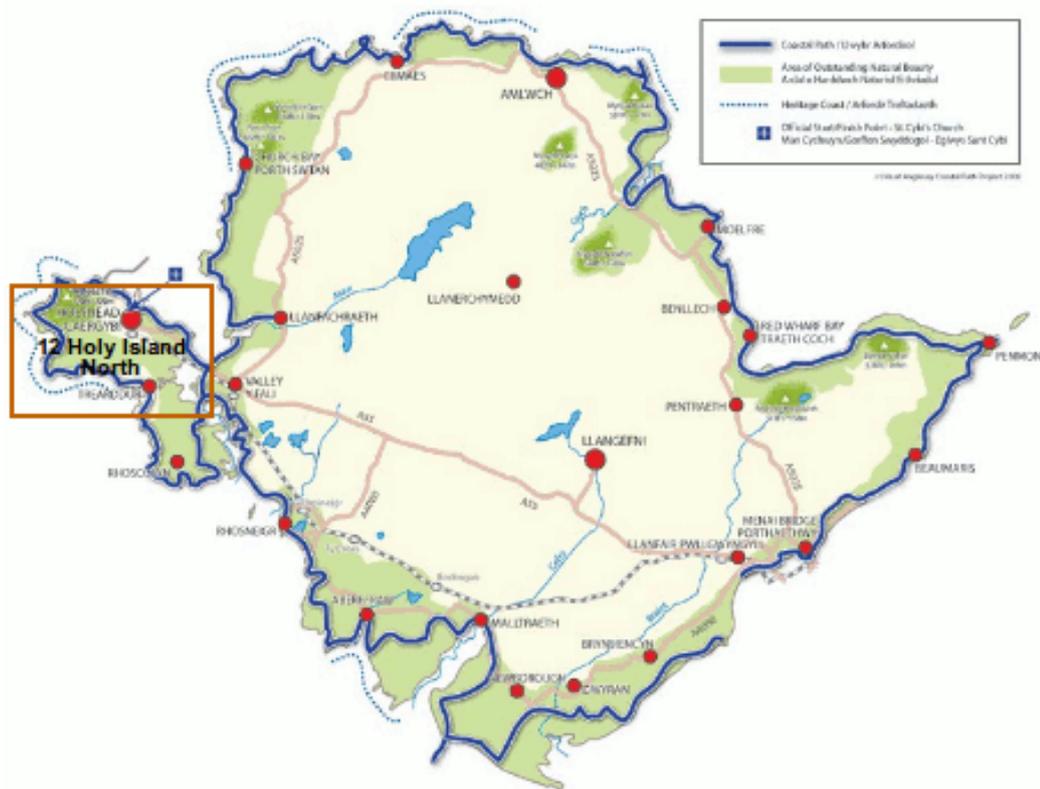


Plate 25-3 Coastal Footpaths -Anglesey

133. The Wales Coast Path closely follows the coastline along the north west of Holy Island. The section around the South Stack area is extremely popular, and part of an important RSPB reserve for active visitor engagement attracting circa 180,000 visitors per year⁴. Landscape and visual impacts from the Wales Coast Path including the South Stack RSPB Reserve has been assessed separately within **Chapter 24, Seascape, Landscape and Visual Impact Assessment**. Potential exists for temporary closures to Public Rights of Way (PRoW), including the Wales Coast Path, during the construction phase of the Project. This potential impact was assessed via the initial impact screening exercise (see **Appendix 25.1 (Volume III)**). A conclusion of minor adverse impact was presented; therefore, this potential impact was not assessed further within the main body of this Chapter.
134. Embedded mitigation has been introduced during the project design process to minimise visual impacts of the Project from the coastline including coastal footpaths. Within indicative subzones 1 – 3 and northern parts of indicative subzones 4 and 8 (which overlay the yellow and purple shaded areas, no visually prominent devices would be deployed. This will further reduce the visibility of the Project from the Wales Coastal Path.
135. Further mitigation in the form of the provision of appropriate signage will also be implemented to ensure all path users (locals and tourists) are notified of any minor diversions and/or temporary restrictions around the construction period. There will also be consultation with local

⁴ RSPB 2010 figure from: http://ww2.rspb.org.uk/Images/PEASouthStackJan11_tcm9-268711.pdf

people and organisations about appropriate signage and interpretation boards when the site is commissioned.

136. Anglesey has an extensive rural cycle path network, and two National Cycle Routes including National Route 8 (Lôn Las Cymru) which runs from Cardiff to Holyhead. Menter Môn has invested heavily in creating cycling infrastructure on the island, supporting the creation of five new cycleways on Anglesey. This investment and the variety Anglesey offers the cyclist means that it appeals to both novice and expert cyclists alike. The island also hosts an annual “Tour De Mon” road biking event, where competitors ride over a 42- or 107-mile course. This event alone attracts over 1,000 competitors to Anglesey each year.
137. Anglesey is also improving its existing mountain biking infrastructure and has two dedicated mountain biking trails, the Bike Quest Nature Challenge Trail and the Corsica Bike trail, both located in Anglesey’s Newborough Forest. The beauty of the national environment and the relative quietness of the island’s roads compared to other areas of the UK, make Anglesey a popular destination for cyclists.
138. Anglesey offers a wide range of coastal and offshore recreational activities. Coasteering -the practice of individuals navigating around rocky headlands and jumping into the sea - is a popular and exhilarating activity. Coasteering is accessible in Anglesey and there many outdoor activity centers offering coasteering trips on Anglesey.
139. Anglesey has a thriving sailing community. The island is home to six yacht clubs catering for both coastal dinghy sailing to offshore yachting. During August each year, the Island hosts the Menai Strait Regatta, with the 2018 regatta attracting approximately 100 boats. A highlight of this Regatta is the Round Anglesey race which has taken place since 1966 and which is a non-stop circumnavigation of the Island. Much of Anglesey coastline is the subject of low to moderate amounts of nearshore, recreational boating activity (UK Coastal Access Recreational Boating Atlas) – see **Chapter 15, Shipping and Navigation**.
140. Anglesey is one of the UK's top dive destinations. Dive operators provide trips to offshore dive sites, however many of the sites can be accessed from the shore which increases its popularity with recreational divers, as can be seen from **Plate 25-4**. This shows a number of popular dive spots on Anglesey’s West Coast. The area known as the Fangs to the South Stack Light House is characterised by bare rocky outcrops, volcanic rocks and steep cliffs. The main diving area is around Rip-Tide Rock and the Fangs which together form a series of inlets and submerged reefs. The Fangs are a pair of drying rocks that lie 100-150 m south of Tide Rip Rock. Many vessels have sunk along this coastline.

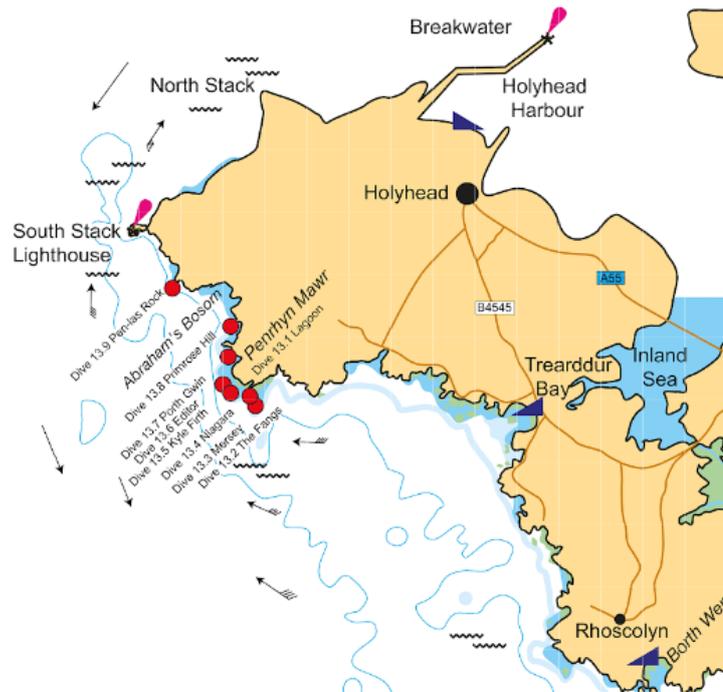


Plate 25-4 Dive Sites (Holy Island South)

141. Anglesey has a growing surfing community, with both North Wales residents and visitors accessing the island's beaches to surf. The island's surf is inconsistent compared to other regions of Wales and the wider UK and suitable swell for good quality surfing is predominantly confined to the winter months. The island's best surfing locations, where the wave regime and bathymetry produce the best surfing waves, are on the south-westerly facing coastline, for example at Rhosneigr.
142. Anglesey is a popular destination for sea kayaking for novices and experienced paddlers. Sea kayaking takes place all around the island's coastal waters, but the north coast of Anglesey has a challenging combination of steep cliffs, strong tidal streams, offshore islands and sheltered bays. The area of sea around Holy Island including the MDZ is particularly challenging in nature and generally only recommended for experienced kayakers (Krawiecki and Biggs, 2013). The sea kayaking community, including local clubs and local kayaking training providers, will be kept informed of the development of the site particularly during construction period and the cable laying closer to shore. This will be backed up by the introduction of relevant signage.

25.4.9. Cultural Heritage

25.4.9.1. National

143. The 2016 Historic Environment (Wales) Act underlines the country's commitment to the preservation of their historic environment, including: monuments, historic building, landscapes and subterranean archaeology.
144. Wales is home to six UNESCO World Heritage sites; Pontcysyllte Aqueduct and Canal, Caernarfon Castle, Beaumaris Castle, Blaenavon World Heritage Site, Harlech Castle and Conwy Castle. Sites of cultural interest in Wales span millennia from the Palaeolithic to the industrial revolution making Wales rich in cultural heritage.

145. The Welsh language continues to be read, spoken and written in mainstream Welsh society; in 2015 it was estimated that 19 % of the Welsh population could speak Welsh (Welsh Government Statistics, Dec 2018). A full assessment of potential Welsh language impacts of the Project is presented in a stand-alone (non-ES) report – “Morlais Welsh Language Impact Assessment” that has been submitted as part of the consent applications for the Project.

25.4.9.2. Regional

146. Of the six UNESCO world heritage sites detailed above, all but Blaenavon World Heritage Site are in North Wales.
147. North Wales is also of historical and cultural significance as a result of a number of other features. Slate mined in North Wales not only roofs houses across the globe, but it also shapes the unique landscape of North Wales and in particular the Snowdonia National Park. The mining of slate is not only of tangible significance but is also highly significant to the cultural make up of North Wales.
148. This heritage can be viewed across North Wales at sites such as; Chwarel Hên Llanfair Slate Caverns (Llanfair), Corris Mine, Inigo Jones Slateworks (Penygroes), Llechwedd Slate Caverns (Blaenau Ffestiniog) and the National Slate Museum (**Plate 25-5**).
149. Portmeirion, is also situated in North Wales and has become a popular tourist attraction, hosting numerous listed properties. The site was acquired in 1925 by Welsh architect Clough Williams-Ellis who then developed an Italian-style village over the period 1926-1973. Several buildings were salvaged from demolition sites.
150. Over the last decades, development of the site has continued and Portmeirion has, in recent years, hosted a major music festival and a range of other cultural events.



Plate 25-5 Abandoned Slate Quarry, Snowdonia

151. North Wales has the highest percentage of the Welsh speakers in Wales, with approximately 33 % of the population speaking Welsh. These values increase in the western part of the region, with Gwynedd having the highest percentage of Welsh speakers in all Wales. In 2011, 65 % of Gwynedd’s population spoke Welsh (Welsh Government Statistics, Dec 2018).

152. A full assessment of potential Welsh language impacts of the Project is presented in a stand-alone (non-ES) report – “Morlais Welsh Language Impact Assessment” that has been submitted as part of the consent applications for the Project.

