Awel y Môr Offshore Wind Farm

Preliminary Environmental Information Report

Non-Technical Summary

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Fferm Wynt Alltraeth
AWEL Y MÔR
Offshore Wind Farm

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Glossary of terms

TERM	DEFINITION
Array	The offshore area where the Wind Turbine Generators (WTGs) will be located.
Design envelope	A description of the range of possible elements that make up the Awel y Môr Offshore Wind Farm (AyM OWF) design options under consideration. The envelope us used to define AyM for Environmental Impact Assessment (EIA) purposes when the exact final engineering parameters are not yet known. This is often referred to as the 'Rochdale Envelope' approach.
Development Consent Order (DCO)	An Order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP).
Effect	The term used to express the consequence of an impact. The significance of effect is determined by correlating the magnitude of an impact with the importance or sensitivity of a receptor in accordance with defined criteria.
Environmental Impact Assessment (EIA)	A process by which certain planned projects must be assessed before a decision to proceed can be made. It involves the collection and consideration of environmental information which fulfills the assessment requirements of the EIA Regulations, including the publication of an Environmental Statement (ES).

TERM	DEFINITION
Horizontal Directional Drilling (HDD)	Method for the installation of cables underground using a drilling rig. HDD is an established example of a trenchless cabling technique.
Impact	The change upon a receptor that is caused, either directly or indirectly, by an action resulting from the construction, Operation and Maintenance (O&M) or decommissioning of the project being assessed.
Magnitude	The degree of change on the receiving environment determined by considering the extent, duration frequency and reversibility of an impact.
Marine licence	A licence under the Marine and Coastal Access Act (MCAA) 2009 for certain works in the marine environment, granted by the Welsh Government.
National Policy Statement (NPS)	A series of documents setting out national (UK) policy against which proposals for NSIPs are assessed and decided upon.
Nationally Significant Infrastructure Project (NSIP)	Large scale development (including offshore wind farms with a generating capacity of over 100 Megawatts (MW)) which requires a DCO under the Planning Act 2008.
(Onshore and offshore) Export Cable Corridor (ECC)	The corridor within which the export cables will be located, allowing connection of the wind farm array to the National Grid network.
Receptor	A component of the physical, biological or human environment that is affected by an impact.
Sensitivity	The extent to which a receptor can accept an impact based on consideration of its value, importance, vulnerability and recoverability.

TERM	DEFINITION
Significance	The significance of an effect combines the magnitude of an impact with the sensitivity of the receptor being affected.
Statement of Community Consultation (SoCC)	A document explaining how consultation is planned to be conducted with the local community.

Abbreviations and acronyms

TERM	DEFINITION
AfL	Agreement for Lease
AEZ	Archaeological Exclusion Zone
AONB	Area of Outstanding Natural Beauty
AoS	Area of Search
AQO	Air Quality Objective
AyM	Awel y Môr Offshore Wind Farm
AyMOWFL	Awel y Môr Offshore Wind Farm Limited
BAE	British Aerospace Engineering
BEIS	Department for Business, Energy and Industrial Strategy
BGS	British Geological Survey
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CoCP	Code of Construction Practice
CRM	Collision Risk Modelling
DCO	Development Consent Order

TERM	DEFINITION
ECC	Export Cable Corridor
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMF	Electro-Magnetic Field
ES	Environmental Statement
ETG	Expert Topic Group
FLP	Fisheries Liaison Plan
GVA	Gross Value Added
GyM	Gwynt y Môr Offshore Wind Farm
HDD	Horizontal Directional Drill
HRA	Habitats Regulations Assessment
IMO	International Maritime Organisation
INNS	Invasive and Non-Native Species
LEMP	Landscape and Ecological Management Plan
LNR	Local Nature Reserve
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site
MCAA	Marine and Coastal Access Act
MHWS	Mean High-Water Springs
MLWS	Mean Low-Water Springs
MMMP	Marine Mammal Mitigation Protocol
MoD	Ministry of Defence

TERM	DEFINITION
MW	Megawatt
NATS	National Air Traffic Services
NGET	National Grid Electricity Transmission
NPS	National Policy Statement
NRA	Navigation Risk Assessment
NRW	Natural Resources Wales
NSIP	Nationally Significant Infrastructure Project
NTS	Non-Technical Summary
O&M	Operation and Maintenance
ONS	Office for National Statistics
OSP	Offshore Substation Platform
PEIR	Preliminary Environmental Information Report
PEMP	Project Environmental Management Plan
PINS	The Planning Inspectorate
PPEIRP	Project Pollution and Emergency Incident Response Plan
PRoW	Public Right of Way
RAF	Royal Air Force
RIAA	Report to Inform Appropriate Assessment
RSPB	Royal Society for the Protection of Birds
SABP	St. Asaph Business Park
SAC	Special Area of Conservation
SAR	Search and Rescue

TERM	DEFINITION
SCA	Seascape Character Area
SLVIA	Seascape, Landscape and Visual Impact Assessment
SMP	Soil Management Plan
SoS	Secretary of State
SPA	Special Protection Area
SPM	Suspended Particulate Matter
SSC	Suspended Sediment Concentration
SSSI	Site of Special Scientific Interest
SUDS	Sustainable Urban Drainage Systems
TCC	Temporary Construction Compound
TCE	The Crown Estate
TJB	Transition Joint Bay
TSS	Traffic Separation Scheme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UKHO	United Kingdom Hydrographic Office
UNFCCC	United Nations Framework Convention on Climate Change
VMS	Vessel Monitoring System
WSI	Written Scheme of Investigation
WTG	Wind Turbine Generator
ZTV	Zone of Theoretical Visibility

Non-Technical Summary

1 Introduction

1.1 The non-technical summary

1 This document is a Non-Technical Summary (NTS) of the Preliminary Environmental Information Report (PEIR) for the Awel y Môr Offshore Wind Farm (hereafter referred to as AyM). The NTS provides summary details of AyM, as well as a description of the existing environment in and around the development area. The NTS also presents a summary of the key findings of the Environmental Impact Assessment (EIA) undertaken for AyM to date.

2 Mae cyfieithiad Saesneg o'r Crynodeb Annhechnegol yma ar gael drwy wefan y prosiect (www.awelymor.cymru).

3 The PEIR has been produced to form the basis of statutory consultation required under the Planning Act 2008 and is presented in the format of a draft Environmental Statement (ES) that will be updated into a final ES format following statutory consultation to accompany the consent application(s) for the AyM project.

4 The NTS is intended to act as a standalone document that will provide an overview of the environmental effects of the proposed development using non-technical language. For more detailed information, the full PEIR should be referred to, which is available on the project website referenced throughout this NTS.

1.2 Introduction to the Awel y Môr offshore wind farm

5 AyM is a proposed sister project to the operational Gwynt y Môr Offshore Wind Farm (hereafter referred to as GyM) off the coast of North Wales (Figure 1) which has been operational since 2015. GyM has invested £90m in Wales during construction, and has since created more than 100 long-term, skilled jobs at the Port of Mostyn.

6 In February 2017, The Crown Estate (TCE) announced the opportunity for developers to apply for project extensions to operating offshore wind farms. Eight applications were received, including AyM, which met the specified criteria. In August 2019, TCE published a plan-level Habitats Regulations Assessment (HRA) which assessed the potential impacts of the proposed projects on relevant nature conservation sites of the National Site Network. Seven of the eight extension projects, including AyM, proceeded to the award of leasing rights as part of the 2017 extensions round. The Agreement for Lease (AfL) for AyM was awarded in Summer 2019.

7 AyM will comprise an array of offshore Wind Turbine Generators (WTGs) with an overall capacity of over 100 Megawatts (MW) and therefore constitutes a Nationally Significant Infrastructure Project (NSIP) under Section 15(3) of the Planning Act 2008. Such projects require a Development Consent Order (DCO) to be granted by the relevant UK Secretary of State (SoS); in this case, the SoS for Business, Energy and Industrial Strategy (BEIS). Marine planning is a matter which is devolved to the Welsh Government, and therefore a marine licence is also required under the Marine and Coastal Access Act 2009. The Applicant is seeking these consents through parallel applications to the SoS for BEIS and Welsh Government, respectively.

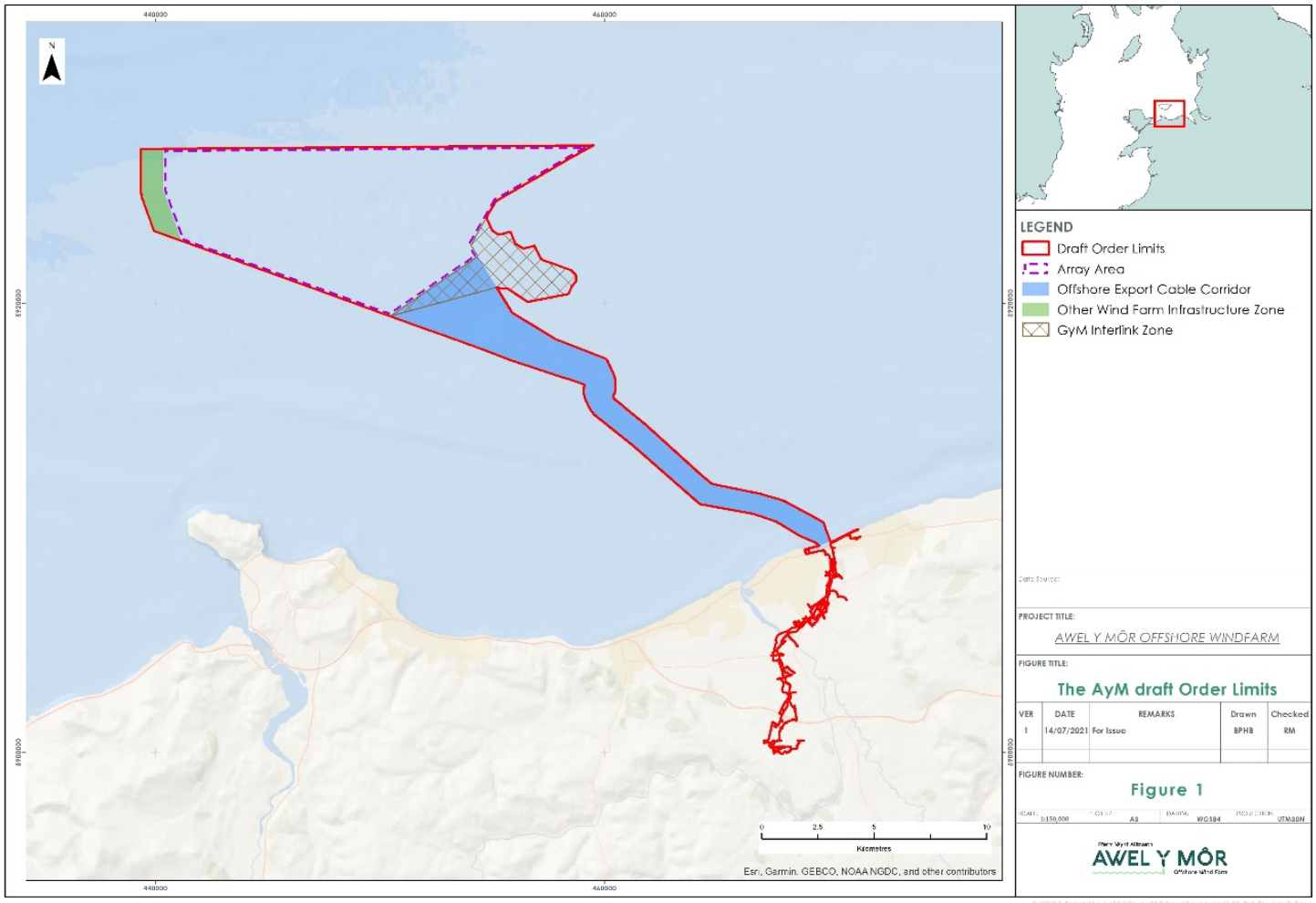

Figure 1: The AyM draft Order Limits.

1.3 Purpose of the Preliminary Environmental Information Report

8 The purpose of the PEIR is to set out the findings of the Environmental Impact Assessment (EIA) to date in support of the pre-application consultation required under the Planning Act 2008. The EIA will then be finalised and reported in the ES which will accompany the DCO and marine licence applications which are anticipated to be submitted in Q1 2022.