25.4.10. Local

153. Anglesey is rich in cultural heritage. Alongside Orkney and Salisbury Plain, it is one of the richest prehistoric landscapes in the UK. Early Neolithic settlers, drawn to the island because of its agricultural potential, erected numerous burial chambers and landscape features, which to this day are of global interest and significance – see **Chapter 13, Offshore Archaeology and Cultural Heritage**. Menter Môn has provided significant funding and support since 1997 to promote the unique cultural heritage of Anglesey.
154. The island is home to a UNESCO World Heritage Site, Beaumaris Castle and has UNESCO Geopark status due to the scientific quality, rarity and aesthetic appeal of its geology. Within proximity of the Project’s landfall on Holy Island there is a long history of human habitation. This is demonstrated by a significant concentration of prehistoric, iron-age and Roman sites of cultural significance.
155. The Western edge of Holy Island has multiple shipwrecks of cultural heritage significance. Wrecks include the *Missouri*, which wrecked in 1886 and the *Matilda*, which foundered on the rocks of the South Stack in 1853. The coastline is also home to multiple small traditional landing sites that historically provided shelter for small vessels, during periods of inclement sea conditions. The Old South Stack signal station is also culturally significant and is an iconic landmark.
156. **Plate 25-6** highlights the proximity of these sites to the Project location and highlights their proximity to main arterial transport routes on the islands that have the potential to be utilised by the Project.
157. Anglesey also has over 1,000 listed buildings, many of which are of architectural or historical interest (British Listed Buildings, 2019). Of these listed buildings, 39 are listed as Grade I (highest importance). Those within the vicinity of the Onshore Development Area are outlined in **Chapter 20, Onshore Archaeology and Cultural Heritage**.
158. The Welsh language is at the centre of Anglesey’s cultural heritage. According to the 2011 Welsh language census carried out by Stats Wales, Anglesey is the county with the second highest proportion of Welsh speakers (57.2 %) in Wales (Stats Wales, 2012). It is anticipated that many of the jobs created by this project will be available to local Welsh speakers, since Menter Môn has a specific initiative, Menter Iaith Môn to provide opportunities to ensure Anglesey continues to be a stronghold of the Welsh language.
159. A 2015 report (Isle of Anglesey and Gwynedd County Councils Joint Planning Policy Unit, 2015) recorded a 1.5 % decline in the number of Welsh speakers in Anglesey between 2001 and 2011. Menter Môn has been very active in this area of promoting use of the Welsh language and cultural heritage.
160. A full assessment of potential Welsh language impacts of the Project is presented in a stand-alone (non-ES) report – “Morlais Welsh Language Impact Assessment” that has been submitted as part of the consent applications for the Project.

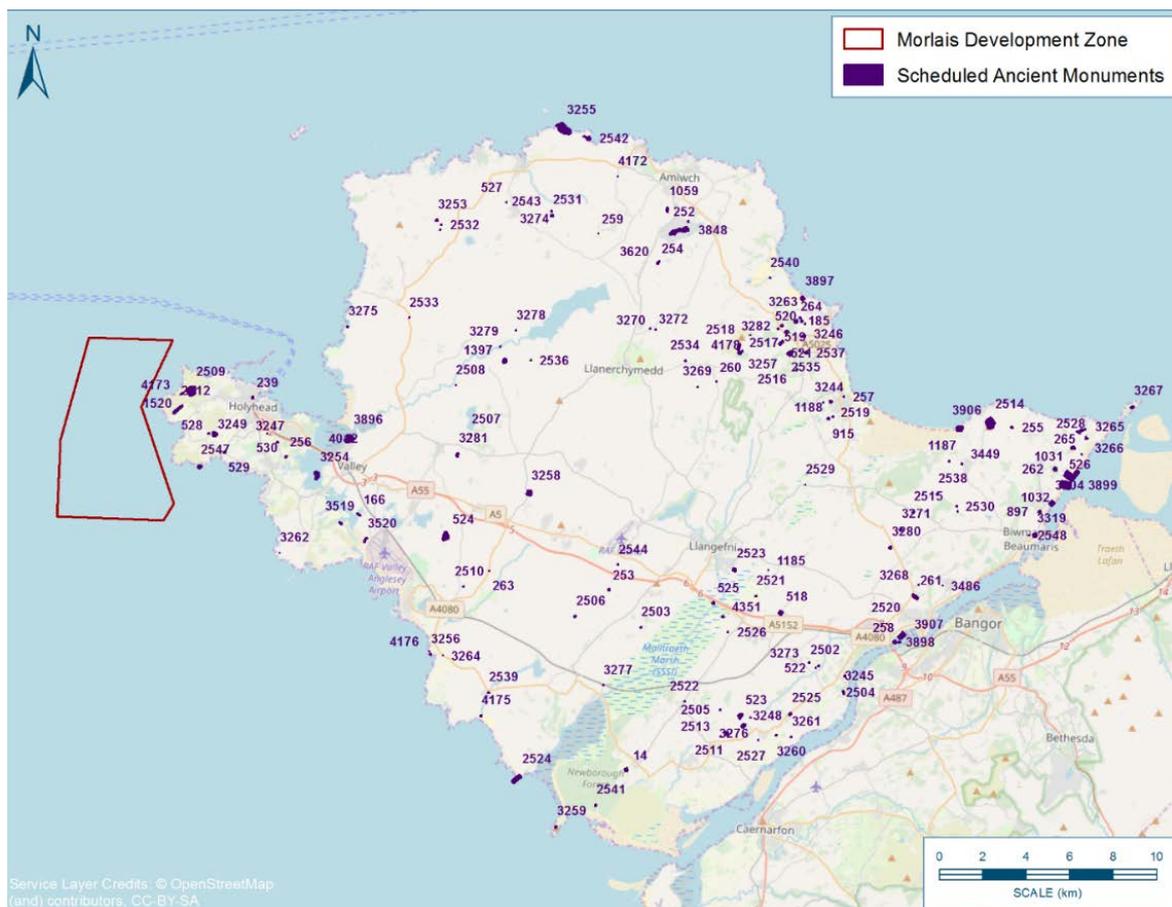


Plate 25-6 Distribution of Scheduled Ancient Monuments

25.5. IMPACT ASSESSMENT

161. This section covers the assessment of potential socio-economic impacts of the Project, using the methodology described in **Section 25.3.5**. The impact assessment is presented as follows:
- Identification of key potential impacts;
 - Potential impacts subject to a screening process (see **Section 25.5.2** below); and
 - Assessment of impacts.
162. A full assessment of potential Welsh language impacts of the Project is presented in a stand-alone (non-ES) report – “Morlais Welsh Language Impact Assessment” that has been submitted as part of the consent applications for the Project.
163. Reference should also be made to **Chapter 23, Traffic and Transport** which considers the possible effects during construction of onshore infrastructure and consequential effects on access and road closures. Any road closures or disruptions to traffic (and tourism) as a consequence of the Project are likely to be minimal so corresponding socio-economic implications have not been assessed further as they are consequently anticipated to be non-significant.

25.5.1. Impact Identification

164. The key impact pathways and associated receptors which are relevant to this assessment are as follows:

- Social issues – local people and communities;
- Economic issues – the economy itself, local residents and their purchases and transactions, levels of local and wider investment;
- Jobs and employment issues – local workers, supply chain employees, remote equipment and specialist service providers;
- Available skills and training issues - the Project, the workforce local educational and training establishments, other sectors that share key skill sets;
- Effects on tourism –local and visiting tourists including day trips, and longer-term stays sector businesses and workers;
- Recreation – resident’s activities, visitor activities sector businesses and workers;
- Shipping and fishing – sector businesses, supply chain businesses and sector workers; and
- Infrastructure issues – existing infrastructure operators and users.

25.5.2. Impact Screening

165. The EIA scoping process in 2015, 2017 and 2018 identified a wide range of socio-economic issues requiring consideration. To establish which of these issues had the greatest potential to cause likely significant impacts, a topic specific screening process was carried out.
166. The long list of topics identified by stakeholders was reviewed and their sensitivity considered in the context of the proposed Project. The potential impact pathway was then assessed further, and the predicted magnitude of effect determined. The outcomes of this process are detailed in **Appendix 25.1 (Volume III)**.
167. A separate exercise has been undertaken to assess possible impacts and their nature and significance on the Welsh Language (see the Morlais Welsh Language Impact Assessment).
168. The assessment of potential impacts was undertaken for each of the major phases of the Project: construction, operations and maintenance (including repowering) and decommissioning.
169. For the purpose of defining impact assessment parameters for the repowering phase, an assumption has been made that 50 % of the tenants will undertake repowering, i.e. for 50 % of the tenants, their infrastructure will be removed and replaced (potentially with different infrastructure by a different tenant). For the other 50 % of tenants, their infrastructure will remain over the lifetime of the Project.
170. On the basis of this approach any socio-economic impact that was considered to be of minor, or negligible significance was screened out from further assessment whilst those screened as Moderate or above were analysed further (see below).
171. The following are considered to be subject to likely significant impacts as identified from the impact screening process described above and were, therefore, subjected to further detailed assessment:

- Impact 1: Social benefits - Decentralisation of economic growth;
- Impact 2: Wellbeing of future generations - Green branding for locality;
- Impact 3: Economic impacts - Direct and secondary income;
- Impact 4: Economic impacts - Accumulation of grant support;
- Impact 5: Level of commerce activity - Green cluster creation;
- Impact 6: Job opportunities –Numbers;
- Impact 7: Job opportunities - Types, quality, skills areas;
- Impact 8: Training Impacts - New skills and competence needs;
- Impact 9: Training Impacts - Tertiary (Bachelor of Science (BSc), Doctor of Philosophy (PhD));
- Impact 10: Additional local services - New technical skills, workboats, cranes, better marine knowledge;
- Impact 11: Energy security - More green electricity, local supply, diversity of supply; and
- Impact 12: Decarbonisation - Clean energy, balancing services, spin-off capacity.

172. Each of these potentially significant impact issues have been assessed in detail with receptor sensitivity and effect magnitude considered. Where appropriate, each assessment has considered individual mitigation and optimisation measures available/implemented and consequently what level of residual impacts are predicted if these measures are successfully implemented.

173. It is noteworthy that the consideration of tourism and recreational impacts, including any socio-economic impact from the temporary, short term closure of coastal paths, along with the analysis of shipping and fishing impacts from a socio-economic perspective did not indicate any likely significant effects. This is due to the temporary nature of potentially disruptive construction works such as any road, path and beach closures (see **Chapter 23, Traffic and Transport**) and the use of embedded mitigation measures such as sub-zoning within the MDZ to limit effects on shipping (see **Chapter 15, Shipping and Navigation**), landscapes and seascapes (**Chapter 24, Seascape, Landscape and Visual Impact Assessment**) and hence tourism and recreation.

25.5.3. Assessment of Effects

174. Each impact is structured broadly as follows:

- Nature of the impact is described;
- Sensitivity and magnitude are described;
- Mitigation/optimisation measures identified;
- Residual impact assessed for relevant phases; and
- Monitoring proposed, where relevant.

25.5.4. Mitigation and Optimisation Measures

175. The possible mitigation and optimisation measures are considered with regards to embedded mitigation, which is already in the plan/design and an additional mitigation which is considered appropriate (See **Section 25.3.5.4**).

25.5.5. Impact 1: Social Benefits - Decentralisation of Economic Growth

25.5.5.1. Nature of Impact

176. Within the UK and Welsh economies, opportunities are constantly being sought to provide economic opportunities for peripheral areas such as Anglesey and North Wales. Tidal energy developments of the type represented by the MDZ, provide such an opportunity for decentralised development and economic growth in such areas.

177. With respect to Anglesey, the potential harnessing of the excellent tidal resources in the waters around the island provides an opportunity for dynamic and sustained economic activity, at a local and regional level, in a high-tech engineering and energy sector. This potential (beneficial) impact was raised by many stakeholders through the consultation process and is explored in more detail below.

178. The scale of potential economic and employment benefits that could arise are considered in further detail in **Sections 25.5.9** and **25.5.10**. These factors are likely to be the key drivers with regard to the opportunities for decentralised growth. The total potential capital and operational spend for the Project over the various deployment scenarios have been estimated as follows.

Table 25-16 Total Project spend (International Energy Agency (IEA) 2015))

Phase	Duration	Capital spend per MW installed	Capital spend	Capital spend per annum	Cumulative operational spend per year (£70k-£300K/MW/yr)	Total annual spend
Phase example 17 MW	2 yrs	£2.5M- £4.3M	£43M- £73M	£21.5M - £36.5M	£1.2M - £5.1M	£22.7M - £41.6M
Phase example 40 MW (add 23MW)	2 yrs	£2.2M – £3.7M	£51M - £85M	£25.5M - £42.5M	£2.8M - £12M	£28.3M-£54.5M
Phase example 100 MW (add 60 MW)	3 yrs	£1.9M – £3.2M	£114M- £192M	£38M-£64M	£7M - £30M	£45M-£94M
Phase example 240 MW (add 140MW)	6 yrs	£1.6M – 2.8M	£224M - £392M	£37M - £65M	£16.8M - £72M	£53.8M-£137M
Ongoing Operation & maintenance only (£70/KW/yr).	25 yrs	-	-	-	£16.8M	£16.8M

179. The table assumes a learning rate of 12 % between phases as per the IEA report. Given a local Anglesey spend rate of 15 % - 20 % (**Table 25-17**) during the construction activities and 35 % during operational activities the following local economic benefits could be envisaged. Note that this estimate of 35 % is based on previous experience of EMEC in Orkney, where there was a target rate of 25 % local spend on O&M, taking into account the location of Anglesey.
180. The table is also based on average figures for projects and may not be fully reflective of the intention to initially build out common infrastructure to support future phases.

Table 25-17 Local Anglesey-based spend projections

Phase	Duration	Capital spend per annum in Anglesey (15% - 25% of total)	Cumulative operational spend per year in Anglesey (35% of total)	Total annual spend in Anglesey
Phase example 17 MW	Years 1-2	£3.2M- £9.1M	£0.42M – £1.8M	£3.6M -£10.9M
Phase example 40 MW (add 23MW)	Years 4-5	£3.8M – £10.6M	£0.98M – £4.2M	£4.78M - £14.8M
Phase example 100 MW (add 60 MW)	Years 6-8	£5.7M- £16M	£2.4M – £10.5M	£8.1M - £26.5M
Phase example 240 MW (add 140MW)	Years 9 - 14	£5.5M - £16.2M	£5.8M – £25.2M	£11.3M – £41.4M
Operation & maintenance only	Years 14 - 37	-	£5.8M	£5.8M

181. In **Table 25-17** Year 3 is considered, on an indicative basis for the purposes of the socio-economic, as a review year to match the environmental monitoring required as part of the ecological commitments and therefore no capital spend is anticipated.
182. As the total economic activity of Anglesey is estimated at around £999 M GVA/per annum (ONS 2017), the local spend of the Project may add somewhere between 0.4 % and 4 % to the annual economic activity of the Island. The associated socio-economic benefits to the local area in terms of decentralisation of economic growth will, therefore, be relatively small overall, but could be significant for demographic segments, such as early and mid-career technologists/engineers.
183. Within Anglesey it has been identified by Menter Môn that there are 12 Engineering and Fabrication companies several which have already and are at present undertaking work for tidal developers in the area. There are also nine marine services companies within the island three of which are already providing services to Minesto.
184. Approximately 70 % of Minesto’s supply chain for the Deep Green Holyhead Deep Project Phase I project off Anglesey has been directly sourced from companies in Wales. They have used several local SMEs including Anglesey Mechanical Solutions, Holyhead Boatyard, Jones

Brothers and Mona Lifting to support engineering aspects of their project (Marine Energy Wales (2019a). State of the Sector 2019: Economic benefits for Wales).

25.5.5.2. Sensitivity and Magnitude

185. The sensitivity of Anglesey and North Wales from a regional development perspective is considered to be low/medium (beneficial), due to chronic under-development and the recent announcements about the suspended nuclear replacement project at Wylfa Newydd Power Station. The magnitude of effect via the proposed Project is considered medium (beneficial) during the construction phase, with an anticipated local expenditure of around £41 M per annum at its peak. This leads to a preliminary impact significance of **Moderate Beneficial** during the construction phase via decentralised economic growth.
186. The O&M, repowering and decommissioning phases of the Project, are considered to have a low (beneficial) sensitivity due to the reduced activity and, therefore, reduced annual local expenditure, although the long-term nature of the Project will confer ongoing benefits. The magnitude of effect is considered low (beneficial). This leads to an impact significance classification of **Minor Beneficial**, for the operational/repowering/decommissioning phases of the Project.

25.5.5.3. Mitigation and/or Optimisation

187. The potential optimisation measures relevant to this impact include:
- Seeking to localise as much development and operational expenditure in Anglesey and North Wales as possible;
 - Menter Môn will endeavour to encourage all contractors to utilise the local workforce and supply chain as much as possible;
 - Encouraging the local supply chain to invest in key capabilities that maximise local contracting opportunities;
 - Menter Môn will develop a supply chain portal that will advertise opportunities for the local contractors and workforce;
 - Encouraging appropriate public sector support and private sector investment to back the supply chain endeavours;
 - Seeking to expand the marine energy and related renewables and energy systems activity in Anglesey and North Wales, as much as possible; and
 - Seeking to expand the range of development activities, to increase the activity during the operations years.

25.5.5.4. Residual Impacts

188. If the optimisation measures outlined above are successful in bringing a greater percentage of the available benefits to the region, the magnitude of effect during the construction phase could increase from Medium to High Beneficial.
189. If a greater proportion of the operational spend can be localised, then the magnitude of effect will increase to medium (beneficial).

190. In addition, if the breadth of activity can broaden to encompass other tidal and low carbon projects and/or delivery of local and regional energy services, then the annual spend can be increased in parallel with the operational phase of the Project – see Cumulative effects (**Section 25.5.17**).
191. On this basis, the level of significance during construction can be increased to **Major Beneficial** and during the operational phase to **Moderate Beneficial**. The other phases remain at **Minor Beneficial**.

25.5.5.5. Summary of Residual Impacts

192. The classification of residual impacts regarding the decentralisation of economic growth, are outlined in **Table 25-18**.

Table 25-18 Summary of Residual Impacts

Impact	Phase	Area N/R/L ⁵	Post mitigation/optimisation receptor sensitivity	Post mitigation/optimisation effect magnitude	Residual significance level
1. Decentralisation of economic growth	Construction	N/R/L	Medium	High Beneficial	Major Beneficial
	Operation	N/R/L	Medium	Medium Beneficial	Moderate Beneficial
	Repowering & Decomm	N/R/L	Low	Minor Beneficial	Minor Beneficial

25.5.5.6. Monitoring Activities Proposed

193. Since the potential economic benefits of the Project are a major driver for the Welsh European Funding Office (WEFO) funding support received, it will be important to collect comprehensive data about the geographic location of spend (UK-wide; National; Regional; Local) by the Project and by Project clients and collaborators. A regular survey of geographic location of spend should could be distributed and feedback sought from all key funding and procurement bodies (public, voluntary and private sector).

25.5.6. Impact 2: Wellbeing of Future Generations - Green Branding of Locality

25.5.6.1. Nature of Impact

194. Over the following decades, many UK regions will be faced by major challenges and upheavals caused by climate change, political uncertainty, and globalisation, as well as demographic and social pressures. One of the tools that may help Anglesey, North Wales and Wales through such transitions is a strong focus on progressive sectors such as renewables and the ‘green’ agenda. The Project can be a key part of the local, regional and national green branding. This issue was raised through the consultation process.
195. The potential success for such a strategy can be seen in communities such as Orkney where the islands green credentials have been significantly enhanced though the presence of ground-

⁵ N = National (Wales); R = Regional (North Wales); L = Local (Anglesey).

breaking marine energy activity. This profile and the skills and capacity associated with it have now been applied to wider innovation associated with energy storage and integrated energy systems as well as onshore and offshore wind. In turn young people are choosing renewable energy careers, with the growing prospects for local employment and issues such as fuel poverty are being acted upon with determination and imagination.

25.5.6.2. Sensitivity and Magnitude

196. Based on the preliminary impact assessment, the sensitivity of Anglesey and North Wales from a progressive “green” branding perspective is considered low (beneficial); defined as the receptor being in an acceptably favourable state, with some adaptability. This judgement considers the past regional branding focus being on aspects such as history, tourism, nuclear energy, transportation (ports) etc.
197. The magnitude of effect with regards to “green branding” from the proposed Project, is considered low (beneficial) during the construction phase, rising to medium (beneficial) during the operational phase. This leads to an impact significance classification of **Minor Beneficial** for the construction/decommissioning phase and **Minor Beneficial**, for the operational/repowering phase of the Project.

25.5.6.3. Mitigation and/or Optimisation

198. The potential optimisation measures relevant to this impact include:
- Establishing and maintaining a strong online and news media presence for the brand through the management of news, data, information and progress announcements;
 - Ensuring that all activities undertaken by the Project and its delivery partners are aligned with a defined set of brand values and guidelines;
 - The capturing of video and photo opportunities associated with all aspects of project development;
 - Having resources available to welcome and host reporters and other interested parties;
 - Organising regular local events to share the brand with local residents and ensure local buy-in;
 - Attending sector events nationally and international as appropriate; and
 - Seeking opportunities for publicising the Project through any appropriate media.

25.5.6.4. Residual Impacts

199. If such optimisation measures are successful in establishing a stronger, early “green brand” for the Project, the magnitude of effect during construction and operation could increase from low to medium (beneficial).
200. However, based on the EIA matrix (**Table 25-6**), the overall level of significance during construction and operation remains at **Minor Beneficial**.

25.5.6.5. Summary of Residual Impacts

The classification of residual impacts regarding green branding of the locality are outlined in **Table 25-19**.

Table 25-19 Summary of Residual Impacts

Impact	Phase	Area N/R/L	Post mitigation/ optimisation receptor sensitivity	Post mitigation/ optimisation effect magnitude	Residual significance level
2. Green Branding of Locality	Construction & Decomm	N/R/L	Low	Medium Beneficial	Minor Beneficial
	Operation & Repowering	N/R/L	Low	Medium Beneficial	Minor Beneficial

25.5.6.6. Monitoring Activities Proposed

201. A marketing strategy should be developed for the Project that should monitor the impact of the Morlais brand and wider green branding at local, regional and national levels. It should also ensure records are kept of media coverage.

25.5.7. Impact 3: Economic Impacts - Direct and Secondary Income

25.5.7.1. Nature of Impact

202. The baseline description has shown that the economic situation in Wales is considered broadly similar to the UK average (albeit slightly lower) for employment and GVA. It was noted however, that there is variation in economic performance across Wales, with Anglesey in particular notable in having the lowest levels of GVA per head of any regions across the UK (51.8 % of the UK average in 2016). Average gross weekly earning rates are also lower in North Wales and Anglesey than in other areas of Wales.

203. The Project has the potential to raise these levels closer to Wales and wider UK values, as well as supporting substantial investment to the Anglesey and the North Wales region. A recent report by Marine Energy Wales (MEW) suggests “*Combining the investment into wave and tidal energy in Wales with publicly funded Welsh research projects brings the total investment to date in marine energy in Wales to £96.2 million*” (MEW, 2019a). This level of investment has been seen even though there is very limited actual deployment to date, highlighting the potential additional benefits that may accrue once deployment at sites like the MDZ proceed.

204. The Project has the intention to deploy up to 240 MW suggesting that there will be substantial investment and research associated with these deployments. The report by MEW highlights that with a UK deployment of 100 MW per year from 2021/22, and a realistic share of a growing global market, the tidal stream industry could generate a net cumulative benefit to the UK by 2030 of £1.4 Bn, consisting of £1.6 Bn GVA from the domestic market and £1.1 Bn GVA from exports, offset by £1.3 Bn of revenue support. The report states that Wales has the potential to establish an early mover advantage in an export market worth an estimated £76 Bn by 2050. The MDZ when fully built out would contribute significantly to this activity.

205. Considering this wider activity to give realistic local and regional scenarios provides further insight into the level and distribution of benefits that could arise. In the earlier assessment of decentralisation of economic benefits (Impact 1), it was shown that Anglesey could expect to

benefit directly from local spend to the value of between £3.6 M and £41.4 M annually (see **Table 25-17**). The benefits to the North Wales region are expected to be around 60 % of that arising in Anglesey itself and may, therefore amount to between £2 M to £25 M annually, with the rest of Wales seeing possible benefits of £14.5 M to £33 M annually, depending upon the phase of activity (**Table 25-16**).

206. Accurately predicting the potential local, regional and national spend associated with marine renewable energy projects can be challenging, as highlighted in Regeneris (2013). Nevertheless, figures for relative local and national spend are available for projects elsewhere in the UK. In 2018 Nova Innovation reported that 25 % of total project spend for their Shetland Tidal Array in Bluemull Sound was in the Northern Isles, with 80 % of project spend in Scotland (Marine Energy Wales annual conference 2018).
207. Of the wave and tidal companies who have built or are building devices in Wales, at least 50 % of their supply chain has come from within Wales to date (Marine Energy Wales (2019a). State of the Sector 2019: Economic benefits for Wales)
208. The Anglesey Enterprise Zone, Energy Island Programmes and North Wales Growth Deal have all been set up to bring skilled jobs and supply chain opportunities to the area. They will help establish the island as a world class area in low carbon energy generation.