9 The PEIR provides statutory (those proscribed under the requirements of Planning Act 2008, such as Natural Resources Wales (NRW) and local authorities) and non-statutory consultees (such as charitable organisations including the Royal Society for the Protection of Birds (RSPB)), as well as the local community, with the information which has been assembled in order to carry out an assessment of the potential environmental effects of AyM.

10 The PEIR establishes the existing environment using the results of desktop study, site-specific surveys and consultation, as well as the methodology used within the EIA process. The PEIR presents the potential impacts arising from AyM, based on the baseline information gathered and the analysis in environmental assessments completed. Based on the outcomes of assessment, the PEIR then puts forward any potential mitigation measures that could prevent, minimise, reduce or offset potentially significant adverse effects.

1.4 About the Applicant

11 The project partners of Awel y Môr Offshore Wind Farm Limited (AyMOWFL) ('the Applicant') are RWE (60%), Stadtwerke München (30%) and Siemens Financial Services (10%). RWE is leading the development of the project on behalf of the project partners.

12 RWE generates one third of all Wales' renewable energy making it the largest renewable energy operator in Wales. RWE has the goal of making a significant contribution towards Welsh Government targets to generate 70% of electricity needs from renewable energy sources by 2030 and to reach net-zero carbon emissions by 2050.

13 As a responsible developer, RWE has also looked to upskill the future generation through creation of its Wind Turbine Apprenticeship Programme in partnership with Grŵp Llandrillo Menai, which officially opened in 2012. The course has trained a number of new apprentices producing high quality technicians who are primarily deployed on offshore and onshore wind farms, both locally and across the United Kingdom (UK).

1.5 Consultation

14 It is a statutory requirement for promoters of NSIPs to engage in pre-application consultation with local communities, local authorities, and anyone who may be directly affected by the proposals. As such the PEIR seeks to inform consultees about AyM and the likely significant effects associated with the construction, operation, maintenance and decommissioning phases of the project.

15 The publication of the PEIR represents the start of the formal consultation process required under the Planning Act 2008. This process will conclude on 11th October 2021, after which the Applicant is obliged to review feedback and have due regard to it as the assessments are finalised in the ES that will accompany the DCO and marine licence applications. A full description of how feedback has been incorporated into the EIA will be presented in the Consultation Report that will also accompany the applications.

2 Policy and legislation

16 This section of the NTS summarises the consents framework and key legislation and policies that have been considered during the development of AyM within the EIA process. A full description of relevant policy and legislation is described within Volume 1, Chapter 2: Policy and Legislation of the PEIR.

2.1.1 Climate change and the role of renewable energy

17 UK legislation relating to climate change and renewable energy is underpinned by a number of international agreements. The United Nations Framework Convention on Climate Change (UNFCCC) commits its parties to setting binding targets for reductions in greenhouse gas emissions. The UK is a signatory to the Kyoto Protocol, an international agreement linked to the development and implementation of the UNFCCC, which came into effect in 2005, and was transposed into UK law via the Climate Change Act 2008. A series of regular meetings of the UNFCC have been held resulting in several important and binding agreements, including the Copenhagen Accord 2009, the Doha Amendment 2012, and the Paris Agreement 2015.

18 The Climate Change Act 2008 places a duty on the UK Government to ensure its net carbon account and greenhouse gas emissions are reduced by 80% relative to 1990 levels by 2050. In 2019, the UK Government increased its target reduction to 100% (net zero carbon emissions).

19 The central objective of UK Government policy is to ensure the security of energy supply, whilst responding to the challenge of climate change by reducing carbon emissions. To meet its objectives, more renewable energy infrastructure is required, with an increased emphasis on generation from renewable and low-carbon sources, including offshore wind. The UK's commitment to renewable energy generation is captured through the publication of the National Policy Statements (NPSs) for Energy, Renewable Energy and Electricity Networks Infrastructure (NPS EN-1, 3 and 5, respectively).

20 In 2019, the Welsh Government declared a climate emergency with the hope of triggering a wave of action to tackle climate change in Wales, and internationally. Several local authorities in North Wales have also declared climate emergencies since. AyM is being developed with the aim of contributing to Welsh Government targets to generate 70% of electricity needs from renewable sources by 2030.

2.1.2 Consent framework and the EIA

21 AyM is defined as an NSIP. The Planning Act 2008 sets out a comprehensive statutory framework for the principal consents required to construct, operate and decommission NSIPs, together with associated infrastructure.

22 Permission to build and operate an NSIP is provided through a Development Consent Order (DCO), which in the case of energy infrastructure is granted by the SoS for BEIS. Marine planning in Wales is a devolved process, and a separate marine licence is also required to be granted by the Welsh Government under the Marine and Coastal Access Act 2009 (MCAA).

23 In support of these processes, applicants are required to undertake an EIA for certain types of development, including offshore wind farms. The legislative framework for EIA was provided by European Directive 2011/92/EU (the 'EIA Directive'), which is transposed into UK law through the Infrastructure Planning (EIA) Regulations 2017 and the Marine Works (EIA) Regulations 2007 (as amended), as relevant to the DCO and marine licensing processes, respectively. In the PEIR, these are collectively referred to as 'the EIA Regulations'.

24 The EIA process can broadly be summarised as consisting of three main elements that take place prior to the final application submissions:

- **Scoping:** Project promotors can request a formal scoping opinion from the relevant authority, setting out what the EIA should consider in broad terms;
- **Consultation:** The project promotor is required to conduct pre-application consultation in accordance with the Planning Act 2008 and associated guidance. This PEIR forms the basis of this statutory consultation and has been prepared in the format of a draft ES;
- **ES preparation:** The ES is prepared considering the responses received during the formal consultation and is submitted as part of the suite of application documentation.

3 EIA methodology

25 This section presents an outline of the EIA methodology that has been employed for Awel y Môr in the preparation of the PEIR. The EIA for AyM describes the potential effects on the environment arising from the construction, Operation and Maintenance (O&M), and decommissioning of the project. If significant effects are predicted, it identifies mitigation to reduce the significance of these effects (where practicable). A full description of the EIA methodology used is described within the PEIR (Volume 1, Chapter 3: EIA Methodology).

3.1.1 Consultation and scoping

26 Scoping is the process of identifying the issues to be addressed during the EIA process. The applicant submitted a Scoping Report to the Planning Inspectorate (PINS) for AyM in May 2020. This document sets out details of the proposed scope of environmental assessments to be undertaken for the proposed development. The formal Scoping Opinion was received from PINS in July 2020 and highlighted a number of areas that consultees wished to see addressed within the EIA. These responses, together with other consultation responses provided throughout the EIA process, have been taken into account in identifying the scope for the EIA. The scope has also been informed by the nature, size and location of the proposed development.

27 Following Scoping, Expert Topic Group (ETG) meetings were held via the Evidence Plan process, a series of regular consultation meetings with key stakeholders on technical matters.

3.1.2 The PEIR

28 The PEIR provides an early assessment of predicted environmental impacts, using the data available at the time. The PEIR provides sufficient information for consultation with the public, statutory and non-statutory consultees and provides information on the predicted impacts arising from the construction, O&M and decommissioning of the development and the assessment methodologies to be used within the ES.

29 The assessment methodology used within the PEIR, and presented below, is proposed to be the same as will be used for the ES. The presentation in the PEIR of the methodology to be used in the ES allows for consultees to comment on the methodology and for agreement to be gained on the final approach to be taken within the ES.

30 The potential environmental effects of AyM have been assessed for each relevant topic area (as agreed during the scoping phase), by comparing the baseline environment with the expected conditions that will prevail if the development goes ahead. The baseline environment is determined through desk studies and surveys and has been agreed through the Scoping Report, through the Evidence Plan process, and other formal consultation processes.

3.1.3 Approach to EIA

31 The assessment of each topic forms a separate chapter within the PEIR, with interlinkages clearly identified, such as the link between fish ecology and fish as a prey resource for marine mammal ecology. Each chapter addresses:

- Policy and statutory context;
- Consultation responses related to that topic to date;
- The scope and methodology of the assessment;
- A description of the relevant existing environment;
- Key parameters for assessment, based on the project design that defines the maximum worst-case scenario, known as the 'Rochdale Envelope' or 'design envelope';
- Identification of embedded mitigation that has already been adopted as part of the project design to date;
- An assessment of potential environmental effects related to that topic;
- Identification of residual impacts (taking into account embedded and further mitigation);
- Identification of cumulative, transboundary and inter-related effects; and
- Identification of any requirements for further mitigation and/ or monitoring to date.

3.1.4 Existing environment

32 The description of the existing environment describes the baseline condition upon which the assessments will be made, forming the foundation of the evidence-based approach. The existing environment of the site and study area form the basis of each assessment, enabling the likely significant effects of the project to be identified. The description of the existing environment draws on site-specific data collected for the purposes of the assessment, as well as information and data from sufficiently similar investigations to inform the understanding of the baseline and/ or impact assessments. As AyM sits adjacent to the existing GyM, extensive data from the EIA, baseline and monitoring for GyM are available which provide both raw data and modelling that can be used to inform the assessments for AyM. Where possible, appropriate and agreed with the relevant stakeholders, RWE has used this existing data to aid in the EIA process.

3.1.5 The 'Design Envelope' approach

33 The design envelope is a term used to identify the range of possible options within the project which characterise the maximum parameters, such as the maximum wind turbine blade tip height or longest length of cable that may be developed. In practice, these maximum design parameters act as an envelope which can be assessed, whilst also limiting the developer by defining maximum parameters which cannot be exceeded.

34 Within the maximum extents, the approach gives the developer a certain amount of flexibility to respond to future best practice and changes in technology. Owing to the complex nature of offshore wind farm development, many of the details of a proposed scheme may be unknown to the applicant at the time of the application. In these circumstances, guidance produced by PINS allows the maximum adverse scenario to be assessed.

35 In order to ensure the developer does not exceed the assessed parameters, the parameters used for the assessment need to be clearly defined in the DCO and therefore in the accompanying ES. This will simplify the assessment and give confidence that the Proposed Development within the DCO (as built) would not result in significant effects beyond those assessed in the ES.

3.1.6 Embedded mitigation

36 The EIA process is an integral and ongoing part of the project appraisal and design process. During the EIA, the likely significant effects have been considered and these issues have been taken into account within the ongoing design process. The EIA has therefore been used as a means of informing and improving the project design. The project assessed within the PEIR consequently includes a range of measures that have been designed to reduce or prevent significant adverse effects from occurring; these measures are called mitigation.

37 The assessment has therefore taken these 'embedded' mitigation measures into account as they form part of the project itself.

3.1.7 Assessment of effects

38 The PEIR sets out an assessment of the likely effects during all phases of the project life cycle (construction, O&M, and decommissioning) based on the likely magnitude of the predicted impacts, and the sensitivity of the receptor(s). The magnitude of impact takes into account its spatial extent, duration, frequency and severity, and can be designated as 'high', 'medium', 'low' or 'negligible'. Impacts are also identified as 'adverse' (negative), or 'beneficial' (positive). The sensitivity of a receptor is also assessed as 'high', 'medium', 'low' or 'negligible'. The assigning of these criteria to impacts and receptors are based on current understanding, expert knowledge and guidance, which are defined and presented within the PEIR chapters. It is important to note that where individual assessments differ from the methodology presented here based on industry guidance, it is clearly defined within the relevant chapters.

39 Once the magnitude and sensitivity have been assessed, these are combined in a matrix to give the significance of the effect (Table 1). Effects of 'moderate' or 'major' are deemed to be 'significant' in EIA terms, whereas effects of 'minor' or 'negligible' are deemed to be 'not significant' in EIA terms.

Table 1: Matrix used to determine the significance of effect.

		SENSITIVITY			
		HIGH	MEDIUM	LOW	NEGLIGIBLE
ADVERSE MAGNITUDE	HIGH	Major	Major	Moderate	Minor
	MEDIUM	Major	Moderate	Minor	Negligible
	LOW	Moderate	Minor	Minor	Negligible
	NEGLIGIBLE	Minor	Minor	Negligible	Negligible
BENEFICIAL MAGNITUDE	NEGLIGIBLE	Minor	Minor	Negligible	Negligible
	LOW	Moderate	Minor	Minor	Negligible
	MEDIUM	Major	Moderate	Minor	Negligible
	HIGH	Major	Major	Moderate	Minor

3.1.8 Cumulative, transboundary and inter-related effects

40 The EIA Regulations require a consideration of cumulative effects, which are effects on a receptor that may arise when the project is considered together with other proposed developments in the area. Cumulative effects are assessed and reported within each topic chapter of the PEIR, using the methodology outlined in Volume 1, Annex 3.1: Cumulative Effects Assessment.