25.5.7.2. Sensitivity and Magnitude

209. Based on values presented in the recent Marine Energy Wales report (Marine Energy Wales, 2019a), it is predicted that the construction phase of the Project will generate major spend at a National scale with £32.5M already invested in Anglesey by the Welsh Government alone (Morlais and Minesto). Developments such as these rely on local skills, services and infrastructure and provide additional indirect economic benefits (MEW, 2019a). This will produce related beneficial effects across local and regional areas. The receptor in question (local/regional/national economy) is assessed as medium (beneficial), defined by the receptor being “in a tolerable, favourable state, with capacity to embrace beneficial influence”. This would be similar for the decommissioning phase.
210. The largest part of the overall predicted spend will be during the construction phase of the Project. Therefore, a medium (beneficial) magnitude of effect is predicted for the construction phase; defined as “change across a region or sub-region, affecting one/few key sectors or one/few key communities, with medium term direct and indirect benefits”. This results in an impact of **Moderate Beneficial** significance.
211. During the O&M and repowering stages, it is predicted that the magnitude of effect will be lower than in the construction phase. Over the longer period of the operational phase, this effect is assessed as low (beneficial) magnitude. This gives an overall impact of **Minor Beneficial** significance.

25.5.7.3. Mitigation and/or Optimisation

212. The potential optimisation measures relevant to this impact include:
 - Menter Môn should attempt to maintain lobbying pressure on UK and Welsh Governments to support marine renewables;

- Menter Môn should encourage the development of support mechanisms for marine energy, such as Innovation PPA, or ring-fenced Innovation CfD, being promoted nationally (Marine Energy Council, 2019);
- Outreach work should be promoted to encourage Schools, Colleges and Universities to develop appropriate training for the workforce;
- Menter Môn will develop a supply chain portal that will advertise opportunities for the local contractors and workforce; and
- Detailed work should be undertaken, outside the framework of this EIA, to fully develop a local and regional supply chain that can take advantage of the opportunities that develop, via this Project.

25.5.7.4. Residual Impacts

213. Even if such optimisation measures are successful in bringing a greater percentage of the available economic benefits to the North Wales region and Anglesey itself, the magnitude of effect during the construction phase would be difficult to increase past the current level of moderate significance. Therefore, a **Moderate Beneficial** impact remains.
214. With the above measures fully supported, the magnitude of effect during the operational and repowering stages could be raised to Medium Beneficial, which in turn would raise the impact significance to **Moderate Beneficial**.

25.5.7.5. Summary of Residual Impacts

215. The classification of residual impacts in regard to direct and secondary income, are outlined in **Table 25-20**.

Table 25-20 Summary of Residual Impacts

Impact	Phase	Area N/R/L	Post mitigation/ optimisation receptor sensitivity	Post mitigation/ optimisation effect magnitude	Residual significance level
3. Direct & secondary income	Construction & Decomm	N/R/L	Medium Beneficial	Medium Beneficial	Moderate Beneficial
	O&M and repowering	N/R/L	Medium Beneficial	Medium Beneficial	Moderate Beneficial

25.5.7.6. Monitoring Activities Proposed

216. Regular updates on Government funding/revenue support should be monitored as well as continual review of work being done by the wider marine energy industry on lobbying of MPs.
217. Since the economic benefits of the Project are a major driver for the WEFO funding support received, it will be essential to gather robust, comprehensive data about the location of spend by the Project and by Project clients and collaborators. A regular survey of location of spend should be distributed and feedback sought from all key funding and procurement bodies (Public, Voluntary and Private sector).

25.5.8. Impact 4: Economic Impacts - Accumulation of Grant Support

25.5.8.1. Nature of Impact

218. As detailed in the previous impact assessment, the recent Marine Energy Wales study (Marine Energy Wales, 2019a) has shown a total investment to date in marine energy in Wales of £96.2 M. Of this, a large proportion has been in the form of grant aid from sources such as UK and Welsh Governments, the EU and a number of Local Authority support mechanisms. It is clear that without these large levels of grant support, the marine energy industry would not be able to develop.
219. The industry is still very much within the development stage but is on the cusp of commercialisation and this Project represents a big step towards this commercialisation phase. However, as the MDZ is still a demonstration zone it has been able to attract grant aid. It will also exist as a continued test facility, which should also attract research grant funding, for various aspects of the development.
220. As with other aspects of the Project, the parallels with Orkney are strong with respect to this impact. Orkney's success as the world's leading test centre for marine energy technologies was greatly facilitated by capital grants to set-up the facility in the first place and by further support for individual technology developers for their own technology development and deployment programmes. It would be expected that this same model would apply to Anglesey where grant funding would continue to aid the potential development (past this initial grant-funded EIA/consenting phase) and also individual developers accessing the MDZ. This experience within the EMEC test site and within the supporting supply chain of applying for and successfully implementing grant supported projects has led to many spin-off R&D opportunities which again could well apply to this Project.

25.5.8.2. Sensitivity and Magnitude

221. Receptor sensitivity is assessed as medium (beneficial) across all regions within the study area due to the uncertainty over medium to longer-term grant support, i.e. receptor is in a tolerable, favourable state, with capacity to embrace beneficial influence).
222. In terms of the magnitude of effect, the construction phase is judged to result in a medium (beneficial) effect (change across a region or sub-region, affecting one/few key sectors or one/few key communities, medium term direct and indirect benefits), as this will have the higher levels of spend and, therefore, will need to attract the larger share of grant funding. This gives an overall impact of **Moderate Beneficial** significance.
223. The O&M and repowering stage of the Project will have a low beneficial magnitude of effect as once the Project has been constructed, individual tenants' projects will attract less grant funding and therefore have a smaller magnitude of effect. This gives an overall impact of **Minor Beneficial** significance during these phases of the Project.

Within the decommissioning stage, there will be very low levels of grant available and therefore it is assessed as being non-significant.

25.5.8.3. Mitigation and/or Optimisation

224. The potential optimisation measures relevant to this impact include:

- Continued pressure exerted by Menter Môn, via both industry-coordinated lobbying and personal communications, on UK and Welsh Government to support the marine energy sector;
- Continued pressure by Menter Môn in support of the suggested development of support mechanisms for marine energy, such as Innovation PPA or ring-fenced Innovation CfD, being promoted nationally (Marine Energy Council, 2019);
- Ongoing research into the full range of grant options available to projects that intend to utilise the Project;
- Full engagement with local and national development agencies to ensure all support mechanisms are fully developed; and
- There are some risks with EU funding around Brexit. This can be mitigated against by fully engaging with relevant Welsh Government departments.

25.5.8.4. Residual Impacts

225. If such measures are successful and the full grant funding opportunities are realised and issues related to Brexit mitigated, then the construction phase magnitude of effect could be increased to high beneficial significance, as the levels of funding could be substantial. With continued government lobbying and development of further R&D/Grant funding opportunities, the Project is expected to experience major and moderate beneficial effects from a grant support perspective during the construction and operation\decommissioning phases respectively This would lead to an impact significance of **Major Beneficial**.
226. The O&M and repowering stage effect magnitude could also be raised to moderate beneficial, if all above mitigation is achieved (**Table 25-21**), resulting in a residual impact of **Moderate Beneficial**.

25.5.8.5. Summary of Residual Impacts

227. The classification of residual impacts regarding accumulation of grant support is outlined in **Table 25-21**.

Table 25-21 Summary of Residual Impacts

Impact	Phase	Area N/R/L	Post mitigation/ optimisation receptor sensitivity	Post mitigation/ optimisation effect magnitude	Residual significance level
4. Accumulation of grant support	Construction	N/R/L	Medium	High Beneficial	Major Beneficial
	O&M and repowering	N/R/L	Medium	Moderate Beneficial	Moderate Beneficial

25.5.8.6. Monitoring Activities Proposed

Regular updates on funding opportunities should be monitored, as well as regular contact with the development agencies, to ensure all grant support mechanisms are fully advertised and support is given to project developers to access them.

25.5.9. Impact 5: Level of Commerce Activity - Green Cluster Creation

25.5.9.1. Nature of Impact

228. There is a growing appreciation that where marine renewables development activity can take place across a number of related businesses and organisations, there can be significant advantages from what is termed a 'clustering effect'. This can be seen by the clustering around EMEC in Orkney as referenced in a Highland and Islands Enterprise (HIE) report (March 2019) and also the extensive development of areas like the Port of Grimsby in response to the offshore wind industry in the southern North Sea. This is associated with the synergies that can occur between entities working in a similar sector, the easier achievement of 'virtual' critical mass and the unforeseen benefits of having others solve problems and seek out opportunities that any one organisation may find hard to do. The need to explore and assess this issue was raised through the consultation process.

25.5.9.2. Sensitivity and Magnitude

229. In the preliminary impact assessment, the sensitivity of Anglesey from a cluster creation perspective was considered medium (beneficial) (receptor in a tolerable, favourable state with capacity to embrace beneficial influence), due to the limited technology (wave/tidal stream) focus to date in the locality. However, this impact assessment does recognise the existence and role of the current Energy Island Programme⁶. The magnitude of possible effect, with regards to green cluster creation from the proposed Project was considered medium (beneficial) during the construction, operation and possible repowering phases.

230. This magnitude of effect was associated with the potential for the Project to stimulate spin-off benefits in areas of activity linked indirectly to marine energy. These may be maritime, technology or energy storage opportunities. The North Wales Growth Deal is likely to provide stimulus for further growth and opportunities. These receptor sensitivities and effect magnitudes led to a preliminary impact significance classification of **Moderate Beneficial**, across all three phases of construction, operation/repowering and decommissioning.

25.5.9.3. Mitigation and/or Optimisation

231. The potential optimisation measures relevant to this impact include:

- Ensuring that there is an understanding of the benefits of clustering within all key stakeholders;
- Ensuring that all activities undertaken by the Project support cluster creation; in particular, through progressive partnership type procurement processes, wherever practical/possible;
- Working with the existing Energy Island Programme to explore further opportunities for cluster creation;
- Encouraging established sector players to create/join in with a local cluster; and

⁶ <http://www.regenwales.org/upload/pdf/062414121051Crew-CaseStudy-Anglesey.pdf>

- Advocating the inherent advantages and opportunities that exist on Anglesey (and possibly North Wales) for such a cluster to be created.

25.5.9.4. Residual Impacts

232. If such measures are successful in establishing a strong, local cluster of green companies/activities, then the magnitude of the possible effects of the Project may increase markedly, and the initial predicated benefits would be better assured. Consequently, the predicted magnitude of beneficial impacts could increase to High beneficial for the latter phases of operation and possible repowering, as the cluster became better established.

233. It is expected that although the residual magnitude of effect would remain moderate beneficial for construction, it could increase to major beneficial for operation and possible repowering. Combined with the medium beneficial receptor sensitivity, this results in a **Moderate Beneficial** impact during the construction phase and a **Major Beneficial** impact during the operational/repowering phase.

25.5.9.5. Summary of Residual Impacts

234. The classification of residual impacts regarding green cluster creation are outlined in **Table 25-22**.

Table 25-22 Summary of Residual Impacts

Impact	Phase	Area N/R/L	Post mitigation/ optimisation receptor sensitivity	Post mitigation/ optimisation effect magnitude	Residual significance level
5. Green cluster creation	Construction	N/R/L	Medium	Medium Beneficial	Moderate Beneficial
	Decomm	N/R/L	Negligible	Negligible	Negligible
	Operation	N/R/L	Medium	High Beneficial	Major Beneficial
	Repowering	N/R/L	Medium	High Beneficial	Major Beneficial

25.5.9.6. Monitoring Activities Proposed

235. Work should be initiated by Menter Môn to explore which existing local and regional companies already contribute to or are formal parts of the existing Energy Island Programme. This work should then review and develop a list of organisations and companies that might be encouraged to join any expanded cluster-type structure in the future. The collective capacity and achievements of the cluster should be captured, shared through various media and publicised widely to expand awareness and draw in more opportunities.

25.5.10. Impact 6: Job opportunities – Increased Numbers of Jobs

25.5.10.1. Nature of Impact

236. The creation of jobs, particularly higher value technology-oriented jobs is a key driver for regional economic development and a key reason why tidal stream energy has been supported at local, national and international levels. There are however many challenges involved in estimating the numbers of jobs that may be created by any project and in establishing where these jobs may arise geographically. This assessment has endeavoured to use the experience of the chapter authors, gleaned from over 15 years of work in the tidal energy sector, coupled with the

phasing/development scenarios used as the basis of this assessment, to predict possible job creation forecasts in the form of both numbers and location.

237. With respect to this specific impact assessment, the Project has been broken into two key phases of analysis (construction and operations/repowering phases). The geographical distribution of jobs has been defined using the local (Anglesey), regional (North Wales) and national (Wales) study area extents used throughout this chapter.
238. Job types have been categorised into Manufacturing, Foundations and Installation, Cabling and Infrastructure and Operation.
239. Within these broad categories, the exact types of jobs that will be created, and skills required, are difficult to accurately estimate. However, the Economic Impact of the Development of Marine Energy in Wales report produced on behalf Welsh Government (Regeneris, 2013) does provide a useful categorisation of potential jobs via “job groups” – see (Appendices D1 and D2).
240. These are presented below, along with relevant Standard Industrial Classification (SIC) codes. It is expected that the majority of these job types will be required to support the Morlais Project across the project life-cycle.

Manufacturing jobs (Manufacturing)

- Group 1 Concrete and non-metal products:
 - (23430) - Manufacture of ceramic insulators and insulating fittings;
 - (23610) – Manufacture of concrete products for construction purposes.

- Group 2 Activity related to metal/metal structure production:
 - (24200) - Manufacture of tubes, pipes, hollow profiles and related fittings, of steel;
 - (24510) - Casting of iron;
 - (24520) - Casting of steel;
 - (24530) - Casting of light metal;
 - (24540) - Casting of other non-ferrous metals;
 - (25110) - Manufacture of metal structures and parts of structures;
 - (25290) - Manufacture of other tanks, reservoirs and containers of metal;
 - (25500) - Forging, pressing, stamping and roll-forming of metal and powder metallurgy;
 - (25610) - Treatment and coating of metals;
 - (25910) - Manufacture of steel drums and similar containers and
 - (25990) - Manufacture of other fabricated metal products.

- Group 3 Activity related to electrical electronic industries:
 - (26110) - Manufacture of electronic components;
 - (26511) - Manufacture of electronic instruments and appliances for measuring, testing, and navigation, except industrial process control equipment;
 - (26512) - Manufacture of electronic industrial process control equipment;
 - (27110) - Manufacture of electric motors, generators and transformers;
 - (27120) - Manufacture of electricity distribution and control apparatus; and
 - (27320) - Manufacture of other electronic and electric wires and cables.

- Group 4 Other machinery and products:
 - (28131) - Manufacture of pumps;
 - (28140) - Manufacture of other taps and valves;
 - (28150) - Manufacture of bearings, gears, gearing and driving elements and
 - (30110) - Building of ships and floating structures.

Non-manufacturing jobs (Foundations and Installation, Cabling and Infrastructure and Operation)

- Group 5 Construction and installation jobs:
 - (33150) - Repair and maintenance of ships and boats;
 - (33200) - Installation of industrial machinery and equipment;
 - (42220) - Construction of utility projects for electricity and telecommunications;
 - (42990) - Construction of other civil engineering projects;
 - (43130) - Test drilling and boring;
 - (43210) - Electrical installation;
 - (50200) - Sea and coastal freight water transport; and
 - (52101) - Operation of warehousing and storage facilities for water transport activities.

- Group 5 Service jobs:
 - (65120) - Non-life insurance;
 - (70210) - Public relations and communication activities;
 - (70229) - Management consultancy activities (other than financial management);
 - (73110) - Advertising agencies;
 - (73120) - Media representation;
 - (71121) - Engineering design activities for industrial process and production;
 - (71122) - Engineering related scientific and technical consulting activities;
 - (71200) - Technical testing and analysis;
 - (74901) - Environmental consulting activities;
 - (74902) - Quantity surveying activities;
 - (77320) – Renting and leasing of construction and civil engineering machinery and equipment;
 - (77342) - Renting and leasing of freight water transport equipment;
 - (77390) - Renting and leasing of other machinery, equipment and tangible goods; and
 - (80200) - Security systems service activities.

241. For the construction phase, the basic number of jobs that may potentially be created has been predominantly based upon a study on the Marine Energy Supply Chain Survey carried out by Sgurr Energy for the Scottish Government in 2009 (Sgurr Energy, 2009). This survey used a factor of 20 FTE job years per megawatt installed as an estimate of job activity during the construction phase.

242. Aquatera's own experience of work in Orkney since this report was published, corroborates this order of employment with a slightly higher internal estimate of 25 FTE job years per MW being

calculated for certain projects. This estimate includes both direct and indirect employment and also includes the induced impact.

243. On the worst case basis of 20 FTE job years per megawatt, the proposed Project of 240 MW final installed capacity could be expected to create up to 4,800 FTE job years over the Project lifetime in terms of capital (construction and installation) activity. This is consistent with estimates used in the Tidal Ventures Ltd (TVL) project at Torr Head in Northern Ireland and the MeyGen project (Meygen, 2012) off the North coast of Scotland.
244. It is clear that Wales has some strong aspirations to develop marine energy industry capability, as shown in the recent MEW report into the state of the sector 2019: *“Marine Energy is offering real diversification opportunities for local supply chain companies. The Welsh supply chain has capability, capacity and ambition to deliver marine energy projects. It would however be difficult to assume that the tidal turbines for the project would be manufactured in Wales”* (MEW, 2019a).
245. At this stage of the assessment, it is not certain where any manufacturing may take place for infrastructure components that may be deployed within the MDZ. Nevertheless, some geographical distribution of employment activity needs to be recognised and assessed.
246. For this Project, it has been assumed (based on Scottish experience: SSE Renewables 2011) that 50 % of the total capital expenditure of the Project will be allocated to manufacturing of the turbines and 30% for foundations and installation works (Meygen, 2012). The final 20 % covers the inter-connecting subsea cabling and onshore infrastructure (substation and onshore cables)
247. It should be noted that such single % estimates are highly indicative and the actual outcomes for any given project may differ from these values. These levels of activity would then be distributed across local, regional and national areas. The predicted split based on total jobs is estimated below. A conservative (worst-case) approach to manufacturing jobs has been taken as well as a more optimistic approach where more of the jobs are retained in Wales in addition to some of the manufacturing capability.
248. Taking these factors into account and the scales of development envisaged the predicted job totals for construction on a locational basis are estimated in **Table 25-23**.

Table 25-23 Job distribution during construction across study area

Study Area	Manufacturing	Foundation and installation	Cabling and infrastructure	Individual area totals
Worst case				
Anglesey	0%	10%	5%	15%
North Wales (exc. Anglesey)	0%	5%	5%	10%
Rest of Wales	0%	15%	0%	15%
Total in Wales	0%	30%	10%	40%
Optimistic option				
Anglesey	5%	10%	5%	20%
North Wales (exc. Anglesey)	5%	5%	5%	15%
Rest of Wales	5%	15%	10%	30%

Study Area	Manufacturing	Foundation and installation	Cabling and infrastructure	Individual area totals
Total in Wales	15%	30%	20%	65%

249. The estimates below have been calculated using two scenarios: (1) worst-case scenario of no manufacturing would represent 40 % of the construction jobs being retained in the Welsh economy; and (b) a more optimistic scenario with 65 % of the construction jobs retained in Wales.
250. It should, however, be noted that both these figures have potential to be even higher if manufacturing as well as other elements of the projects can be attracted to Wales and the local region.
251. For this Project, it is also assumed that 15 - 20 % of these temporary (construction phase) jobs have potential to be applied locally in Anglesey. Due to the stated intention of Menter Môn to retain as many of the jobs locally, together with the port infrastructure and the marine experience already developed via previous projects in the region, a figure of 15 – 20% is considered a conservative estimate for the proportion of total jobs that could be achieved in this area. This is well within the ‘absorption capacity’ of the area’s industry supply chain and its capability in benefitting from the Project outputs. These figures are broad estimates and give a range from a worst case scenario to a more optimistic position (**Table 25-24**) used to give a basis for assessment but may vary from the eventual figures.
252. Tidal turbine installation including the turbine support structure for Phase 1 (up to 40 MW) will likely take place over a period of five years. With regard to the subsequent phases of installation, these will likely take place over a number of years and the associated workforce may well be maintained. Due to lessons learned and streamlining of activities, there is the potential to increase efficiency and as a result, reduce the length of installation activities.
253. This will require a construction workforce to be on site for several years, if all four Phases are completed. The construction of the devices will involve commissioning as many of the turbines and the associated components onshore as possible.
254. **Table 25-24** highlights the construction job estimates linked to the distribution shown in **Table 25-23**. These results are presented for two cases, a worst case where there is no device manufacturing taking place in Wales and an alternative case where some generator manufacturing does take place in Wales. It can be seen that the local jobs range from 26 to 93 per year depending upon the scenario and phase of development. The regional jobs, including local ones range from 43 to 163 per year. Finally, the overall Welsh jobs range from 68 to 303 per year.



Table 25-24 Construction phase job estimates

Phases	Running Total MWs (Installed Capacity)	Additional MW installed	Phase completion Year	Total jobs/Phase FTE yrs	Jobs per year FTE/yr	Total Construction FTE/yr			Totals for Wales FTE/yr	Regional jobs FTE/yr	Local jobs FTE/yr
						Turbine Manufacture	Foundation and installation	Cabling and infrastructure			
Worst case⁷				Based on 20 FTE/MW					40%	25%	15%
Phase example 17 MW	17	17	2	340	170	85	51	34	68	43	26
<i>Review of env. monitoring data collected in Yrs 1-2</i>	17	0	3	0	0	0	0	0	0	0	0
Phase example 40 MW (add 23 MW)	40	23	5	460	230	115	69	46	92	58	35
Phase example 100 MW (add 60 MW)	100	60	8	1,200	400	200	120	80	160	100	60
Phase example 240 MW (add 140 MW)	240	140	14	2,800	467	233	140	93	187	117	70
Sub-total (FTE yrs)				4,800		2,400	1,440	960	1,920	1,200	720
Repowering of 50% of devices (FTE yrs)				1,920		1,200	720	-	720	360	240
Overall total (FTE yrs)				6,720		3,600	2,160	960	2,640	1,560	960

⁷ Assuming no manufacturing in Wales.



Phases	Running Total MWs (Installed Capacity)	Additional MW installed	Phase completion Year	Total jobs/Phase FTE yrs	Jobs per year FTE/yr	Total Construction FTE/yr			Totals for Wales FTE/yr	Regional jobs FTE/yr	Local jobs FTE/yr
Optimistic									65%	35%	20%
Phase example 17 MW	17	17	2	340	170	85	51	34	111	60	34
<i>Review of env. monitoring data collected in Yrs 1-2</i>	17	0	3	0	0	0	0	0	0	0	0
Phase example 40 MW (add 23 MW)	40	23	5	460	230	115	69	46	150	81	46
Phase example 100 MW (add 60 MW)	100	60	8	1,200	400	200	120	80	260	140	80
Phase example 240 MW (add 140 MW)	240	140	14	2,800	467	233	140	93	303	163	93
Sub-total (FTE yrs)				4,800		2,400	1,440	960	3,120	1,680	960
Repowering of 50% of devices (FTE yrs)				1,920		1,200	720	-	1,080	600	360
Overall total (FTE yrs)				6,720		3,600	2,160	960	4,200	2,280	1,320

255. An additional factor that has been considered for the construction activities is the repowering of berths by improved or replacement models. As an indication of possible repowering activity it has been estimated that 50% of the tenants will undertake repowering, i.e. for 50% of the berths, their devices and foundations will be removed and replaced either by the same or a different tenant). For the other 50% of tenants, their infrastructure will remain over the lifetime of the project. It is not anticipated that the cables to shore and other site infrastructure would be repowered. Since the timing of any such activity is unclear the total job estimate of FTE years has been used to establish a combined level of activity. This is also shown in **Table 25-24**.
256. An initial basis for the estimation of the O&M phase jobs has been taken from the MeyGen project which used a factor of 0.58 FTE jobs per MW per year (MeyGen, 2012). Based on experience on this project and at other development locations, it is considered that initial numbers closer to 3.0 FTE jobs per MW per year may be more appropriate. However, with O&M tasks it is expected that there will be significant efficiencies over time. Therefore due to O&M teams gaining experience and efficiencies within operations the basis for the job estimates per installed MW, provided in **Table 25-25** reduce over the different project phases (e.g. Phase example 17 MW = 3.0 jobs/MW; Phase example 240 MW = 1.0 jobs/MW).