41 A consideration of transboundary effects is also given in each topic chapter, based on the outcome of the transboundary screening presented in Volume 1, Annex 3.2: Transboundary Screening. Transboundary effects are those that may impact the interest of territories outside the UK Exclusive Economic Zone (EEZ).

42 There is also a requirement to consider inter-related effects between topics and across multiple project phases which may lead to environmental effects of greater significance than when they are considered in isolation. A consideration of inter-related effects is given in Volume 2, Chapter 14: Inter-related effects.

4 Site selection

43 This section summarises the site selection process and approach undertaken for AyM to identify the various elements of the site and the alternatives (both onshore and offshore) which have been considered as the project has been developed.

44 The approach taken for the development of AyM has been based on early engagement with a range of stakeholders, together with a range of electrical, engineering, environmental, and socio-economic appraisals. Stakeholder engagement has been a key aspect of the project design, with each phase of consultation undertaken being designed to provide opportunities for stakeholders to review and provide information in order to influence the relevant project design decisions that have been taken to date in the process of the project development.

45 The stages of site selection and consideration of alternatives are set out below in chronological order from inception to the point of PEIR submission (Stages 1 to 5). The final two stages of the site selection process (Stages 6 to 7) will take place after the PEIR stage. A full description of the site selection process is provided within the PEIR (Volume 1, Chapter 4: Site Selection and Alternatives).

46 An overview of the process of site selection, and the associated consultation that has informed the project design is illustrated in Figure 2 below. It is important to note that whilst the site selection process is illustrated and described as a linear approach in this document for ease of presentation, the reality of any project development is that site selection is a complex, iterative process with decisions made having considered multiple factors.

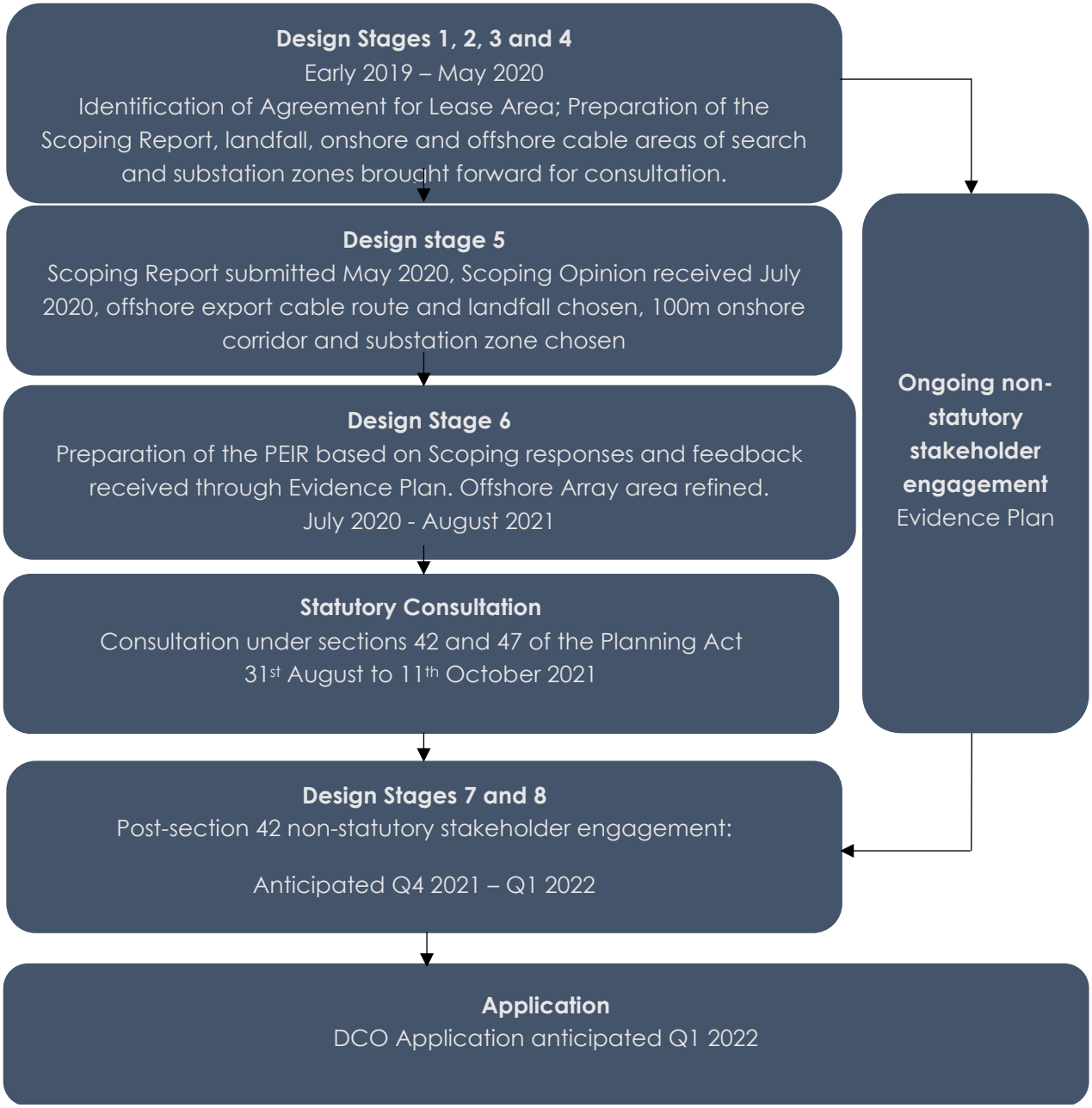

Figure 2: Summary of the AyM site selection process.

4.1 Stage 1 – Identification of the Array area

47 Further to the Welsh and UK Government's confirmed policy in support of offshore wind, there is a need to identify the best sites around the UK for a rapid increase in offshore wind development to occur and for renewable energy targets to be met. Given the presence of GyM, AyM's sister project, the region is identified as a good site for wind resource; confirmed by the operational output of GyM.

48 Following an initial consideration of environmental parameters and constraints, an area of search was determined as a preliminary offshore boundary to delineate the location of offshore WTGs. The initial boundary was identified through an analysis of engineering, environmental, economic and consenting risks and subject to further feasibility studies for key areas of interest.

49 In parallel with this, existing environmental 'hard constraints' were considered, based on spatial data and an understanding of the likely constraints. The initial study considered an extension of GyM with a longer extension to the north-west on the basis of wind resource availability.

50 Following more detailed feasibility studies including shipping and navigation, offshore ornithology, underwater noise, and seascape, landscape and visual impacts, consultation was held with members of the EIA Evidence Plan ETG for Seascape, Landscape and Visual Impact Assessment (SLVIA) and Cultural Heritage[i]. The conclusion of the Stage 1-4 assessment, stakeholder consultation and public consultation was therefore to revise the proposed boundary, reducing the north-westerly spread of the proposed development.

[i] The EIA Evidence Plan is formed of a range of expert statutory, government, and non-governmental organisations providing advice on topics such as ecology, SLVIA, human environment, and offshore ornithology. Representatives on the Evidence Plan include Denbighshire County Council, Natural Resources Wales, and RSPB.

4.2 Stage 2 – Identification of Grid Connection Location

51 The connection of energy generating stations (such as OWF projects) to the National Grid is managed through a controlled process by National Grid Energy Transmission Ltd (NGET). Initial proposals were made to make a grid connection at Bodelwyddan, the National Grid substation where the existing GyM connects into the National Grid. Since AyM is located in close proximity to GyM, a grid connection at the same location as is both practical and logical, given the previous work in determining a suitable and consentable grid connection.

52 Following on from the NGET offer of grid connection in Q2 2020, an initial desk-based assessment of potential landfall options on the North Wales coast was undertaken. This assessment looked into several environmental and technical constraints. Further engineering feasibility studies considered aspects such as construction space, ground conditions and access. The result was that an offshore cable route area of interest was delineated alongside the wind farm boundary, incorporating options for cable routeing and landfall at three locations along the North Wales coast.

4.3 Stage 3 and 4 – Identification of Project for Scoping, and Consultation

53 Stage 3 of the AyM design process involved the identification of the offshore export cable and landfall zone(s). During Stage 3 of the route design work, existing infrastructure such as railways, roads, ports, recreational areas and built-up areas were considered in an initial search area. The initial search area encompassed the North Wales coast. Following an initial appraisal, six options were brought forward for consideration.

54 Following a grid connection application, further onshore cable routeing work, site walkover and input from electrical design and construction specialists, and consultation with stakeholders via the EIA Evidence Plan process individual areas of search were identified for the offshore export cable, landfall, and onshore export cable.

4.4 Stage 5 and 6 Refinement of Project for PEIR; statutory consultation

55 Following the scoping phase, further consideration was given to the consideration of the areas of search and a detailed appraisal was undertaken of the offshore and onshore export cable options, and the landfall options.

56 The offshore export cable corridor, landfall, onshore cable corridor, and onshore substation, were subject to a process of multi-criteria analysis alongside a long-listing and short-listing process, in order to identify a preferred route for the purposes of PEIR. Each long-list comprised up to 20 options and was reduced to a short-list of around five to eight options which was consulted on with the ETG membership through the Evidence Plan process, including NRW, local councils and the Welsh historic environment authority Cadw.

57 For the offshore cable route, it was determined that the preferred option for offshore routeing would avoid the Constable Bank feature and route to the east, crossing the existing GyM cable and make landfall to the east of Rhyl. The easterly offshore export cable corridor, and associated landfall option offered considerably less risk from a technical, consenting and commercial perspective, and followed the advice provided by the ETG membership.

58 Following the identification of the landfall AoS, six zones along the coastal stretch were identified. Further analysis was also undertaken for the onshore cable routes, to understand potential constraints and risks which may further influence the balance of landfall options. As a result of the analysis and consultation feedback, the landfall location at Ffrith beach was progressed.

59 For the onshore cable route, a series of sixteen routes were identified. Following an appraisal of these options, eight were discounted. The remaining eight options were therefore taken forward for further consultation with the EIA Evidence Plan panel. Following consultation, it was determined that the chosen onshore route would be progressed for the purposes of PEIR.

60 For the onshore substation identification, the initial Area of Search was refined to 14 possible substation zones. The zones were each analysed, with an eventual six possible substation zones put forward for consultation through the evidence plan process. Of the possible six zones, three were discounted directly as a result of stakeholder feedback. Of the remaining three it was determined that one of the options would be discounted due to potential impacts to traffic, stakeholder feedback on archaeological risk, and ecology.

61 Of the remaining two options, the constraints on the physical availability of the land at the two substation options fed into the assessment of mitigation and access. It was determined that one zone provided a greater availability of land for potential mitigation to be implemented. Another zone was comparatively constrained by existing woodland, properties to the east, and overhead lines to the north. In addition, an assessment of the potential access to the chosen zone identified that this was significantly less constrained, with multiple options that could improve choice, and involve less highway works and the associated construction disruption. As a result, the chosen zone was brought forward for the current phase of consultation.

62 The Applicant considers that these options and refinements are sufficiently justified and refined to enable stakeholders (through the consultation process) to meaningfully comment on the proposed scheme and its potential effects on the receiving environment.

4.5 Stage 7 – Refining of the Project Between PEIR and ES/ DCO Application Submission

63 The Applicant will continue to develop and refine the project as it progresses towards a final DCO application and beyond this as it moves towards construction. This process will be informed by further stakeholder engagement and interpretation of the outputs from ongoing engineering, commercial and environmental investigations.

64 The final project boundaries that will be included with the final DCO application will represent the culmination of this iterative site selection process and will be considered reflective of the most appropriate location from a technical, commercial and environmental perspective.

5 Project description

65 This section of the NTS provides an outline description of the potential design of both the onshore and offshore project infrastructure, as well as the activities associated with the construction, O&M and decommissioning of AyM. A full project description is provided in Volume 2: Chapter 1: Offshore Project Description and Volume 3: Chapter 1: Onshore Project Description.

66 The Applicant is planning the development of AyM, located off the coast of North Wales, immediately west of and adjacent to the existing GyM, along with associated offshore and onshore infrastructure. The proposed development boundary encompasses:

- **The array area:** where the OWF will be located, which will include the WTGs, Offshore Substation Platforms (OSPs) and subsea cables;
- **The 'other wind farm infrastructure zone':** where a single meteorological mast may be located;
- **The GyM interlink area:** which facilitates a single cable connection to the existing GyM;
- **The offshore Export Cable Corridor (ECC):** where up to two offshore export cable circuits will be located to bring the power generated to shore;
- **Landfall:** where the offshore cables are brought ashore east of Rhyl and are connected to the onshore cable circuits;
- **The onshore ECC:** where the onshore cable circuits will be located; and
- **The onshore substation:** where the onshore substation will be located to facilitate transfer of electricity to the National Grid network.

5.1 Offshore

67 The number of WTGs used will depend on the individual capacity of the WTG model chosen. In any case, the number of WTGs used will not exceed 91.

68 Foundation structures are needed to securely support the WTGs, OSPs and met mast to the seabed, and will also provide safe access for O&M activities. A range of foundation types is being considered:

- **Piled foundations:** Comprising either a single pile, or a steel lattice jacket structure supported by multiple smaller piles, which are driven into the seabed;
- **Suction caisson foundations:** comprising either a single suction caisson, or a steel lattice jacket structure supported by multiple caissons, which penetrate the seabed via suction; and
- **Gravity based foundations:** comprising either a single foundation, or a steel lattice jacket structure supported by multiple legs, which sit on the seabed surface.

69 In terms of offshore cabling, the project will require array cables to connect the WTGs to each other and to the OSPs, as well as a single cable to connect the project to GyM. Up to two OSPs may be required, which act as collection points for a network of array cables from individual strings of WTGs and then transmit the electricity generated to shore via up to two offshore export cables. The offshore cables will be buried with cable protection required wherever burial is not possible.

70 Up to one meteorological mast (met mast) may be installed within the array area or within the 'other wind farm infrastructure zone' for the purposes of collecting detailed site-specific measurements of wind speed and other meteorological conditions.

71 Offshore construction is anticipated to take up to three years, after which the project is expected to be operational for approximately 25 years. Decommissioning of the project is anticipated to involve full removal of all project infrastructure, although some elements such as buried cables may be left *in situ* if it is deemed more environmentally damaging to remove them closer to the time.

5.2 Onshore

72 The onshore aspects of the development will comprise all infrastructure required to transmit the energy from the landfall to the National Grid connection at Bodelwyddan. All cable infrastructure will be buried. The key onshore components of AyM are likely to include:

- Transition Joint Bays (TJBs) at the landfall location to connect the offshore cables to the onshore cable circuits;
- Up to two onshore cable circuits; and
- One offshore substation and associated infrastructure to connect the project to the National Grid.

73 The landfall location is at Ffrith beach east of Rhyl and adjacent to Rhyl golf club. The works at landfall will include:

- Construction of the landfall temporary construction compound; and
- Works associated with trenchless techniques (such as Horizontal Directional Drilling (HDD)) or other suitable alternative techniques to install cables under the beach and/or trenching in the intertidal zone.

74 Onwards of the landfall location, cables will be buried by open trenching, with trenchless techniques used to install cables under obstacles such as roads and watercourses. Once the cables are installed, the trenches will be backfilled using excavated material.

75 The onshore substation will be located within a compound at Bodelwyddan, including planting and landscaping to ensure visibility of the structure is minimised. An onward connection to the National Grid will also be required.

6 Potential environmental effects

76 The EIA process has assessed the potential for the construction, O&M and decommissioning of AyM to create impacts upon the physical, biological and human environments, as characterised by a review and analysis of data collected via site-specific surveys, desk-based studies, peer reviewed literature, as well as modelling of specific parameters. This section of the NTS provides a summary of the assessments undertaken for AyM to date. Further, more detailed information is available within the topic-specific chapters found within the offshore and onshore volumes (Volume 2 and Volume 3, respectively) of the PEIR.

6.1 Marine geology, oceanography and physical processes

77 An assessment of potential effects on the marine physical environment considers the potential for changes in tides, currents, waves and sediment transport as a result of the proposed development during construction, O&M and decommissioning. The assessment describes the existing physical environment and is supported by existing data as well as site-specific surveys to assess the predicted effects. The full marine physical processes assessment can be found within the PEIR (Volume 2, Chapter 2: Marine Geology, Oceanography and Physical Processes).

78 AyM lies in an area with a typical spring tidal range of approximately 6.5 m, with tidal current speeds of between 0.75 and 1.0 m/s. The array area is open to north-westerly offshore waves that are generated within the Irish Sea. Locally-generated waves related to the prevailing winds come from westerly, north-westerly and northern sectors. To the north-east of the array, lies the permanent Liverpool Bay front which expands northwards from the River Dee. Stratification related to this front is predominantly associated with differences in salinity, although temperature gradients can also have a seasonal effect.

79 The seabed within the array and offshore ECC is mostly comprised of sand, with varying proportions of gravel. Net sediment transport along the north Wales coast at the seabed level is easterly, with some transport of finer material in suspension. The geology of the Awel y Môr site has been shaped by a series of glacial events during the retreat of the British Isles ice sheet and Irish sea ice stream. Overlaying the bedrock is an extensive sequence of Quaternary coarse and fine-grained sediments.

80 Water depths in the array vary between 15.2 and 41.9 m, increasing towards the north-west. Water depths in the offshore ECC generally decrease with proximity to shore.

81 The impact assessment considers a range of features, processes and pathways that may be affected by the proposed development, such as changes to Suspended Sediment Concentration (SSC), tidal and wave regimes and sandbanks. The impacts considered include changes to the marine physical environment brought about both directly (as a result of the presence of infrastructure), as well as indirectly (through changes to physical processes themselves). Embedded mitigation measures such as scour protection and cable armouring have been adopted into the project design in order to mitigate potential effects.

82 During construction, effects due to changes to SSC, sandwave clearance and seabed preparation, impacts to sandbanks and the coastline were assessed as being of ***minor adverse*** significance, which is not significant in EIA terms.

83 During O&M, the assessment concluded that effects due to changes to the tidal and wave regime, sediment transport pathways and impacts due to seabed scour would also be of ***minor adverse*** significance, which is not significant in EIA terms.

84 In the decommissioning phase, the assessment concluded that effects as a result of potential changes to SSC, as well as changes to the coastline would be of ***minor adverse*** significance, which is not significant in EIA terms.

85 In terms of cumulative effects, the assessment considered that additive effects from AyM in-combination with other plans, projects and activities such as aggregate extraction, dredge and disposal activities would not result in any significant effects. No significant transboundary effects were predicted with regard to marine physical processes on the interests of non-UK states.

6.2 Marine water and sediment quality

86 The assessment of potential effects to marine water and sediment quality covers the marine and coastal areas within 18 km of the proposed development boundary, which is approximately equivalent to the maximum theoretical spring tidal excursion. The assessment considers the potential changes in marine water and sediment quality as a result of the proposed development during the construction, O&M and decommissioning phases of the proposed development, using existing data and site-specific survey data. A full description of the assessment can be found within the PEIR (Volume 2, Chapter 3: Marine Water and Sediment Quality).

87 The offshore ECC lies within the North Wales coastal waterbody and the Clwyd transitional waterbody. The proposed development boundary is also within 2 km of five designated bathing waterbodies.

88 The sediments throughout the array area and wider study area are generally highly heterogeneous, although site-specific surveys showed that sediments in the south-west are generally coarser, with finer, sandier sediments being found further offshore. To assess the sediment quality and presence of contaminants within the array area and offshore ECC, two site-specific surveys have been undertaken. Sediment type is an important factor when considering the potential presence of contaminants; sediments with a finer particle size provide a higher surface area to volume ratio for adsorption of contaminants which may be released when sediment is disturbed. Sediments with larger particle sizes (e.g. sands) are not associated with anthropogenic contaminants.

89 Contaminant analysis revealed that metal concentrations in sediment samples were below the marine sediment quality guidelines within the array area, apart from arsenic, concentration levels of which were elevated, as a result of geological inputs from the north Wales coast region but remained below Action Levels 1 and 2 as set by the Centre for Environment, Fisheries and Aquaculture Science (Cefas).

90 In terms of SSC, monthly averaged satellite imagery of Suspended Particulate Matter (SPM) suggests that within the AyM array area, average (surface) SPM is generally greater than 10 mg/l, increasing markedly throughout winter months. SSC increases with proximity to the coast and is at its highest within inshore and nearshore areas of the offshore ECC due to a combination of enhanced re-suspension from wave activity within shallow water and fluvial input of sediment.

91 The impact assessment considers the deterioration of water quality as a result of effects including increases in SSC, the release of sediment-bound contaminants and the accidental release of pollutants. Embedded mitigation measures such as scour and cable protection, and the production of a Project Environmental Management Plan (PEMP have been incorporated into the project to mitigate against potential effects.

92 In the construction phase, the assessments concluded that potential effects as a result of deterioration in water quality due to resuspension of sediments, release of sediment-bound contaminants and the accidental release of pollutants would be of ***minor adverse*** significance, which is not significant in EIA terms.

93 During the O&M phase, it was concluded that deterioration in water quality due to the resuspension of sediments, release of sediment-bound contaminants and accidental release of pollutants would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

94 During decommissioning, deterioration in water quality as a result of resuspension of sediments, release of contaminants from sediment-bound contaminants and accidental release of pollutants would be of ***minor adverse*** significance, which is not significant in EIA terms.

95 The cumulative effects assessment considered effects on water and sediment quality from AyM in-combination with other projects and activities including aggregate dredging and cable installation and concluded that potential effects due to the release of contaminants from disturbed sediments would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms. The assessment concluded that there would be no transboundary effects in terms of marine water and sediment quality receptors.

6.3 Offshore ornithology

96 The assessment of potential impacts to offshore ornithology is focused on individual bird species and populations, rather than sites designated for birds. Only where likely significant effects on bird species are predicted, are associated designated sites taken into account, with a full HRA submitted separately within Report 5.1: Report to Inform Appropriate Assessment (RIAA).

97 The offshore ornithology study area includes the proposed AyM array area with a 4 km buffer around it, an 8 km buffer to the south of the array to cover coastal areas, as well as the offshore ECC up to the Mean Low Water Springs (MLWS) mark. The assessment considers potential effects on offshore ornithology in the construction, O&M and decommissioning phases of the proposed development, using existing data, site-specific survey data as well as results from Collision Risk Modelling (CRM) and displacement analysis. A full description of the assessment can be found within Volume 2, Chapter 4: Offshore Ornithology of the PEIR.

98 Species included within the assessment are those recorded during site-specific aerial surveys that are considered to be at potential risk from the proposed development due to being present in high abundances and those considered to be at risk due to species-specific characteristics such as flight height. The assessment is also informed by monitoring at the existing GyM site. The species considered include red-throated diver, common scoter, guillemot, razorbill and gannet. The numbers and distribution of species identified within the array are presented in full within Volume 2, Chapter 4.

99 The impact assessment considers potential effects on offshore ornithology receptors as a result of the construction, O&M and decommissioning phases of the proposed development. The key issues for the assessment are disturbance and/ or displacement of foraging seabirds and collision of individual seabirds with offshore infrastructure leading to injury or mortality. Embedded mitigation includes a commitment to a minimum wind turbine blade tip height of 22 m above Mean High Water Springs (MHWS), which reduces collision risk since the majority of birds fly below this height.