Table 25-25 Direct, indirect and induced job estimates

Phases	Installed MW	Estimated jobs per MW	Direct Job totals	Indirect jobs 60%	Induced jobs 18.70%	Total jobs
Phase example 17 MW	17	3	51	31	15	97
Phase example 40 MW	40	2	80	48	24	152
Phase example 100 MW	100	1.5	150	90	45	285
Phase example 240 MW	240	1	240	144	72	456

257. It is important to also assess the indirect and induced employment that could arise from the Project. Indirect jobs would be created by the MDZ tenants (device developers) as they purchase supplies or other items associated with the Project. An induced job is a job that is created by the employees of the projects, spending their money, i.e. additional hotel staff needed to accommodate temporary workers.
258. In order to assess indirect and induced impacts, employment multipliers need to be added to the direct employment figures.
259. To estimate indirect and induced jobs, the typical approach is to use estimated Type I and Type II Multipliers, derived from input-output tables. A comprehensive set of these is not available for Wales, so Scottish values were chosen from the 1998 - 2015 input/output tables and Industrial Order Classifications: (IOC) 41 Construction (Scottish Government, 2019a).
- Type I employment multiplier (direct and indirect) 1.6; and
 - Type II employment multiplier (direct, indirect, induced) 1.9.

Therefore:

- The indirect impact equals 60 % of the direct impact, and
- The induced impact is 18.7 % of the combined direct and indirect impact ($[(1.9-1.6) / 1.6]$).

260. Using the multipliers described above, gives the basis for the figures for indirect and induced jobs shown in **Table 25-25** (above).
261. With respect to where these jobs may be located, for this project, there is a keen interest and priority in creating jobs locally in Anglesey, within the wider North Wales region and more broadly within Wales. The possible breakdown of jobs by location is presented in **Table 25-26**.
262. As with the construction phase jobs, a range of job outcomes could be foreseen. Overall it is considered more likely that localisation within Anglesey will occur during the operational phase, with similar contributions from North Wales and wider Wales. Taking these principles into account the following estimations can be made.
263. It is thought that around 60 % to 80 % of created jobs could be secured for Wales, with 30 % to 50 % of this being within Anglesey, 20 % in the rest of North Wales and 10 % in wider Wales (**Table 25-27** to **Table 25-29**).

Table 25-26 O&M jobs breakdown by geographical area

Phases	Anglesey	North Wales (Exc. Anglesey)	Rest of Wales
Worst case	30%	20%	10%
Optimistic	50%	20%	10%

Table 25-27 O&M jobs allocation across study area per year based on 30 % local content

Phases	Total jobs	Anglesey 30%	North Wales (Exc. Anglesey) 20%	Rest of Wales 10%
Phase example 17 MW	97	29	19	10
Phase example 40 MW	152	46	30	15
Phase example 100 MW	285	86	57	29
Phase example 240 MW	456	137	91	46

Table 25-28 O&M jobs allocation across study area per year based on 50% local content

Phases	Total jobs	Anglesey 50%	North Wales (Exc. Anglesey) 20%	Rest of Wales 10%
Phase example 17 MW	97	49	19	10
Phase example 40 MW	152	76	30	15
Phase example 100 MW	285	143	57	29
Phase example 240 MW	456	228	91	46

Table 25-29 O&M jobs allocation across study area per year over project lifetime

Phases	Total jobs	Number of yrs. in phase	Total FTE per phase	Anglesey 30%	Anglesey 50%	North Wales (Exc. Angl'y) 20%	Rest of Wales 10%
Phase example 17 MW	97	3	291	87	145	58	29
Phase example 40 MW	152	2	304	91	152	61	30
Phase example 100 MW	285	3	855	256	427	171	85
Phase example 240 MW	456	6	2,736	821	1,368	547	274
Ongoing full ops	456	23	10,488	3146	5,244	2,098	1,049
Overall totals	-	37	14,674	4,401	7,336	2,935	1,467

25.5.10.2. Sensitivity and Magnitude

264. Based on the information presented in the tables throughout this Section, verified by the assumptions used in the previous Marine Energy Supply Chain Survey for the Scottish Government in 2009 (Sgurr Energy, 2009), and knowledge of the current economic situation on Anglesey, the sensitivity of this receptor (local, regional and national job market) is judged to be of medium (beneficial) sensitivity.
265. Based on the job creation predictions in **Table 25-25**, the magnitude of effect is judged to be medium (beneficial) for the construction phase, as this stage of the Project will have the highest numbers of FTE jobs created with up to 303 FTE estimated across Wales, 163 regionally and some 93 locally, before any repowering opportunities are taken into account.. This results in a predicted impact on job creation of **Moderate Beneficial** significance.
266. For the operational and repowering phases, lower numbers of jobs are anticipated to be created (see **Table 25-25**), but with good retention regionally which will give a low magnitude of effect. Coupled with the medium sensitivity of the receptor, this results in a **Minor Beneficial** impact significance.
267. The decommissioning phase will still see some substantial numbers of jobs potentially created, with approximately 100 – 150 within the region, which would have a medium magnitude effect leading to a **Moderate Beneficial** impact significance.

25.5.10.3. Mitigation and/or Optimisation

268. The potential optimisation measures relevant to this impact include:
- Ensuring support is given to developers (tenants) to manufacture and construct the devices within Wales;
 - Developing training programmes to up-skill the workforce;
 - Menter Môn will develop a supply chain portal that will advertise opportunities for the local contractors and workforce which will highlight the job availability across Wales, timely and in advance of the developments to encourage workforce to prepare;

- Encouraging the supply chain to prepare and bid for any contracts through utilising the local portal and direct engagement with potential developers; and
- Creating a cluster of local and region companies that can ensure local content – see Impact 5.

25.5.10.4. Residual Impacts

If the optimisation measures suggested above are implemented, it should encourage a stronger local content / more local jobs. Overall the figures are already strongly beneficial, and it is therefore not thought the proposed measures would significantly change the assessments.

25.5.10.5. Summary of Residual Impacts

The classification of residual impacts regarding increased number of jobs are outlined in **Table 25-30**.

Table 25-30 Summary of Residual Impacts

Impact	Phase	Area N/R/L	Post mitigation/ optimisation receptor sensitivity	Post mitigation/ optimisation effect magnitude	Residual significance level
6. Increased number of jobs	Construction & Decomm	N/R/L	Medium	Medium Beneficial	Moderate Beneficial
	Operation & Repowering	N/R/L	Low	Medium Beneficial	Minor Beneficial

25.5.10.6. Monitoring

It will be important to monitor the job impacts locally and across the Project. Maximising the local input and matching skill shortages to types and numbers of jobs will require regular surveying of the workforce, as well as the developers on site. Menter Môn have already completed the “Shaping the Future” project in 2015, a programme of assistance for people leaving the nuclear industry between 2016 and 2020. They have database including extensive information of Magnox and contractor employees living in the region.

25.5.11. Impact 7: Job Opportunities – Type, Quality, Skill Areas

25.5.11.1. Nature of Impact

269. The tidal industry requires a diverse range of skills to support its development. Although a number of the jobs will come from established industries such as engineering and manufacturing the innovative nature of the Project and tenants’ individual projects will require a significant amount of upskilling from the local employment market. Some of the employment opportunities will be associated with the direct and indirect supply chain.

25.5.11.2. Sensitivity and Magnitude

270. As the Project develops there will be a high number of jobs created within the local economy, some of which will be highly skilled and will provide a very strong opportunity regionally and locally. Based on the criteria in **Table 25-3**, a medium (beneficial) sensitivity is assigned to this receptor group (local/regional workforce).

271. During the construction, operational and repowering stages, there is an opportunity to develop a highly skilled supply chain and work force, leading to a medium (beneficial) magnitude of effect for these areas. This gives rise to an impact of **Major Beneficial** significance with respect to an improved number of new, skilled jobs, separate to more traditional engineering and manufacturing jobs.
272. With respect to potential decommissioning phase impacts, the magnitude of effect at this stage is judged to be low (beneficial), which, when combined with the medium beneficial sensitivity of this receptor will result in an impact of **Minor Beneficial** significance.

25.5.11.3. Mitigation and/or Optimisation

273. The measures to maximise job opportunities and the creation of a highly skilled local workforce for this Project are:

- Development of appropriate training to up-skill the work force in advance of the Project;
- Menter Môn will develop a supply chain portal that will advertise opportunities for the local contractors and workforce which will highlight the job availability across Wales, timely and in advance of the developments to encourage workforce to prepare;
- Encouraging Schools, Colleges and Universities to develop appropriate training for the workforce;
- Incentivising developers to create apprentices and other training opportunities; and
- Encouraging some of the specialist skilled workforce needed to relocate to the Anglesey area.

25.5.11.4. Residual Impacts

If the measures suggested are implemented, it should encourage a stronger local content with respect to skilled, specialist jobs related to the Project. It would support the up skilling of the workforce and also improve the quality of jobs on offer, but overall the figures are strongly beneficial, and it is, therefore, not considered that it would change the assessments.

25.5.11.5. Summary of Residual Impacts

The classification of residual impacts regarding the quality of jobs, are outlined in **Table 25-31**.

Table 25-31 Summary of Residual Impacts

Impact	Phase	Area N/R/L	Post mitigation/optimisation receptor sensitivity	Post mitigation/optimisation effect magnitude	Residual significance level
7. Increased range and scope of available skills for the Project	Construction and Repowering	N/R/L	Medium	Beneficial Major	Major Beneficial
	Operation	N/R/L	Medium	Beneficial Major	Major Beneficial
	Decommissioning	N/R/L	Medium	Beneficial Low	Minor Beneficial

25.5.11.6. Monitoring Activities Proposed

274. No specific measures are proposed, and this could be a difficult topic area for gathering reliable data.

25.5.12. Impact 8: Training Impacts - New Skills and Competence Needs

25.5.12.1. Nature of Impact

275. The construction phase of the Project will offer temporary employment opportunities both in terms of direct construction jobs and wider opportunities in the supply chain i.e. through provision of professional services and building materials for the Project. The onshore civil works will require a number of new employees and the development of the offshore site will employ significantly more individuals again over a prolonged period of time. With suitable training and education, these personnel could be sourced locally or regionally, which could support the development of this local supply chain.
276. There is a requirement for up-skilling of the local, regional and national workforce to take advantage of the opportunities presented by the Project. The Project will require a range of new skills due to the developmental nature of the tidal industry.

25.5.12.2. Sensitivity and Magnitude

277. The sensitivity of this receptor (local/regional employment market) is considered medium (beneficial) as it has capacity to embrace beneficial influence (via new skills and competence training).
278. The majority of the benefits from new skills and competence training will occur during the construction phase, as this will be when the largest workforce would be required, as well as when the larger, more wide range of jobs types will be available. The magnitude of effect is, therefore, assessed as medium (beneficial) which gives an overall significance of **Moderate Beneficial**.
279. During the operational phase (and repowering), opportunities for training of potential employees with new skills and competencies will still exist, but these will be more limited than during the construction phase, with lower job numbers and types of roles needing to be fulfilled. Therefore, the magnitude of effect is deemed to reduce to a low (beneficial) level leading to an impact of **Minor Beneficial** significance.
280. During the decommissioning stage, there will be limited training/up-skilling opportunities than in the other phases, therefore the magnitude of effect is considered to be of negligible magnitude leading to a **Negligible Beneficial** impact.

25.5.12.3. Mitigation and/or Optimisation

281. The potential optimisation measures relevant to this impact include:
- Ensuring there is a robust and experience-based plan of what capacity, skills, and experience are required to support a project of this nature;
 - Menter Môn, the third-party managers of the Project, have a remit to maximise the economic benefit to Anglesey and therefore the retraining of the potential workforce will be a high priority, to optimise and maximise this potential beneficial impact;
 - Menter Môn should map out the opportunities and encourage the development of specific training programmes, that focus on the development opportunities identified in the mapping process; and

- These options could be developed throughout the phases of the Project, allowing for increased employment opportunities.

25.5.12.4. Residual Impacts

282. Implementing the proposed optimisation measures set out above has the potential to increase the training uptake and development of skills in the construction phase, although it will not be enough to alter the magnitude of effect and, thus overall significance of **Moderate Beneficial**. These measures could also improve the beneficial impacts detailed above in the operational and repowering stages although not enough to alter the existing significance of **Minor Beneficial**.

25.5.12.5. Summary of Residual Impacts

283. The classification of residual impacts regarding new skills and competence needs is outlined in **Table 25-32**.

Table 25-32 Summary of Residual Impacts

Impact	Phase	Area N/R/L	Post mitigation/ optimisation receptor sensitivity	Post mitigation/ optimisation effect magnitude	Residual significance
8. New skills and competence needs	Construction & Decommissioning	N/R/L	Medium	Medium Beneficial	Moderate Beneficial
	O&M and Repower	N/R/L	Medium	Low Beneficial	Minor Beneficial

25.5.12.6. Monitoring Activities Proposed

284. Regular review of training needs and gaps should be carried out. With surveys of local and regional supply chain to ascertain if the training being offered is appropriate to maximise benefits.