100 During construction, the assessments concluded that potential effects as a result of direct disturbance and displacement, as well as indirect effects through impacts to habitats and prey species would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

101 In the O&M phase, the assessments concluded that potential effects due to direct disturbance and displacement, indirect effects through impacts to habitats and prey species, collision risk, and barrier effects would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

102 During decommissioning, the conclusions of the assessments were that potential effects due to direct disturbance and displacement, and indirect effects through impacts to habitats and prey species would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

103 In terms of cumulative effects, the assessment considered the combined effects of AyM together with other plans, projects and activities, considering the cumulative effects of direct disturbance and displacement and the operational collision risk. Cumulative effects were concluded to be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

6.4 Benthic subtidal and intertidal ecology

104 Benthic ecology refers to seabed habitats (including intertidal) and associated animals that live on and within the seabed together with the way these interact with each other and with the wider marine system. The assessment of potential impacts to benthic subtidal and intertidal ecological receptors considers the potential effects of AyM on the subtidal and intertidal benthic ecology as a result of the construction, O&M and decommissioning of the proposed development within the study area. The study area encompasses the array area and offshore ECC, as well as an 18 km buffer around the array and an 8.5 km buffer around the offshore ECC. The assessment draws on existing data where relevant, as well as site-specific benthic characterisation surveys undertaken for the project, and an intertidal habitat survey. The full assessment can be found within Volume 2, Chapter 5 of the PEIR.

105 The AyM benthic ecology study area is categorised by coarse sediments, broadly lacking in hard substrate, with mobile sand wave features in the eastern part of the array area and the offshore ECC. The sedimentary characteristics of AyM show a spatial pattern linked to the geophysical characteristics of the seafloor, where particle size distribution is linked to the degree of sediment mobility. Isolated patches of coarser gravel, pebble and cobble were identified in the offshore ECC, characterised by species which have an affinity to coarser sediments. The site-specific surveys identified several habitat types, biotopes, biotope complexes and communities consisting of species of polychaetes, bivalves and annelids.

106 Within the intertidal, the foreshore is predominantly comprised of sand, with areas of muddy sand interspersed across the mid shore. Areas of consolidated mud are present in the mid and upper shore, as well as anthropogenic structures including an outfall pipe and sea defences, where the honeycomb worm *Sabellaria alveolata* was present.

107 The impact assessment considers the potential effects on benthic subtidal and intertidal ecology as a result of impacts including direct disturbance and temporary habitat loss, indirect effects from increases in SSC and sediment deposition, and effects due to the colonisation of seabed infrastructure. Embedded mitigation measures include definition of the proposed development boundary to minimise environmental impacts, the burial of cables where practicable, and adherence to best practice guidelines to minimise the introduction and spread of marine Invasive and Non-Native Species (INNS).

108 In the construction phase, the assessment concluded that potential effects as a result of temporary habitat disturbance, temporary increases in SSC and sediment deposition, and marine INNS would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

109 During the O&M phase, it was concluded that potential effects due to long-term habitat loss/ change, colonisation of subsea infrastructure, disturbance due to maintenance activities, disturbance due to Electromagnetic Fields (EMF), and changes as a result of changes to physical processes would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

110 In the decommissioning phase, the assessment concluded that potential effects due to temporary disturbance, temporary increases in SSC and sediment deposition, loss of habitat due to removal of seabed infrastructure, and permanent habitat loss due to infrastructure left in situ would be of ***minor adverse*** significance, which is not significant in EIA terms.

111 Potential cumulative effects considering Awel y Môr alongside other plans, projects and activities in the region were predicted to be of ***minor adverse*** significance, which is not significant in EIA terms.

6.5 Fish and shellfish ecology

112 The assessment of potential effects on fish and shellfish ecology considers the impacts as a result of the construction, O&M and decommissioning of AyM. The assessment has drawn on extensive existing data, monitoring programmes as well as regional studies and the distribution data of spawning and nursery grounds. The assessment has also drawn upon results from underwater noise modelling undertaken to investigate the impacts of underwater noise from piling during construction. The full assessment is presented in Volume 2, Chapter 6: Fish and Shellfish Ecology of the PEIR.

113 Based on existing datasets, including surveys, a wide range of species are known to inhabit the fish and shellfish study area, including cod, whiting, plaice, common sole, herring, mackerel, sandeel, spotted ray, thornback ray, dab and common dragonet. Shellfish known to occur include edible crab, queen scallop and king scallop.

114 The Irish Sea also provides important spawning and nursery grounds for a variety of species including spurdog, herring, whiting, cod and sole.

115 Several species of conservation importance have also been recorded, designated under the Habitats Regulations, including Atlantic salmon, European eel, allis shad, twaite shad, and river and sea lamprey. Other species protected under the Environment (Wales) Act include sea trout, smelt, basking shark and angel shark.

116 The impact assessment considers the potential effects on fish and shellfish ecology from impacts including direct damage and disturbance, increases in SSC and sediment deposition, noise due to piling, the release of pollutants, long-term habitat loss from the presence of seabed infrastructure, and EMF effects. Mitigation measures embedded into the project design include the use of soft-start piling, pollution control measures such as the following of a PEMP, and the burial of cables where practicable to reduce effects from EMFs.

117 During construction, potential effects from direct damage and disturbance, temporary increases in SSC and sediment deposition, release of sediment-bound contaminants, and underwater noise and vibration were concluded to be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

118 In the O&M phase, the assessment concluded that potential effects as a result of long-term habitat loss from the presence of seabed infrastructure, increased presence of hard substrate and structural complexity, operational underwater noise, EMFs, disturbance from maintenance activities, indirect disturbance from the accidental release of pollutants, and displacement of fishing pressure would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

119 In terms of decommissioning activities, the assessment concluded that potential effects would be of no greater significance than for the construction phase, if project infrastructure is completely removed during decommissioning. If it is deemed closer to the time of decommissioning that removal would result in greater environmental impacts than leaving certain components *in situ*, then leaving *in situ* may be preferable, in which case potential effects would be of no greater significance than for the O&M phase (***negligible*** to ***minor adverse***, which is not significant in EIA terms).

120 The assessment considered cumulative effects of AyM in-combination with other OWFs, cable installations, and dredge and disposal areas. The assessment concluded that potential cumulative effects from habitat loss, increases in SSC and sediment deposition, underwater noise and vibration, long-term habitat loss and EMFs would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms. It was also concluded that there would be no transboundary effects on other states as a result of the proposed development.

6.6 Marine mammal ecology

121 The assessment of potential effects on marine mammal ecology describes the potential impacts on marine mammal species that may arise from the construction, O&M and decommissioning of AyM. It considers effects within the marine mammal study area, which varies according to the management unit of the individual species in question. The marine mammal assessment has been based on existing data and site-specific aerial surveys, as well as underwater noise modelling to assess impacts associated with construction piling noise. The full assessment can be found in Volume 2, Chapter 7 of the PEIR.

122 A number of marine mammal species have been identified as being present within the marine mammal study area, including harbour porpoise, bottlenose dolphin and grey seal.

123 The impact assessment considers the potential effects on marine mammals as a result of impacts including underwater noise, vessel interactions, disturbance and seal haul-out sites, changes in water quality, and the loss of prey resources due to changes in benthic habitats and the fish and shellfish community. Mitigation measures embedded into the project design include a Marine Mammal Mitigation Protocol (MMMP) for piling, soft-start piling, and pollution prevention measures including the production of a PEMP.

124 During the construction phase, the assessment concluded that potential effects due to underwater noise, vessel interactions, changes to water quality and prey abundance would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

125 In the O&M phase, the assessment concluded that potential barrier effects, vessel interactions, changes to water quality and prey abundance would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

126 During decommissioning, effects would be similar to or less than those occurring in the construction phase. Therefore, the assessment concluded that potential effects due to underwater noise, vessel interactions, changes to water quality, and indirect impacts on prey species would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

127 In terms of cumulative effects, the assessment considered effects from AyM together with other plans, projects and activities and concluded that potential effects would be of ***negligible*** to ***minor adverse*** significance (not significant in EIA terms) for all species. With regard to transboundary effects, the assessment concluded that impacts from AyM would be localised and of negligible to minor significance, and transboundary effects were not considered further. The potential for significant effects on European designated sites in other states is specifically addressed within the HRA.

6.7 Commercial fisheries

128 The assessment of potential impacts to commercial fisheries considers impacts to commercial fishing activity, which is defined as the activity by licensed fishing vessels undertaken for the legitimate sale of finfish and shellfish. The assessment was based on multiple data sources including UK fisheries statistics, Vessel Monitoring System (VMS) data, as well as information obtained through industry consultation with local fishermen. The full assessment is presented in Volume 2, Chapter 8: Commercial Fisheries of the PEIR.

129 The key fleets operating across the commercial fisheries study area include UK vessels targeting shellfish species, in particular whelk, king and queen scallop, lobster, common prawn and crab, as well as UK vessels targeting mixed demersal species, in particular bass, flounder and thornback ray.

130 Larger vessels, including dredgers and potters, target particular species all year round, but a portion of vessels will form part of a local UK multi-purpose fleet comprised typically of vessels under 10 m in length which switch between gears to adapt to seasonal variations in fisheries.

131 Landings from the fleets in the study area in terms of landed volume and value are dominated by shellfish species; over 90% of landings between 2015 and 2019 were shellfish, whilst the remainder is accounted for by demersal species.

132 The impact assessment considers potential effects to commercial fisheries due to changes to fish and shellfish populations, safety issues, increased steaming times to fishing grounds, interference to static and mobile fishing gear, and displacement of fishing activity due to the presence of infrastructure. These potential impacts are considered in the context of different types of fishing activity (e.g. potting and beam trawling), and in the context of the country of origin. Mitigation measures embedded into the project design include liaison with commercial fisheries stakeholders, the burial of cables where practicable to prevent damage to fishing gear, regular WTG spacing and layout, and the following of a dropped objects procedure.

133 During construction, potential effects as a result of displacement of activity leading to gear conflict, disturbance to commercially important fish species, increased vessel traffic and increases in steaming times to established fishing grounds would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms. Impacts as a result of reduction in access to fishing grounds were predicted to have moderate adverse (significant in EIA terms) effects on the potting fleet in the absence of mitigation. With the application of mitigation through the Fisheries Liaison Plan (FLP), which may include co-operation agreements, the effect is concluded to be of ***minor adverse*** significance, which is not significant in EIA terms.

134 During the O&M phase, potential effects due to impacts to fishing activities, safety issues, interference with fishing gear, increased steaming times to fishing grounds, and displacement of fishing activity were assessed as being of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

135 In the decommissioning phase, potential effects were predicted to be of no greater significance than in the construction phase.

136 In terms of cumulative effects, the assessment considered that the effects of Awel y Môr in-combination with other plans, projects and activities would be of no greater significance than ***minor adverse***. The assessment of transboundary effects forms an integral part of the assessment and no significant transboundary effects were predicted.

6.8 Shipping and navigation

137 The shipping and navigation assessment considers the potential impacts arising from the construction, O&M and decommissioning of AyM on shipping and navigation receptors within the study area, which includes the array area plus a 10 nautical mile buffer, as well as the offshore ECC plus a 5 nautical mile buffer. The assessment involves a Navigation Risk Assessment (NRA), which identifies hazards and the likelihood of those hazards occurring to give a conceptual understanding of navigational risk to vessels including recreational craft, commercial traffic and fishing vessels. The full assessment is presented in Volume 2, Chapter 9: Shipping and Navigation of the PEIR.

138 In terms of the existing environment, the key navigational feature in the area is considered to be the Liverpool Bay Traffic Separation Scheme (TSS) International Maritime Organisation (IMO) adopted routeing measure, given that it dictates the majority of vessel routeing in the area. Liverpool is the busiest port in the study area, which has between 6,000 and 7,000 vessel arrivals per year. There are also five pilot boarding stations associated with the nearby ports. Two charted anchorage areas are located to the east and north east of the array, associated with the port of Liverpool.

139 The main vessel types recorded in the 2020 winter vessel traffic survey were cargo vessels, tankers and wind farm vessels. Fishing vessels, marine aggregate dredgers, tugs, passenger vessels, recreational vessels and oil and gas vessels were also recorded.

140 The impact assessment considers potential effects on shipping and navigation receptors due collision risk between vessels, allision risk between vessels and wind farm infrastructure, traffic routeing, pilotage and recreational activities. Embedded mitigation includes appropriate lighting and marking, the promulgation of information to the relevant stakeholders and marking of the wind farm on navigational charts.

141 In the construction phase, the assessment concluded that effects from increased collision and allision risk, restriction of adverse weather routeing, reduced access to ports and reduction in Search and Rescue (SAR) capabilities would be ***broadly acceptable*** to ***tolerable*** (not significant in EIA terms).

142 During O&M, the assessment concluded that effects from increased collision and allision risk, restriction of adverse weather routeing, reduced access to local ports, reduction in SAR capabilities, reduction in under-keel clearance and anchor interactions would be ***broadly acceptable*** to ***tolerable*** (not significant in EIA terms).

143 Effects during decommissioning are assessed as being no greater than those during the construction phase.

144 In terms of cumulative effects, the assessment considered that effects on shipping and navigation receptors from AyM alongside other plans, projects and activities would be ***broadly acceptable***, which is not significant in EIA terms. Transboundary effects are considered inherently within the NRA and no significant transboundary effects were predicted.

6.9 Seascape, landscape and visual impacts

145 The SLVIA considers the effects of the offshore components of AyM as a result of changes to the seascape/ landscape as an environmental resource in its own right, as well as on people's views and visual amenity. The assessment considers potential effects within a 50 km radius study area (the area that the tips of the WTGs are theoretically visible from) and uses a combination of landscape/ seascape character assessment, and computerised visual representations from a variety of sensitive viewpoints within the Zone of Theoretical Visibility (ZTV) through a site-specific survey to assess the potential effects. The full assessment can be found in Volume 2, Chapter 10: SLVIA of the PEIR.

146 The majority of the study area is covered by the sea, characterised by a number of Seascape Character Areas (SCAs) and Marine Character Areas. The southern part of the Irish Sea is a busy area, with multiple offshore activities including fishing, main shipping routes, oil and gas extraction and dredging. Offshore wind farms extend into the north-west of the study area. These activities also influence the night-time character with lighting on the main offshore platforms and wind turbines across the area. The sea is shallow, generally less than 40 m deep, and is sheltered with low tidal flows.

147 The landscape character of the study area is highly varied and derived largely from its diverse underlying geology and resulting landform. In the west lies Anglesey which is characterised by a diverse scenic coastal strip in the east with relatively little development, cliffs and bays. Separating the Isle of Anglesey and the Menai Strait from the Snowdonia foothills lies the Arfon lowland area that runs from the north-east to the south-west. To the east of the Snowdonia upland area lies the landscape of the Conwy Valley, which is the valley of Wales' longest tidal river. The valley effectively forms the border between the north-east and the north-west of Wales. To the north, the North Wales Coast extends from the prominent headland of the Great Orme in the west to the Point of Ayr in the east. This stretch of coastline is indented by a number of bays many of which are characterised by towns and villages that are popular with tourists. Further inland, the land rises providing containment to the coast and less developed uplands. This is with the exception of the lower lying Vale of Clwyd which runs away from the coast set below the Clwydian Range.

148 In terms of landscape designations, of particular importance to the SLVIA are the Anglesey Area of Outstanding Natural Beauty (AONB), Clwydian Range and Dee Valley AONB, and Snowdonia National Park, which are located at distances of 16.9km, 23.4 km and 16.6 km from the AyM array area at their closest points, respectively. There are also several areas within the study area that have been defined as Heritage Coast. On the Isle of Anglesey, these coincide with northerly parts of the Isle of Anglesey AONB coastline.

149 A number of viewpoint locations have been agreed with the SLVIA and Cultural Heritage consultees through the scoping and consultation process. These include both representative and illustrative seascape, landscape and visual viewpoints, viewpoints that are associated with the effects on the settings of cultural heritage features and assessed in Volume 2, Chapter 11: Offshore Archaeology and Cultural Heritage and locations of interest in relation to the tourism assessment included in Volume 3, Chapter 4: Tourism and Recreation of the PEIR.

150 Views of offshore wind farms can evoke a range of responses from the people who view them, with some describing them as 'intrusive', 'ugly' or 'imposing'. Others report positive visual effects of offshore wind farms, describing them as anything from 'grand' to 'inspiring' or even 'beautiful'. Although the SLVIA considers visual effects as a worst-case to be negative, it should be noted that equally, many find the visual effects to be beneficial.

151 In the construction, O&M and decommissioning phases, a range of effects on seascape character, landscape character, designated areas and viewpoints have been predicted, ranging from ***non-significant*** to ***significant***, in EIA terms. Cumulative effects are an inherent part of the SLVIA and are therefore considered within the assessments for the construction, O&M and decommissioning phases of the development. No transboundary effects are predicted to arise.

6.10 Offshore archaeology and cultural heritage

152 The assessment of potential effects on offshore archaeology and cultural heritage receptors considers the effects as a result of the construction, O&M and decommissioning of the offshore components of AyM. Data sources include existing data and maps, as well as site-specific data obtained through geophysical and geotechnical surveys. The offshore archaeology and cultural heritage baseline was assessed in relation to three themes: seabed prehistory and seabed features. The full assessment is presented in Volume 2, Chapter 11: Offshore Archaeology and Cultural Heritage of the PEIR.

153 During the seabed features assessment, a total of 494 anomalies of archaeological potential in the array area plus a 500 m buffer, and six known wrecks, including the SS Albanian and the Dublin. A total of 132 anomalies of archaeological potential were identified within the offshore ECC, none of which are designated. The fuselage of an Avro Anson bomber aircraft was located in 1993 near Rhyl Buoy, the engines of which are thought to have already been removed, however the date and circumstance of this is unknown. A survey in 2000 did not locate any more aircraft wreckage and the record was amended to 'dead'. The findspot is located within the cable route and it is recorded by the UK Hydrographic Office (UKHO) as an obstruction.

154 There are no designated or known palaeogeographic sites within the array or offshore ECC. However, there is potential for archaeological material of prehistoric origin to exist within the study area.

155 The impact assessment considered effects as a result of permanent loss or disturbance of known or potential shallow seabed receptors and prehistory receptors, indirect effects such as those from changes in sedimentation and erosion patterns. Embedded mitigation includes the production of a Written Scheme of Investigation (WSI), which will outline mitigation measures, and the implementation of Archaeological Exclusion Zones (AEZs) around features of archaeological interest, in which no works will be undertaken.

156 During construction, the assessment concluded that potential effects due to the loss/ disturbance of seabed and archaeological receptors, as well as indirect effects due to changes in physical processes would be of ***negligible*** to ***minor adverse***, which is not significant in EIA terms. ***Minor*** to ***moderate beneficial*** (significant) effects were also concluded in some cases where appropriate pre-construction archaeological investigation on seabed and prehistory receptors takes place.

157 During O&M, potential effects as a result of permanent physical loss of or disturbance of archaeological receptors, and indirect effects from changes to physical processes would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms. ***Minor*** to ***moderate beneficial*** (significant) effects were also predicted where appropriate archaeological investigation on archaeological receptors takes place.

158 In the decommissioning phase, effects were concluded to be of no greater significance than in the construction and O&M phases.

159 In terms of cumulative effects, the assessment considered the potential effects of Awel y Môr together with other plans, projects and activities. The assessment concluded that potential cumulative effects on known and unknown archaeological receptors would be of ***negligible*** to ***minor adverse*** significance. In some cases, ***minor*** to ***moderate beneficial*** (significant) effects were also predicted where appropriate archaeological investigation on archaeological receptors takes place. No transboundary effects are predicted to arise outside the UK EEZ.

6.11 Other marine users and activities

160 The assessment considers potential effects to offshore infrastructure as a result of the construction, O&M and decommissioning of AyM, including other OWFs, cables and pipelines and recreational fishing. The assessment draws on existing data, as well as industry consultation with charter anglers. The full assessment can be found in Volume 2, Chapter 12: Other Marine Users and Activities of the PEIR.

161 There are a number of operational offshore wind farms in the Irish Sea region, including the adjacent GyM, North Hoyle, Rhyl Flats, as well as Burbo Bank and Burbo Bank Extension further east. There are also numerous subsea cables in the study area associated with these projects, as well as the Eirgrid East-West Interconnector that connects the UK to the Republic of Ireland. Several of these assets will need to be crossed by the Awel y Môr offshore export cables in order to reach shore.

162 To the north of AyM and GyM, a series of manned and unmanned oil and gas platforms are located. A pipeline runs south through the existing GyM site. Extensive sand and gravel extraction operations have taken place in Liverpool Bay. Currently, there are three licenced aggregate areas in close vicinity to the Project, however none overlap with the array or ECC. Historically, significant quantities of material have been disposed of in Liverpool Bay.

163 Recreational fishing in the areas includes shore anglers, private boat anglers and charter boat operators. Private boat angling is widespread across Liverpool Bay but centres on or around launch sites, moorings and marinas. Private boat angling tends to be trailer launched with boat owners using moorings, marinas and harbour facilities that enable quick launching and safe storage during the months of more frequent fishing activity.

164 The assessment considered potential effects from the construction, O&M and decommissioning of AyM on other offshore wind farms, subsea cables and charter angling. Embedded mitigation measures include the implementation of safety zones around active construction activities, advisory safety distances, promulgation of information to relevant stakeholders, the establishment of cable crossing agreements with relevant cable operators and the use of standard industry techniques to ensure no operational impacts to other subsea cables.

165 During construction, it was concluded that effects on other offshore wind farms, cables and pipelines and charter angling would be of ***minor adverse*** significance, which is not significant in EIA terms.

166 During O&M, it was concluded that effects on cables and pipelines and charter angling would be of ***minor adverse*** significance, which is not significant in EIA terms.

167 In the decommissioning phase, effects were concluded to be of no greater significance than in the construction and O&M phases.

168 In terms of cumulative effects, the assessment considered that effects from AyM in-combination with other plans, projects and activities in the study area on charter angling would be ***minor adverse***, which is not significant in EIA terms. No transboundary effects outside the UK EEZ were predicted to arise.

6.12 Aviation and radar

169 The aviation and radar assessment considers the potential effects on military, aviation and radar receptors as a result of the presence of offshore wind farm infrastructure during the construction, O&M and decommissioning phases of the development. The full assessment is presented in Volume 2, Chapter 13: Aviation and Radar of the PEIR.

170 A number of aviation and radar receptors were identified, including National Air Traffic Services (NATS) radar systems and Ministry of Defence (MoD) operational sites at British Aerospace Engineering (BAE) Warton and Royal Air Force (RAF) Valley. Other stakeholders included Chester Airport and the Ronaldsway Airport on the Ise of Man.

171 The assessment considered the potential for effects as a result of interference to radar systems, the presence of infrastructure as obstructions, as well as impacts to flight operations. Embedded mitigation includes the notification of aviation stakeholders of the locations and specifications of infrastructure and associated construction and O&M activities, and the fitment of obstacle lighting to WTGs.

172 During construction, the assessment concluded that effects from the creation of an aviation obstacle would be of ***minor adverse*** significance, which is not significant in EIA terms.

173 During O&M, the assessment concluded that effects from the creation of an aviation obstacle, interference on military and civil aviation radar systems and impacts on offshore helicopter operations would be of ***minor adverse*** significance, which is not significant in EIA terms.

174 In the decommissioning phase, effects were concluded to be of no greater significance than in the construction and O&M phases.

175 In terms of cumulative effects, the assessment considered that effects from AyM in-combination with other plans, projects and activities in the study area on charter angling would be ***minor adverse***, which is not significant in EIA terms. No transboundary effects outside the UK EEZ were predicted to arise.

6.13 Landscape and Visual

176 The onshore Landscape and Visual Impact Assessment (LVIA) considers the potential effects to the landscape and visual receptors as a result of the construction, O&M and decommissioning of the onshore components of AyM. The assessment was informed by desk-based study, site-specific photography, modelling and photographic visualisations (photomontages) of the proposed onshore infrastructure. The study area comprises a 1 km buffer around the landfall and onshore cable route, as well as a wider 5 km buffer around the onshore substation. A full description of the assessment can be found within the PEIR (Volume 3, Chapter 2: Landscape and Visual Impact Assessment).

177 The part of North Wales in which the proposed project is to be installed has a distinct coastal landscape broadly characterised by the coastal towns and resorts which span its coastline of extensive beaches and dune landscapes. Inland from the coastline, the landscape of the study area is largely characterised by agricultural lowland landscapes which providing a rural backdrop to the coast. Further inland the landscape tends to be characterised by more elevated rolling hills of Rhos which transition to the more upland areas of the Denbigh Hills further to the south.

178 The landscape character of the landfall, onshore cable route, and proposed onshore substation is defined according to the National Landscape Character Area 'Colwyn and Northern Coastline', which is primarily coastal in character. The onshore cable route and onshore substation are not located within any designated areas.