25.5.13. Impact 9: Training Impacts - Tertiary BSc, PhD educational levels

25.5.13.1. Nature of Impact

285. The development of the Project offers the opportunity to complete a number of tertiary level (BSc, MSc, PhD) research projects associated with an innovative and relatively new low carbon industry (tidal energy). The proximity of local universities with existing strong programmes in Marine Science and Engineering, enhance the options for undergraduate and post graduate research and training programmes.

286. This impact is considered beneficial for all three study area scales being assessed (local; regional; national), as there could also be benefits to other regional and national university's and training establishments. The existing SEACAMS2 partnership programme that involves Bangor, Swansea and Aberystwyth Universities is a good example of how training/research linked to the Project may be fed into research priorities for these tertiary-level educational establishments.

25.5.13.2. Sensitivity and Magnitude

287. In the preliminary impact assessment, the sensitivity of this receptor group (tertiary-level educational facilities) is considered as medium (beneficial) (receptor in a tolerable, favourable state, with capacity to embrace beneficial influence). The encouragement to broaden teaching

topics to include all aspects of tidal energy development, i.e. resource assessment; hydrodynamics; environmental impact; subsea engineering etc., could strengthen the region's academic standing.

288. The magnitude of effect predicted during the construction (and decommissioning phases) of the Project is judged to be low (beneficial). It is considered that the magnitude of this effect (research opportunities) would be greater in the operational phase (see below). Therefore, the medium (beneficial) sensitivity of the receptor and low (beneficial) magnitude of effect results in a **Minor Beneficial** impact being predicted.

289. Due to the longer duration of the operational (repowering) phase, there is greater scope for research opportunities typical of tertiary establishments (6 months for MSc through to 3+ years for PhD). Experience from Herriot Watt University in Orkney suggests that upwards of ten (10) PhD opportunities and perhaps another 10 annual internships could arise that were linked directly to the Project. This results in an effect magnitude of medium (beneficial) being assigned. The medium beneficial sensitivity and medium (beneficial) magnitude of effect results in an impact of **Moderate Beneficial** significance.

25.5.13.3. Mitigation and/or Optimisation

290. The measures to ensure a team with the right skills is built for the Project include:

- The full support of the local and regional universities to fully utilise the MDZ to develop research and courses and seek out tidal energy research students should optimise this impact; and
- Encourage schools, colleges and universities to develop appropriate training for the workforce.

25.5.13.4. Residual impacts

291. It may be difficult to raise the construction and decommissioning significance, due to the short-term nature of these projects. It is thought that with some targeted courses there could be significant academic research and training that could be developed in the Universities, raising the magnitude although not enough to alter the significance level.

25.5.13.5. Summary of Residual Impacts

292. The classification of residual impacts regarding tertiary training and opportunities outlined in **Table 25-33**.

Table 25-33 Summary of Residual Impacts

Sub-topic area	Phase	Area N/R/L	Post mitigation/optimisation sensitivity	Post mitigation/optimisation magnitude	Residual significance
9. Tertiary training opportunities	Construction & Decommissioning	N/R/L	Medium Beneficial	Low Beneficial	Minor Beneficial
	O&M and Repower	N/R/L	Medium Beneficial	Medium Beneficial	Moderate Beneficial

25.5.13.6. Monitoring Activities Proposed

293. Regular monitoring of educational needs and gaps should be carried out, to ensure that courses and research options are being targeted correctly.

25.5.14. Impact 10: Additional Local Services - New Technical Skills, Workboats, Cranes, Better Marine Skills

25.5.14.1. Nature of Impact

294. Along with the developing capacity within the Project organisation (Menter Môn), the Project will require, and will act as the catalyst for similar developing capacity within the local supply chain. This capacity could/will continue to progress and over time will provide additional, services, facilities and knowledge. In addition to the direct capacity building through the Project, the supply chain will also be able to apply capacity built through other similar projects and through activities in other sectors. The need to address this issue was raised within the consultation process.

25.5.14.2. Sensitivity and Magnitude

295. In the preliminary impact assessment, the sensitivity of this receptor (capacity for additional services) was considered to be medium (beneficial), due to the opportunities for local businesses to contribute additional capacity. The magnitude of possible beneficial effects was considered as a worst-case scenario to be medium (beneficial) during the construction phase, reducing to low (beneficial) for the subsequent operational/ repowering phases, due to lowering activity levels. These judgements result in a preliminary impact significance classification for supply chain service capacity of **Beneficial Moderate** during construction and non-significant impacts during subsequent phases.

25.5.14.3. Mitigation and/or Optimisation

296. The measures to ensure the creation of local supply chain opportunities include:

- Establishing a clear list of anticipated requirements well in advance of the need actually arising and engaging with the local supply chain to assess their interest in engaging in capacity building;
- Ensuring that there are appropriate, transparent and legal procurement mechanisms to reward proactive local capacity investment, with participation in future work activities;
- Menter Môn will develop a supply chain portal that will advertise opportunities for the local contractors and workforce;
- Exploring parallel capacity building projects with prospective supply chain partners;
- Taking forward the Action Plan produced via the 2015 Fisheries Supply Chain Study report commissioned by Menter Môn (MarineSpace and Aquatera, 2015);
- Establishing formal supply chain partnerships where there is strong alignment of purpose; and
- Ensuring that site users and clients are made aware of and beneficially directed to engage with, local suppliers who have invested in important local capacity.

25.5.14.4. Residual Impacts

297. If such measures are successful in encouraging and supporting local capacity building by the supply chain, then beneficial impacts of the Project may increase. It is thought however that this would not be enough to alter the significance assessment.

25.5.14.5. Summary of Residual Impacts

The classification of residual impacts with regard to local supply chain opportunities are outlined in **Table 25-34**.

Table 25-34 Summary of Residual Impacts

Sub-topic area	Phase	Area N/R/L	Post mitigation/ optimisation sensitivity	Post mitigation/ optimisation magnitude	Residual significance level
10. Local supply chain opportunities	Construction	R/L	Medium Beneficial	Medium Beneficial	Moderate Beneficial
	Operation	R/L	Medium Beneficial	Low Beneficial	Minor Beneficial

25.5.14.6. Monitoring Activities Proposed

298. The supply chain members willing to engage in capacity building, should be tracked down and communicated with regularly. The levels and types of investment made by the supply chain should be recognised, acknowledged and celebrated.

25.5.15. Impact 11: Energy Security – More Green Electricity, Local Supply, Diversity of Supply

25.5.15.1. Nature of Impact

299. Over the coming years the pressures on the existing energy systems are likely to increase markedly, as the transition to a more decentralised and decarbonised energy model accelerates (UK Industrial Strategy 2017). The Project will help to beneficially support such a transition, by showing how and where best tidal energy may be able to contribute effectively to local, regional and UK energy supply. This topic was requested to be addressed through the consultation process.

25.5.15.2. Sensitivity and Magnitude

300. In the preliminary impact assessment, the sensitivity of this receptor (energy security) was considered to be medium (beneficial), i.e. “receptor in a tolerable, favourable state, with capacity to embrace beneficial influence”. This classification took account of the need to transition to carbon free energy sources and the recent uncertainty over the longer-term status of the Wylfa Newydd nuclear facility. The magnitude of possible effects during construction and decommissioning were considered negligible due to the relatively short-term nature of these phases. During the operational/repowering phases, the magnitude of effects at a National level was considered negligible but at Local level was considered as a worst-case scenario to be medium (beneficial). These judgements led to a preliminary impact significance classification for energy security of **Beneficial Moderate** during operations and possible repowering phases.

25.5.15.3. Mitigation and/or Optimisation

301. The measures to consider how the Project might maximise energy security benefits include:

- Consider the actual scale and pattern of power outputs at different stages of development, with different technologies and with predicted maintenance and unplanned outages;
- Consider the merits or otherwise of introducing power storage and grid system balancing technologies alongside the generation assets;
- Consider specialised energy markets that may exist locally, that could be directly serviced by power outputs; and
- Consider how supplies of tidal energy might add to the resilience of the Anglesey and nearby grid system.

25.5.15.4. Residual Impacts

302. If such measures are implemented, then the energy security benefits from tidal energy can be maximised. However, the predicted magnitude of beneficial impacts at a local level is expected to remain the same at **Beneficial Medium** for both operations and repowering phases.

It is expected that the residual magnitude of impact for these two phases would therefore also remain at **Beneficial Moderate**.

25.5.15.5. Summary of Residual Impacts

The classification of residual impacts regarding energy security is outlined in **Table 25-35**.

Table 25-35 Summary of Residual Impacts

Sub-topic area	Phase	Area N/R/L	Post mitigation/optimisation sensitivity	Post mitigation/optimisation magnitude	Residual significance level
11. Energy Security	Construction & Decommissioning	N/R/L	Medium	Negligible	Negligible
	Operation & Repowering	N	Medium	Negligible	Negligible
	Operation & Repowering	R/L	Medium	Beneficial Medium	Beneficial Moderate

25.5.15.6. Monitoring Activities Proposed

303. The Project needs to be aware of likely short- and longer-term grid stability, balancing issues as well as the strategy for achieving the necessary decarbonisation. Based upon this information, the Project can assess how tidal energy can best contribute and what enabling mechanisms may be needed, to ensure that tidal energy makes a beneficial energy security contribution locally.

25.5.16. Impact 12: Decarbonisation - Clean Energy, Balancing Services, Spin-Off Capacity

25.5.16.1. Nature of Impact

304. The UK is striving towards increased levels of decarbonisation. The government's industrial strategy states (UK Industrial Strategy) that "The move to cleaner economic growth – through low carbon technologies and the efficient use of resources – is one of the greatest industrial

opportunities of our time. By one estimate, the UK's clean economy could grow at "four times the rate of GDP". The document sets out how the UK should embrace clean growth, of which the Project is one example.

305. The country is increasingly in need of balanced services, with the increased penetration of intermittent renewable generation projects. These services have a value and are a potential opportunity for projects that can link different renewable technologies into a grid system
306. These options can add spin out benefits around the projects. It is expected that during the lifetime of the projects these spin out projects will change in nature as the grid system develops and changes

25.5.16.2. Sensitivity and Magnitude

307. These decarbonisation and clean growth opportunities are assessed as being of medium (beneficial) sensitivity, as they represent a strong opportunity across the entire study area.
308. The opportunities for decarbonisation and clean growth will only be fully realised within the operational and repowering stages of the projects. It is assessed that this is a medium (beneficial) magnitude effect which gives a combined impact of **Moderate Beneficial** significance.

25.5.16.3. Mitigation and/or Optimisation

309. The measures by which the decarbonisation benefits of the Project might be clearly demonstrated and maximised include
- Full assessment of the possible carbon savings for each of the tenant's projects within the overall Morlais Project should be quantified and maximised;
 - An assessment methodology that highlights how projects and the supply chain can make carbon savings should be developed;
 - Balancing services that can complement the introduction of tidal energy should be developed, in parallel with the phases of the Project; and
 - Spin off opportunities should be encouraged and developed alongside the different phases of the Project.

25.5.16.4. Residual Impacts

310. It will take some significant interventions to raise the magnitude of these impacts, so it is not anticipated that (even with the mitigation measure proposed) that the assessment of **Moderate Beneficial** significance will change.

25.5.16.5. Monitoring Activities Proposed

311. The Project needs to monitor the carbon savings across the Project. These will be important in documenting the overall impact of the Project.
312. The individual tenant's projects should also be encouraged to monitor and report the savings made.

25.5.17. Cumulative Effects

25.5.17.1. Introduction

313. The cumulative effects section firstly considers the degree of cumulative impacts between different phases of the Project and between the different topic areas. It then goes on to consider the possible effects of the Project, in combination with other possible projects in the vicinity both onshore and offshore. The additional projects considered are presented below.
314. A separate exercise has been undertaken to assess possible impacts (including cumulative) and their nature and significance on the Welsh Language (see the Morlais Welsh Language Impact Assessment).

25.5.17.2. Onshore Cumulative Projects

315. During the scoping process, several projects were identified that should be considered with regard to onshore cumulative impacts
- The Land and Lake holiday resort, which would be to the East and North of the landfall;
 - Residential housing to the South of the Parc Cybi;
 - Lateral Eco Parks/Orthios Holyhead Eco Park- a plan to convert the Anglesey Aluminium site and surrounding area into a biomass plant (grid connection option);
 - Horizon Nuclear Power Plant – the development of a new nuclear power station on the site of the existing Wylfa;
 - National Grid options for upgrading the grid; and
 - Stena Line Holyhead Port.