179 Principle sensitive visual receptors within the study area include roads, settlements, recreational routes and other features from which visual receptors would experience views. The assessment identified several viewpoint locations which are described within the onshore LVIA chapter.

180 The assessment considered potential changes to physical landscape and landscape character, and effects on visual receptors. Embedded mitigation incorporated into the project design has included the site selection process, which considered landscape character and visual amenity alongside other technical and environmental constraints. For example, existing tree planting around the proposed substation area will provide visual screening for the majority of visual receptors in the area.

181 In the construction and decommissioning phases, it was concluded in the LVIA assessment that potentially significant short-term, reversible effects may occur on the physical landscape. Both ***non-significant*** and ***significant*** short-term, reversible effects were predicted to occur on landscape character, as well as on visual receptors. The predicted significant effects were predicted to occur as a result of the landfall, onshore cable route, and as a result of construction/ decommissioning of the substation.

182 During the O&M phase, the assessment concluded that there would be ***non-significant*** effects on physical landscape, landscape character and visual receptors related to the onshore cable route. With regards the onshore substation ***non-significant*** effects were predicted on landscape character after year 1, with ***significant*** and ***non-significant*** effects predicted on visual receptors in close proximity to the proposed substation zone. The assessment was undertaken on an outline worst case approach, in which a substation zone was assessed through identification of the worst-case location within the substation zone. Further refinement is anticipated to inform the final location of the proposed substation.

183 Cumulative effects were considered as part of the LVIA, with no significant effects predicted for the construction, O&M and decommissioning phases of the development.

6.14 Socioeconomics

184 The assessment of potential effects on socio-economics considered effects as a result of the construction, O&M and decommissioning of AyM, examining the interaction between the proposed development and the local and wider economy within two study areas. It also considers the potential for the local labour force to absorb new employment opportunities in terms of capacity and skills profile. The baseline description has been informed using data from the study areas using existing relevant datasets from the Office for National Statistics (ONS), which provides data on population, labour market and employment conditions, and is described in detail within the socio-economics chapter. A full description of the assessment can be found within the PEIR (Volume 3, Chapter 3: Socio-economics).

185 Specifically, the assessment considers potential effects as a result of direct and indirect employment creation, Gross Value Added (GVA) creation, the potential for displacement of workers currently employed in other industries, and demand for housing. Embedded measures incorporated into the project design to mitigate potential adverse effects include ensuring access for local businesses and supply chains and access for local employment opportunities.

186 The assessment concluded that potential effects during construction, O&M and decommissioning as a result of the impacts of direct and indirect employment creation, direct and indirect GVA creation, local employment, employment displacement, and impacts on demand for housing and accommodation would range from minor adverse to minor beneficial, which are not significant in EIA terms. Beneficial effects are expected in terms of employment and GVA creation, as well as through local employment. No significant adverse effects are anticipated with the construction and operation of the project.

187 Cumulative effects as a result of Awel y Môr combined with other plans and projects in the region were concluded to be of ***negligible significance*** across all receptors, which is not significant.

6.15 Tourism and Recreation

188 The assessment considers the potential effects on tourism and recreational activities within the study area, including both onshore and offshore receptors, during the construction, O&M and decommissioning phases of AyM. The assessment of impacts to tourism and recreation identified four main study areas, focusing on direct and indirect onshore and offshore receptors, depending on the nature of the receptor assessed. The description of the existing environment draws on a review of existing data and includes maps, relevant legislation and policy and internet searches, as well as site-specific walkover surveys to identify additional features and levels of public use. A full description of the assessment can be found within the PEIR (Volume 3, Chapter 4: Tourism and Recreation).

189 The study identified onshore recreational resources including the tourism economy, Public Rights of Way (PRoW) and promoted trails and footpaths as resources that could potentially be affected by AyM. The study noted that nearly all of the resources identified appeared to be moderately used, however operating within their carrying capacity and aided by good levels of maintenance.

190 In terms of offshore recreational resources, the study identified bathing waters, water sports activities, sailing and recreational angling (as well as bait collection) as potential receptors. A full description of these offshore resources is provided within the tourism and recreation chapter.

191 The tourism economy is largely seasonal and is based on the more traditional seaside destinations, however the area benefits from all-weather attractions which encourage tourism all year round and varies considerably across the wider study area. Data suggests that tourism contributes over £1.47 billion to the Welsh Economy, although employment supported directly by tourism within the wider study area is comparable to that found nationally (around 14%).

192 The assessment considered potential effects on onshore and offshore recreational receptors, as well as on the tourism economy, as a result of restriction of access, modifications to rights of way, restrictions on parking, restriction of access to marine recreation, and visual intrusions arising from the proposed project. Embedded mitigation includes keeping PRoW and promoted trails and footpaths open where practicable and reinstating disturbed PRoW following construction activities, as well as careful routeing of the onshore cable to avoid key areas of sensitivity.

193 During construction, potential effects due to direct and indirect effects on onshore and offshore recreation and utility users, with the exception of the Rhyl Golf Course and Llandudno, would be of ***negligible*** to ***minor adverse significance***, which is not significant. The predicted effect for Rhyl Golf Course and Llandudno is short term, reversible and of ***moderate adverse significance*** which is significant in EIA terms.

194 In the O&M and decommissioning phases, potential direct and indirect effects on onshore and offshore recreational users, as well as effects on the tourism economy were concluded to be of ***negligible*** to ***minor adverse significance***, which is not significant in EIA terms.

195 The assessment concluded that there were limited projects that would contribute to cumulative effects for onshore or offshore tourism and recreation receptors, and no significant effects identified.

6.16 Biodiversity and Nature Conservation

196 The assessment of potential effects on onshore biodiversity and nature conservation considered the impacts to sensitive onshore ecological receptors as a result of the construction, O&M and decommissioning activities associated with AyM, including terrestrial ecology and ornithology. For onshore biodiversity, the study area was based on a 2 km zone around the onshore project boundary. The assessment draws on existing data sources to identify nature conservation sites, as well as site-specific ecological surveys to identify the habitats and species present that could potentially be affected by AyM. A full description of the assessment can be found in Volume 3, Chapter 5: Onshore Biodiversity and Nature Conservation of the PEIR.

197 The onshore elements of AyM are located on the North Wales coastline on low-lying, predominantly agricultural, land situated between the towns of Rhyl, Rhuddlan and the St. Asaph Business Park (SABP). the River Clwyd bisects the study area, flowing from St Asaph northward into Rhyl.

198 There are a number of designated sites close to the study area, including Local Wildlife Sites (LWSs), Special Protection areas (SPAs), Special Areas of Conservation (SACs), Ramsar sites, Local Nature Reserves (LNRs) and Sites of Special Scientific Interest (SSSIs).

199 Habitats in the study area include cropland, fen marsh and swamp, neutral and modified grassland, hedgerows, scrub, standing and open water, rivers and streams, woodland, urban areas and beach sediments at the landfall.

200 Within the mosaic of habitats, there is the potential to support several notable and protected species, including bats, Great Crested Newts (GCN), water vole, badger, breeding and over-wintering birds, terrestrial and aquatic invertebrates, and vascular plants.

201 The assessment considered potential effects on ecological receptors as a result of direct damage and disturbance, habitat loss and pollution effects. Mitigation measures embedded into the project design include the use of existing field access points where possible, the storage of topsoil (including the seedbank) in affected areas for re-instatement, protected species licensing and the implementation of a Landscape and Ecological Management Plan (LEMP).

202 The assessment concluded that following the implementation of appropriate mitigation measures, potential effects from accidental lethal or non-lethal injury, habitat loss, disturbance and accidental pollution would be ***non-significant*** in EIA terms.

6.17 Ground Conditions and Land Use

203 The assessment considers the potential effects on ground conditions, flood risk and land use due to activities associated with the construction, O&M and decommissioning of the onshore components of Awel y Môr. The study was based on a review of existing data sources such as the British Geological Survey (BGS) and Natural Resources Wales (Lle), as well as the findings of site-specific walkover surveys. The study area comprised the proposed onshore development boundary as well as a 1km buffer around the proposed onshore substation at Bodelwyddan, and a 250m buffer around the landfall and cable route. A full description of the assessment can be found within the PEIR (Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use).

204 Land use within the Ground Conditions and Land Use study area is predominantly agricultural, situated between the settlements of Rhyl, Rhuddlan and St Asaph. The River Clwyd crosses the study area, flowing from St Asaph northward to the west of Rhyl. A number of other NRW designated main rivers also cross or are evident within the onshore ECC and the wider Ground Conditions and Land Use study area. Land to the south-west of the River Clwyd crossing is predominantly agricultural, with flat, low-lying land within the Clwyd valley, close to the estuary. Further south towards the A55 and beyond, land begins to rise up with more undulating topography. Field boundaries are typically well-established hedgerows and sometimes drystone walls. Woodlands and hedges are more common in this area.

205 There are no geological designations within the study area, and also no groundwater special protected zones. The majority of the study area is classified as of grade 3a or 3b good to moderate, or moderate, quality agricultural land. The superficial geology is generally classified as Glacial Till, with Marine Beach Deposits at the landfall location.

206 The assessment identified several sensitive receptors including soil land quality receptors. It considered the potential effects of AyM on ground conditions, and land use as a result of works. Embedded mitigation includes implementation of a Pollution Prevention and Emergency Incident Response Plan (PPEIRP), a Soil Management Plan (SMP), and adherence to a Code of Construction Practice (CoCP), and the effective design of site drainage to ensure that flood risk is minimised (including utilising Sustainable Urban Drainage Systems (SUDS) principles).

207 During construction, the assessment concluded that potential effects on soil and land quality would be of negligible to minor adverse significance, which are not significant in EIA terms.

208 In the O&M phase, it was concluded that potential effects on soil resource and land quality, in particular at the proposed substation, would be of negligible to minor adverse significance, which is not significant in EIA terms.

209 In the decommissioning phase, it was concluded that potential effects on soil and land quality would be of negligible to minor significance.

210 The cumulative effects assessment considered AyM alongside other planned and proposed projects and concluded that there were no significant effects.

6.18 Hydrology and Flood Risk

211 The assessment considers the potential effects on hydrology, hydrogeology and flood risk due to activities associated with the construction, O&M and decommissioning of the onshore components of Awel y Môr. The study was based on a review of existing data sources such as the BGS and NRW flood risk data, as well as the findings of site-specific walkover surveys. The study area comprised the proposed onshore development boundary plus a 1 km buffer around the proposed onshore substation, and a 250 m buffer around the landfall and the onshore ECC (including access routes and Temporary Construction Compound (TCC) areas). A full description of the assessment can be found within the PEIR (Volume 3, Chapter 7: Hydrology, Hydrogeology and Flood Risk).

212 The coastal area at the proposed landfall is between the relatively densely populated settlements of Rhyl and Prestatyn. Pedestrian footpaths are present directly adjacent to the beach, as is a golf course and caravan park. Man-made sea-defences including imported rocks are present, along with groynes which serve shingle and sand beaches.

213 Land use within the hydrology, hydrogeology and flood risk study area is predominantly agricultural, situated between the towns of Rhyl, Rhuddlan and St Asaph. The Afon Clwyd bisects the onshore ECC study area, flowing from St Asaph northward into Rhyl. A number of other NRW designated main rivers also cross or are present within the onshore ECC and the wider hydrology, hydrogeology and flood risk study area.

214 Land to the east and south of Rhyl is predominantly agricultural, low-lying land with a network of drainage ditches. Hedgerows and woodland are relatively scarce and limited to field boundaries.

215 Land to the south-west of the Clwyd crossing is predominantly agricultural, with relatively flat, low-lying land within the Clwyd valley, close to the Clwyd Estuary. Further south, towards the A55 and beyond, land begins to rise with more undulating topography. Field boundaries are typically well-established hedgerows and sometimes drystone walls. Woodlands and hedges are more common in this area.

216 The assessment identified several sensitive receptors including surface water quality, groundwater, and flood risk receptors. It considered the potential effects of AyM as a result of works. Embedded mitigation includes implementation of a PPEIRP, preparation of a Flood Response Plan, adherence to a FRP, and the effective design of site drainage to ensure that flood risk is minimised (including utilising SUDS principles).

217 During construction, the assessment concluded that potential effects on surface water, groundwater, and flood risk would be of ***negligible*** to ***minor adverse*** significance, which are not significant in EIA terms.

218 In the O&M phase, it was concluded that potential effects on surface water, groundwater, and flood risk, in particular at the proposed substation, would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

219 In the decommissioning phase, it was concluded that potential effects on soil and land quality would be of ***negligible*** to ***minor adverse*** significance.

220 The cumulative effects assessment considered Awel y Môr alongside other planned and proposed projects and concluded that there were no significant effects.

6.19 Archaeology & Cultural Heritage

221 The onshore historic environment assessment considered the potential for the construction, O&M and decommissioning of AyM to have effects on the archaeology and cultural heritage of the study area, which included the proposed onshore development boundary, as well as a 500 m buffer in all directions, and potential effects from offshore (wind turbines) on onshore receptors (historic setting). This was to allow information on heritage assets in close proximity to AyM to be collected in order to fully understand the potential for as-yet unrecorded assets. In order to understand the significance of potential effects, baseline data has been reviewed to identify known or suspected archaeological sites within the site boundary, and to characterise the heritage resource from the study area. A full description of the assessment can be found within the PEIR (Volume 3, Chapter 7: Onshore Historic Environment).

222 The study area for the onshore historic environment reveals the coastline and onshore cable route to have potential interest that ranges from early prehistoric populations at Prestatyn and Rhyl, through to potential bronze age finds at landfall, and The Castles and Town Walls of King Edward in Gwynedd (a United Nations Educational, Scientific and Cultural Organisation (UNESCO) -designated World Heritage Site). Whilst there is limited evidence of Romano-British influence and limited medieval settlement, evidence indicates small medieval settlements present at Cefn Du and Rhyd Orddwy, and a possible Romano-British enclosure at Bryn Cwnin.

223 The assessment considers the results of a combination of desk-based study and site-specific geophysical survey. The assessment identified evidence of prehistoric settlement near the River Clwyd, with the desk top study reporting finds from the Rhuddlan area noted as including flint, and a Neolithic axe. There is also evidence of bronze age activity in the area, and iron age settlement to the north of the onshore cable route.

224 More recent Historic Assets of interest identified in the study area, include Pengwern Hall, the Chain Radar Station at Rhuddlan, and Bodelwyddan Registered Park and Gardens. Further afield, sites considered for the potential effect on historic setting that may occur as a result of the offshore wind turbines, include Beaumaris Castle, the Menai Bridge, and The Castles and Town Walls of King Edward in Gwynedd World Heritage Site.

225 Within the wider region outside of the study area, there are a number of designated heritage sites along the north coast, comprising mainly Grade I and Grade II listed buildings, scheduled monuments, and the World Heritage Site.

226 The assessment considered potential direct and indirect effects on archaeological receptors, as well as effects due to changes in setting as a result of the proposed development. Embedded mitigation included careful routeing of the onshore cable route to avoid key areas of sensitivity, and the production of an agreed programme of archaeological work as identified through further work.

227 In the construction/ decommissioning phases, the assessment concluded that potential effects as a result of disturbances of would be of ***negligible significance***, which is not significant in EIA terms.

228 During the O&M phase, potential effects resulting from changes in setting of the identified Heritage Assets, including Conservation Areas and listed buildings were concluded to be of ***negligible*** to potential ***moderate adverse significance***. All potentially significant effects relate to change in setting.

229 The cumulative effects assessment concluded that no adverse cumulative effects were anticipated.

6.20 Traffic and Transport

230 The assessment of potential effects on traffic and transport as a result of the construction, O&M and decommissioning activities associated with AyM within an identified study area defined as the highway network around the proposed project boundary. The study was informed by an initial desktop study to identify potential construction access routes, highway infrastructure and transport facilities within the proximity of the proposed development. Review of existing data, as well as the undertaking of surveys including automated and manual traffic counts also informed the assessment.

231 In order to assess the potential effects of the construction phase of AyM on driver severance and delay, the peak hours on the highway network have been identified using the existing Department for Transport and Automatic Traffic Count (ATC) data. A correction factor, agreed with statutory advisers, has been applied to account for changes in baseline traffic numbers associated with the outbreak of COVID-19, and the associate downturn in general activity. A full description of the assessment can be found within the PEIR (Volume 3, Chapter 8: Traffic and Transport).

232 The local highway network includes the A548, the A525 between Rhyl and the A55 Junction 27, Sarn Lane, and Glascoed Road. The A525 and A55 are dual carriageways subject to the national speed limit (70 mph). the A525 acts as the main connection between Rhyl and Newcastle under Lyme in England. The A55, also known as the North Wales Expressway, connects Chester to Holyhead carrying a significant amount of traffic on a daily basis.

233 Detailed vehicle, cyclist and pedestrian counts are presented within the traffic and transport chapter, however light goods vehicles make up the majority of the baseline vehicle flows. Accident trends or clusters were identified within the study area, on the Rhyl Coast Road (A548), the A525 between Rhyl and Rhuddlan, and the A547. The baseline environment also includes pedestrian, cycle, and bus routes within the local area.

234 The assessment considered the potential effects on traffic and transport receptors due to construction traffic associated with AyM. As part of the embedded mitigation, a Traffic Management Plan to manage and control vehicle movements will be developed, and certain key roads will have the cables installed underneath them via horizontal directional drilling rather than trenching.

235 In the construction, O&M and decommissioning phases of the development, the assessments identified that there would be no significant effects due to impacts including delays to drivers, public transport or pedestrian amenity, PRoW crossings, or accidents and safety. The assessment concluded that all potential effects would be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

236 Any potential cumulative effects arising from AyM considered alongside other plans and projects were assessed as ***negligible*** to ***minor adverse***, which is not significant in EIA terms.

6.21 Airborne Noise and Vibration

237 The noise and vibration assessment examines the potential effects that may be generated through the construction, O&M and decommissioning of AyM upon sensitive areas or premises used by people. To inform the study, calculations were made based on the attenuation of noise from various activities including construction noise associated with excavation and cable laying, piling at the substation, noise from construction traffic, and noise from the operational substation. A full description of the assessment can be found within the PEIR (Volume 3, Chapter 10: Noise and Vibration).

238 The existing baseline has been characterised by a baseline sound survey undertaken in 2021 at multiple locations that were representative of noise sensitive receptors in the vicinity of Awel y Môr. The existing environment currently comprises a mix of rural, industrial, commercial and recreational uses. The existing ambient noise environment at each of the locations is described in detail within the noise and vibration chapter.

239 The assessment considered potential effects as a result of impacts due to temporary construction noise, construction traffic, offshore piling, and the operation of the onshore substation. Embedded mitigation measures include the production of a Noise and Vibration Management Plan within the CoCP, which would set out requirements for construction such as the use of effective silencers and noise insulation on plant, and the use of local noise screening where necessary.

240 It was concluded that potential effects in the construction phase as a result of construction noise, traffic noise, vibration and offshore piling noise would be of ***negligible*** to ***minor adverse*** significance with mitigation, which is not significant in EIA terms.

241 In the O&M phase, it was concluded that potential effects from operational fixed plant (the substation) would be of ***minor*** adverse significance with mitigation, which is not significant in EIA terms.

242 Potential effects from decommissioning activities through decommissioning noise and traffic noise were concluded to be of ***negligible*** to ***minor adverse*** significance, which is not significant in EIA terms.

243 The cumulative effects assessment considered the potential effects of AyM in-combination with other plans and projects in the area. No significant cumulative effects are predicted.

6.22 Air Quality

244 The air quality assessment has assessed the potential effects on air quality as a result of the onshore construction, O&M and decommissioning activities of AyM, including the landfall, onshore cable route, and substation. The assessment draws on existing data and air quality management reports by local authorities, as well as predicted traffic counts defined by the project description. A full description of the assessments can be found within the PEIR (Volume 3, Chapter 11: Air Quality).

245 AyM is not located within any Air Quality Management Areas. The nearest (non-automatic) air quality monitoring stations are located around 0.7 and 2.5 km to the south of the proposed development boundary. Data from these stations between 2015 and 2019 showed that there have been no exceedances of Air Quality Objectives (AQOs for NO_2 or PM10).

246 The assessment of potential effects on air quality as a result of impacts of construction dust and construction vehicle and plant emissions on human and ecological receptors. Mitigation measures embedded into the project design include the implementation of a construction management plan for traffic, and the following of standard guidance measures and principles of good practice.

247 During construction, the assessment concluded that potential effects due to increases in road traffic generated pollutant concentration and impacts from dust on human and ecological receptors would be of ***negligible*** significance, which is not significant in EIA terms.

248 In the O&M phase, potential effects due to increases in traffic generated air quality pollutant concentrations on human and ecological receptors would be of ***negligible*** significance, which is not significant in EIA terms.

249 During decommissioning, potential effects due to dust impacts on human and ecological receptors would be of ***negligible*** significance, which is not significant in EIA terms.

250 The cumulative effects assessment considered the onshore elements of Awel y Môr alongside other planned projects and developments in the area, including residential development, and solar farms, and concluded that potential cumulative effects would be of ***negligible*** significance, which is not significant in EIA terms.

6.23 Public Health

251 The health assessment chapter (Volume 3, Chapter 12: Public Health) draws primarily on other assessments such as air quality, traffic, noise, hydrology, and tourism to understand the implications of AyM on public health. In addition to these topics the public health chapter considers the potential effects associated with electromagnetic fields that may be emitted by AyM.

252 As the onshore export cable circuits will be buried, potential impacts from electric fields have been scoped out from detailed assessment as burial is recognised as mitigating the potential effects.

253 Further to this all infrastructure built will comply with the government guidelines on electromagnetic radiation emission. The embedded mitigation in place as well as no conclusive scientific evidence relating EMF and certain health effects leads to the assessment concluding the effect to be of ***negligible adverse*** significance, which is not significant in EIA terms.

254 All other effects on public health are considered to be of ***negligible*** to ***minor adverse*** significance with mitigation, which is not significant in EIA terms.

7 Next steps and further information

255 The Statement of Community Consultation (SoCC) for AyM was consulted on from 9th July 2021 until 9th August and details how the consultation process on the PEIR, which runs from 31st August 2021 to 11th October 2021, will work.

256 The PEIR is to be issued digitally, which corresponds with existing good practice during the COVID-19 pandemic, and the guidance of the Planning Inspectorate. Government regulations have permanently lifted the requirement to make consultation materials available in hard copies at select physical locations (Infrastructure (Publication and Notification of Applications etc.) (Coronavirus) (Amendment) Regulations 2020).

257 However, subject to COVID-19 restrictions, the Applicant aims to deposit hard copies of select consultation materials at several deposit locations within North Wales. The materials provided in hard copy may include (including Welsh Language versions):

- Hard copies of the SoCC;
- This NTS of the PEIR; and
- The Consultation Questionnaire.

258 Please check the project's dedicated website for further details (www.awelymor.cymru).

259 The full PEIR is available in English language in digital format from the project website. This non-technical summary of this PEIR provides a brief overview of all of the technical topic assessments, as well as the site-selection process that has led to the scheme design envelope. The full PEIR, including non-technical summary, is available at:

- www.exhibition.awelymor.cymru/

260 Physical hard copies of the non-technical summary are also available (including Welsh language versions) on request by contacting:

- Email: awelymor@rwe.com
- Telephone: 0800 1978232
- Or write to us at:

  Awel y Môr Offshore Wind Farm Ltd
  RWE Renewables UK Ltd
  Windmill Hill Business Park
  Whitehill Way
  Swindon
  SN5 6PB

261 As part of the consultation process, virtual exhibitions will be run via the project website during the statutory consultation (31st March to 11th October). The project team will also run online information sessions throughout the statutory consultation period; please refer to the dedicated project website for more information.

262 Responses to this consultation must be received by AyM by 5pm on 10th October 2021 for comments to be considered. Please note that, though we will endeavour to consider any consultation responses received after this date, we cannot guarantee this. If you would like to comment on or make suggestions about the AyM project, you can do so in any of the following ways:

- By completing a paper copy of the questionnaire, available at the project website (www.awelymor.cymru/);
- Or by contacting us to request a hard copy be sent to you via the following methods:
  - On the project website (www.awelymor.cymru);
  - By email (awelymor@rwe.com); or
  - In writing to:

    Awel y Môr Offshore Wind Farm Ltd

    RWE Renewables UK Ltd

    Windmill Hill Business Park

    Whitehill Way

    Swindon

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