25.5.17.3. Offshore Cumulative Projects

316. For offshore cumulative impacts, the scoping process suggested inclusion of other marine energy projects along with any other non-energy marine projects within the area of Anglesey, Conwy coast and the Llŷn Peninsular that are consented, in planning or being scoped.
317. On this basis there are two tidal projects planned for North Wales that should be considered:
- Minesto Deep Green project to the immediate West of the Project; and
 - Nova Innovation Ynys Enlli project 60 km to the South of the Project (Bardsey Sound).
318. As the spatial extent of the study area(s) assessed within this chapter also includes national scale (Wales), consideration is also given to other proposed marine projects in these geographic areas. These include:
- Marine Energy Test Area (META) in Milford Haven;
 - Strumble Head tidal energy project off Strumble Head, Fishguard, Pembrokeshire; and
 - Pembrokeshire Wave Demonstration Zone.
319. Finally, the assessment also considered whether any of these cumulative project activities may impact upon the Project itself and its ability to deliver the objectives, plan and mitigation/optimisation measures outlined.

25.5.17.4. Assessment of Cumulative Effects within the Project

320. The wide ranging and long-lasting nature of the Project has the potential to give rise to sustained impacts throughout the duration of the Project. Different impacts could also potentially interact on receptors simultaneously, leading to greater or lesser effects alone or in combination. **Table 25-36** presents a summary of the topics and stages in the Project where individual significant effects were assessed to be likely. The distribution of these effects has then been assessed to see which stages and which issues have greatest cumulative potential.

Table 25-36 Assessment of cumulative significance of issues across different phases of activity

Impact topic	Mechanism	Beneficial / Adverse	Con	Ope	Rep	Dec	Cumulative impacts across phases and issues
Social benefits	Decentralisation of economic growth	Beneficial	Minor/Moderate	Minor	Minor	Minor	Minor
Wellbeing of future generations	Green branding for locality	Beneficial	Minor	Moderate	Minor	-	Minor
Economic impacts	Direct & secondary income	Beneficial	Moderate	Minor	Minor	Moderate	Moderate
Accumulation of grant support		Beneficial	Moderate	Minor	Minor	-	Minor
Level of commerce activity	Green cluster creation	Beneficial	Moderate	Moderate	Moderate	Minor	Moderate
Jobs opportunities	Numbers	Beneficial	Moderate	Minor	Minor	Minor	Minor
Types, quality, skills areas		Beneficial	Major	Major	Major	Moderate	Major
Training opportunities	New skills and competence needs	Beneficial	Moderate	Minor	Minor	Negligible	Minor
Tertiary BSc, Eng, PhD		Beneficial	Minor	Moderate	Minor	Minor	Minor
Additional local services	New technical skills, workboats, cranes, better sea knowledge	Beneficial	Moderate	Minor	Minor	-	Minor
New infrastructure outside project budget	New piers, storage and laydown areas	Beneficial	Moderate	Minor	Minor	-	Minor
Energy security	More green electricity, local supply,	Beneficial	-	Moderate	Moderate	-	Moderate

Impact topic	Mechanism	Beneficial / Adverse	Con	Ope	Rep	Dec	Cumulative impacts across phases and issues
	diversity of supply						
Decarbonisation	Clean energy, balancing services, spin-off capacity	Beneficial	-	Moderate	Moderate	-	Moderate
Cumulative influences within phases between disciplines			Major	Moderate	Moderate	Low	

321. It can be seen from this analysis, that in terms of phases of activity, the construction phase has greatest scope for overall cumulative effects. This potential arises from the greater scale of activity that will take place during this phase, this in turn, will lead to most pressure and most opportunity - particularly in Anglesey itself. The operational and possible repowering phases of the Project will still have significant potential for multifaceted effects upon key, social-economic receptors.
322. In terms of impact vectors, the mechanisms with greatest cumulative potential are considered to be around job opportunities and economic impacts on the local area, through the combined benefits accrued across all phases of the Project.
323. The importance of this analysis is that it will be key for the overall management strategy for the Project, to focus upon the many Beneficial and some adverse issues associated with the construction phase, which is where many benefits arise. Secondly, it will be important to have a strong policy and monitoring framework geared towards jobs and economic benefits, since this is where the greatest levels of sustained impact may arise.

25.5.17.5. Assessment of Cumulative Effects with Other Projects

324. In terms of the in-combination effects with other projects, the first stage in the process was to identify which impact mechanisms may be of key interest. This was done by reviewing the impact assessment results presented in **Appendix 25.1 (Volume III)** and identifying the issues where it was considered that possible cumulative effects may arise (see **Appendix 25.1, Volume III**). These included areas which had already been deemed to be significant in that analysis and also those considered non-significant for the individual Project, but where cumulative effects were still considered possible.
325. From this preliminary assessment the non-significant issues that have cumulative potential were:
- Beneficial impacts of the Project from the influx of workers;
 - Adverse impacts on rental housing market distortion due to worker influx;
 - Beneficial impact of increased investment opportunities;
 - Adverse impact of job displacement from similar roles;

- Beneficial impact of increased media attention including public outreach and information;
- Adverse impacts of congestion on piers and in ports;
- Adverse impacts on tourism of an increased sense of Industrialisation;
- Beneficial impact of new grid connections; and
- Beneficial impact with the availability of new boats.

326. Significant issues that also have cumulative potential were considered to be:

- Beneficial impact of increased direct and secondary incomes;
- Beneficial impact of more grant income attracted to area;
- Beneficial impact of green cluster development; and
- Beneficial impact of the diversification of the economy.

327. The next stage in the process was to establish which of these mechanisms could interact across which of the in-combination projects that have been identified. The results of this analysis are shown in **Table 25-37**.

Table 25-37 Cumulative effects linked to assessed projects

Key	Potential for cumulative effects			
	Potential interaction?	High	Medium	Minor
Yes		All or most projects involved, all or most issues	Many projects involved, many issues	Few projects involved, few issues

Impact	Project										Potential for cumulative effects
	Land and Lake resort	Parc Cybi housing	Holyhead Eco Park	Horizon Nuclear Power Plant	National Grid upgrades	Stena Line port expansion	Minesto tidal project	Nova tidal project	META	Strumble Head	
More workers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
House rental market	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			High
Investment opportunities			Yes				Yes	Yes	Yes	Yes	Low
Worker mobility	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			High
Regional profile	Yes		Yes	Yes		Yes	Yes	Yes			Medium
Pier congestion							Yes	Yes			Low
Industrialisat'n				Yes	Yes		Yes	Yes		Yes	Medium
Grid connections				Yes	Yes		Yes	Yes		Yes	Medium

Impact	Project										
	Land and Lake resort	Parc Cybi housing	Holyhead Eco Park	Horizon Nuclear Power Plant	National Grid upgrades	Stena Line port expansion	Minesto tidal project	Nova tidal project	META	Strumble Head	Potential for cumulative effects
New vessels						Yes	Yes	Yes			Low
Greater local GDP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	High
Greater grant income			Yes				Yes	Yes	Yes	Yes	Low
Green cluster			Yes	Yes	Yes		Yes	Yes	Yes		Medium
Economic diversification	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
	Medium	Low	Medium	Medium	Medium	Medium	High	High	Low	Low	

328. From this analysis, it was apparent that there was greatest potential for cumulative effects with the two other tidal projects that are being considered for the region (as well as the two further afield in South Wales) and that the other onshore projects (and especially the housing project) has less potential for cumulative effects. As for individual impacts, the socio-economic topic areas where it was considered that there was most potential for impact, were associated with jobs, skills needs and economic activity.

329. This analysis strongly suggests that developing a common, strategic approach to the development of tidal energy and other related energy projects in the area, is likely to be important and beneficial and also that there is an acute need to manage and monitor the metrics associated with jobs and economic activity.

25.6. SUMMARY

330. A summary of the impact assessment presented within this chapter is shown in **Table 25-38**.

Table 25-38 Summary of Potential Impacts for Socio-Economics, Tourism and Recreation

Impact	Description	Effect	Significance
Impact 1: Social benefits - Decentralisation of economic growth	£3.6 M and £41.4 M per annum local expenditure is anticipated during the construction (peak) and operation phases of the Project. With the implementation of mitigation measures that maximise local content, the effects during construction and operation are predicted to be major and moderate beneficial.	Major and moderate beneficial	Significant
Impact 2: Wellbeing of future generations - Green branding for locality	The implementation of mitigation measures that strengthen the 'green' credentials of the Project/locality will lead to moderate beneficial effects on the wellbeing of future generations for all phases.	Moderate beneficial	Significant

Impact	Description	Effect	Significance
Impact 3: Economic impacts - Direct and secondary income	<p>In terms of direct spending in the locality, Anglesey is expected to benefit in the region of £3.6 M and £41.4 M per annum during the construction and operation phases respectively.</p> <p>The construction phase of the Project is going to see major spend at a National scale.</p> <p>With the implementation of mitigation measures such as development of support mechanisms and the local work force, direct and secondary income is expected to experience moderate beneficial effects for all phases.</p>	Moderate beneficial	Significant
Impact 4: Economic impacts - Accumulation of grant support	<p>The Project would represent a big step towards this commercialisation, but it is a demonstration zone, so should still attract grant aid. It will also attract research grant funding, for various aspects of the development.</p> <p>With continued government lobbying and development of further R&D/Grant funding opportunities, the Project is expected to experience major and moderate beneficial effects from a grant support perspective during the construction and operation\decommissioning phases respectively.</p>	Major and moderate beneficial	Significant
Impact 5: Level of commerce activity - Green cluster creation	<p>The successful implementation of measures that increase the understanding of the Project and establish a strong green cluster locally, will lead to major beneficial effects during the operation and repowering phases. The effects will be moderate beneficial during construction.</p>	Moderate beneficial	Significant
Impact 6: Job opportunities – Numbers	<p>The Project could be expected to generate when fully realised up to 467 jobs per year during initial construction with perhaps 50% of this (approx. 230 depending on individual project timescales) associated with any repowering activities.</p> <p>In total, based upon progressive procurement and manufacturing strategies, the construction and repowering stages could add between 960 – 1320 FTE yrs within Anglesey, 1560 – 2280 FTE yrs in North Wales and 2640 – 4200 FTE yrs across the whole of Wales.</p> <p>A further total of up to 456 jobs per year could arise from O&M activity. Of these it is estimated that approximately 137 – 228 could be in Anglesey, 91 in North Wales and 46 across the rest of Wales</p> <p>With implementation of appropriate mitigation\optimisation, the Project is therefore expected to give rise to major beneficial impacts across all phases.</p>	Major beneficial	Significant

Impact	Description	Effect	Significance
Impact 7: Job opportunities - Types, quality, skills areas	The Project will create a high number of jobs within the local economy, some of these will be highly skilled and will provide a very strong opportunity regionally and locally. Major beneficial effects are expected for the majority of phases with the implementation of appropriate mitigation e.g. encourage a stronger local content and support the up skilling of the workforce to improve the quality of jobs on offer.	Major beneficial	Significant
Impact 8: Training Impacts - New skills and competence needs	Project construction will offer temporary employment opportunities both in terms of direct construction jobs and opportunities in the supply chain. There is a requirement for up-skilling of the local, regional and national workforce to take advantage of the opportunities presented by the Project. Moderate beneficial effects will be experienced nationally, regionally and locally if measures such as those that increase training uptake are implemented.	Moderate and minor beneficial	Significant
Impact 9: Training impacts - Tertiary BSc, Eng, PhD	This impact is considered beneficial for all three regions being assessed, as there could also be benefits to other regional and national university's and training establishments.	Moderate and minor beneficial	Significant
Impact 10: Additional local services - New technical skills, workboats, cranes, better marine knowledge	Development of local supply chain will continue to progress and over time will provide additional, services, facilities and knowledge. Moderate and minor beneficial effects will be experienced during the construction and operation phases respectively where measures that are successful in encouraging and supporting local capacity are implemented.	Moderate beneficial	Significant
Impact 11: Energy security - More green electricity, local supply, diversity of supply	The Project will help to beneficially support a transition to a more decentralised and decarbonised energy model by showing how and where best tidal energy may be able to contribute effectively to local, regional and UK energy supply.	Moderate beneficial	Significant
Impact 12: Decarbonisation - Clean energy, balancing services, spin-off capacity	Opportunities for decarbonisation and clean growth will only be fully realised within the operational and repowering stages of the Project and tenant's projects.	Moderate beneficial	Significant

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